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The Impact of Migration to the United States and Costa Rica on Nicaraguan Fertility

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ABSTRACT

We examine the impact of migration to the United States and Costa Rica on the fertility of Nicaraguan women, using the Latin American Migration Project (LAMP-NIC5). Focusing on the differential influences of migration to these two countries, we analyze women's transitions to first and subsequent births. Preliminary results based on the transition to first and second births indicate that 1) migration to Costa Rica prior to marriage shortens the interval to first birth, and 2) international migration has a negative effect on the likelihood of second births, particularly for husbands with U.S. migration experience. Analyses currently in progress include: a larger sample population, measures of both women's migration and community context, and estimates of the likelihood of higher order births.

INTRODUCTION

Research on the link between migration and fertility often examines this relationship among migrants by exploring differences in fertility using nativity status or duration of residence in the host country. This approach allows researchers to answer questions about individuals who migrate and successfully maintain residence in the host country. Such studies are 1) likely based on a select sample of individuals, 2) unable to examine the impact of the temporary migration of one spouse, and 3) limited in their ability to address issues relating to the influence of international migration in the sending community. These limitations are problematic, particularly when women are the units of analysis, since in many cases such as Nicaragua, they remain considerably less likely to migrate than men (Ton 2000). In addition, temporary and seasonal migration constitutes a significant flow of migration from Latin America; research indicates that a large amount Nicaraguan migration to Costa Rica is indeed temporary (Ton 2000). Furthermore, transnational migration further implicates limitations in studying the effects of migration using nativity or duration of residence, as well as the potential for broader influence on the sending society.

Where nativity status or duration of residence in the host country are used as measures of the influence of migration on fertility, the question to be answered is often one about the changes that occur in attitudes, behaviors, or economic conditions over time in the host country. That is, such research may inform us about the process of assimilation. However, questions about the influences of international migration on non-migrants and return migrants are not addressed with such methods, therefore leaving a gap in knowledge about the effects of separation among couples that occurs when one spouse migrates. Furthermore, such studies are unable to address the issue of how a migration experience may influence those who do not remain in the

destination area. More recent data collection efforts, however, increasingly provide researchers with the ability to examine migrant sending communities and the effects of return migration.

This paper seeks to advance the literature on the migration-fertility relationship by examining the roles of assimilation/cultural adoption, separation and selection on the fertility of women in Nicaragua, using a unique dataset containing information on migration to the United States and Costa Rica that allows us to assess the impact of this movement on women's likelihood of giving birth. To do so, we compare the transitions to first and second births among women whose husbands have migrated and returned to those with non-migrant husbands, controlling for a number of characteristics known to influence both fertility and migration. Furthermore, our analysis provide preliminary evidence of the influence of fertility on migration to investigate the possibility that such movement occurs in response to an increase in family size.

Although relatively little attention has been devoted to Nicaraguans in this area of research, the demographic characteristics of the country make it a highly relevant context within which to study the migration-fertility relationship. More specifically, Nicaraguan fertility rates are higher than the regional average (Gilbert 1994), and experience with migration is relatively common due to historical refugee outflows and the availability of agricultural employment opportunities (Funkhouser 1992; Ton 2000). This provides a good setting in which to examine the role of migration in discouraging or promoting fertility. Such an approach is contrary to the usual concern of research in this area, which seeks to understand the implications of immigration from countries with high fertility for low fertility, immigrant-receiving societies.

MIGRATION AND FERTILITY

A number of different explanations for the link between migration and fertility have been proposed. The most prominent of these relate to the roles of selection in the process of

migration, cultural influences, and disruption effects. The available literature on these explanations provides mixed support and often concludes that they are not mutually exclusive. That is, evidence of these three hypotheses varies, and it is not uncommon for research to find support for more than one in the same context. In this paper, we focus on the assimilation/cultural adoption, separation, and selection hypotheses in efforts to account for patterns in the relationship between international migration and the fertility of Nicaraguan women.

The assimilation, or cultural adoption, hypothesis has a rich tradition in the literature on the impact of migration on individuals and immigrant groups. This hypothesis suggests that migrants will gradually adopt fertility related norms and values to which they are exposed in the destination area (see, for example, Lindstrom and Saucedo 2002; Singley and Landale 1998). That is, when immigrants encounter fertility behavior different from their own, they will gradually adjust their behavior to resemble that of the culture in which migration immerses them. For example, migration to the U.S. from developing nations where fertility is high should result in an eventual decline in the fertility of such immigrants. In looking at the role of cultural adoption in influencing fertility in the sending society, we can infer that migrant's experiences may influence them in a manner that persists upon return home. For example, return migrants may bring with them altered attitudes or innovative information and ideas that may, in turn, shape their fertility behavior.

In the case of Nicaraguan migration, we might expect the role of assimilation in fertility decline to be minor and perhaps negligible among those with migration experience to Costa Rica, where fertility rates differ only slightly. However, Nicaraguan immigrants with exposure to the U.S. should demonstrate decreases in fertility, according to this theory. In hypothesizing

the role of cultural adoption in changing the fertility of immigrants, it is important to note gender differences in migration experiences. That is, while men who migrate often do so with the intention of generating income and returning home to their usual way of life, women often find the experience of migration as liberating (Pedraza 1991). This is particularly so when women from patriarchal societies migrate to places like the U.S. that are somewhat more egalitarian. Overall, this would lead us to expect that women's migration experiences are more relevant in the context of assimilation, and there may be only minor, if any, effect of men's migration.

The separation hypothesis, sometimes referred to as the disruption effect, suggests that migration may impede fertility (Hervitz 1985; Lindstrom and Saucedo 2002; Stephen and Bean 1992; Yang 2000). Perhaps the most obvious mechanism through which migration affects fertility is by way of decreased exposure to intercourse associated with the physical separation of spouses that may occur due to the movement of one spouse without the other. Although long or frequent separations may yield a reduction in completed fertility (Lindstrom and Saucedo 2002), the primary impact of separation is expected to be temporary. Another possibility put forth in the separation hypothesis is that couples will "make up" for time apart by increasing coital frequency. When this pattern prevails, the negative impact of separation will be rather quickly counterbalanced by attempts to achieve the desired number of children. Overall, this hypothesis implicates a negative effect of migration on fertility (during the time of separation) and a rather immediate positive effect after the reunion of couples takes place.

The selection hypothesis posits that migrants are a distinct group of individuals whose fertility levels are different overall from their non-migrant counterparts (Hervitz 1985; Lindstrom and Saucedo 2002; Singley and Landale 1998). In other words, "The selectivity hypothesis refers to the tendency for migrants to be selected for individual characteristics that are associated

with lower- or higher-than average fertility" (Lindstrom and Saucedo 2002: 1347). The characteristics that serve to distinguish migrants from non-migrants may be differences in human capital or social-psychological factors (e.g., aspirations, preferences, etc.), among others, and as such, may be observed or go unmeasured (Kanaiaupuni 2000). Data available for the study of immigrants often do not contain the detail to control for all factors that differentiate the two groups. Therefore, support for the selection hypothesis tends to be indirect, particularly when looking at return migrants.

THE CONTEXT OF NICARAGUA

Like many Latin American countries, high fertility rates, declining mortality rates, and resulting population increase characterize Nicaragua. In fact, Nicaraguan total fertility rates exceed the regional average, despite having a number of female-headed households, high rates of maternal mortality, and the highest women's labor force participation rate in Central America (Gilbert 1994; Metoyer 2000). The country's high fertility rates reflect, in part, low levels of literacy and education among women, an emphasis on reproduction (Metoyer 2000), and young ages of sexual initiation (Gilbert 1994). Recent results from the Demographic and Health Survey, however, suggest that fertility may be declining (Population Council 2000). For example, the United Nations estimates a total fertility rate (TFR) of 4.9 from 1990-1995, while survey estimates of the TFR are 3.9 for 1993-1998.

Compared to research on Nicaraguan fertility trends, considerably more ambiguity exists regarding migration patterns, which is attributable, at least in part, to the relative difficulty in measuring migration. According to 1990 U.S. Census figures, Nicaraguans made up 1 percent of the 1980-1990 foreign-born population with approximately 170,000 individuals in the U.S. hailing from this country (Hirschman 1996; see also Rumbaut 1994). The influx of this group of

immigrants to the U.S. occurred largely as a result of an exodus of individuals fleeing political turmoil. Although this estimate likely understates the amount of Nicaraguan migration to the U.S. in that it does not include temporary or return migrants and may fail to account for those living in the country illegally, it provides some indication of the volume of immigrants.

Another common destination country for Nicaraguans is Costa Rica. While immigration laws have changed over time, particularly with regard to refugees, Costa Rica has generally welcomed Nicaraguan immigrants (Basok 1990). According to one report, Nicaraguan immigrants have certain characteristics that place them at an advantage in terms of acceptance into Costa Rica. That is, they are largely young, male agricultural workers seeking admittance into a country where less than one-third of the population works in agriculture (Encuesta Nacional de Hogares, Empleo y Desempleo, July 1989 cited in Basok 1990). Another study concurs that Nicaraguan women tend not to migrate largely due to domestic obligations (Ton 2000). Furthermore, those who do migrate to Costa Rica tend to do so overwhelmingly for employment as domestic workers.

Examining migration from one area of Nicaragua, Ton (2000) finds that 1) age is strongly correlated with migration to Costa Rica—younger men are much more likely than older men, 2) much migration occurs as Nicaraguans seek seasonal agricultural employment in Costa Rica, and 3) seasonal migration is not limited to areas of Nicaragua directly bordering Costa Rica, as suggested by past research. When men do migrate, they tend to do so alone because of relatively high costs of living incurred while in Costa Rica. Furthermore, the author notes that migration is based on economic calculations of the costs and benefits, since migration is a major source of cash for many smallholders. In fact, "For many households, migration income was the prime

cash generator, not only for consumer goods, but especially for agricultural inputs and debts" (Ton 2000, 217).

Looking at migration from Nicaragua more generally, Funkhouser (1992) finds that approximately one-tenth of the population emigrated. Although he provides no indication of destination area and proportions who return to Nicaragua, his findings suggests that emigrants are indeed a select group of individuals. More specifically, emigrants are typically working age, better educated, and leave from larger, wealthier households in Nicaragua. Selectivity on such characteristics is important since these are also determinants of fertility. Overall, what is known about the fertility and migration patterns of Nicaraguans provides a good starting point to examine the relationship between these two factors and suggest that this context, while somewhat unique, can inform concerns about the demographic situation in Latin American countries today.

DATA

We utilize retrospective life history data collected from 2000 to 2001 in two Nicaraguan communities and in selected U.S. and Costa Rican migrant settlement areas as part of the Latin American Migration Project (LAMP). The sample consists of 200 households from the first community and 195 households from the second community, selected through simple random sampling. Sampling frames were constructed by conducting a census of all dwellings in the community, or specific working-class neighborhoods in the case of large urban areas. The first community is located in the western part of the country roughly fifty kilometers away from the capital city of Managua. The second community is situated one hundred kilometers east of Managua. These communities include neighborhoods and small towns, and were selected to represent a range of sizes, economic bases, and migration levels.

Interviews were conducted using ethnosurvey methods to gather information on a number of individual and household characteristics, including social, economic, and demographic factors. Respondents were asked whether household members had ever migrated to the United States and/or Costa Rica. If migration did occur, more detailed information was collected, including the timing and duration of the first and last trip. With regard to concerns about recall bias, Massey and colleagues found migrants recollection of retrospective details to be accurate (Massey et al. 1987; Massey and Zenteno 2000).

Household records are used to reconstruct our sample population. Of the 3,108 individuals included in the LAMP survey, we limit our sample to women who are household heads or spouses of household heads, excluding those missing husband's information[1]. The reduced sample (N=386) is used to construct two event history files in which each woman contributed one record for each year she was at risk of first and second birth. The final analysis files consist of 646 person-year observations for the first transition and 1,021 person-year observations.

MEASURES

Dependent Variables. The first dependent variable, risk of first birth, is measured dichotomously as whether the woman had a first birth (coded 1) and is defined in terms of discrete time units. More specifically, we construct this measure using the year of first birth as reported by the respondent at the time of survey. Our second dependent variable, risk of second birth, is again measured dichotomously as whether the woman had a second birth (coded 1), given that she already had a first birth. Respondent's who did not experience the event of interest (first or

[1] Cases without husband's information include women who are separated, divorced, or widowed at the time of survey. Unfortunately, the LAMP did not ask women to report information for ex-husbands.

second birth) were censored at the year of interview or at the end of the reproductive cycle (age 45).

Baseline Covariates. Woman's and man's age at marriage are fixed covariates measured in years and calculated as the difference between year of birth and year of marriage. Woman's employment status is a dichotomous time varying covariate lagged one year. That is, a value of 1 is assigned to observations where the woman worked[2] during the year prior and 0 if she did not work during that year. Another time-varying covariate, woman's education, is the number of years of schooling completed. Length of first birth interval is a continuous variable measured as the number of years between union formation and the birth of a first child.

A series of dummy variables are included to indicate the length of time until the occurrence of a birth. Duration begins at year of union formation for the transition to first birth, and second births are gauged in relation to the year of first birth. Five dummy variables coded 1 when the birth occurred and 0 otherwise are included beginning with the first year, which is either the year of marriage or year of first birth (depending on the event of interest) and ending with the fifth year. The reference group is comprised of those births that occurred six years or later.

Migration Variables. The main covariates of interest in this study relate to man's migration status, which is determined for both the United States and Costa Rica. Man's migration is measured by dummy variables coded either 1 if he ever migrated in the period of interest and 0 otherwise. We construct two measures of migration in relation to the intervals of interest. The first indicates migration prior to the start of the interval, and the second measure relates to

[2] A woman is considered working in that person-year if she had an occupation code for any job outside of the household.

migration during the interval[3]. There are separate measures for both intervals and countries, totaling eight in all.

METHODS

We employ discrete-time logistic regression analysis to model the transition from marriage to first birth and from first birth to second birth. More specifically, we estimate separate models for the transitions to first and second birth. These models are appropriate when examining non-repeatable events occurring at discrete time points (Yamaguchi 1991). Furthermore, the use of event history models is suitable where right censoring is a problem. This feature is important since our sample includes women from different age cohorts, some of who are censored by the truncation of the observation period in the year of interview. In addition, discrete-time logistic regression models work well with multiple time-varying covariates (Allison 1995). These models assume positive integer values for time and the independence of individual observations, which begin at some common starting time (Allison 1995). The starting point for observation (t=1) is the year of union formation in models predicting first birth. For models of the transition to second birth, the year of first birth is the starting point.

The regression model for this analysis takes the following form:

$$\log(P_{it}/(1-P_{it}))= \beta_1 x_{1i}+ \beta_2 x_{2i} + \beta_3 x_{3i},$$

where, β_1 is the vector of coefficients for the baseline model, which includes woman's and man's age at marriage, and woman's educational attainment and employment status. In models of second birth, β_1 also includes the length of first birth interval. β_2 and β_3 are the parameter estimates for father's migration to the United States and Costa Rica, respectively. In general, the models predict an exit from the transition period. That is, the first model predicts the likelihood

[3] Our models look at two separate intervals—transition to first and second birth. Year of marriage is the starting point for the transition to first birth, while year of first birth begins the second interval.

of having a first birth in year t, for those married or in a consensual union. The second model predicts whether the women had a second birth in year t, given that she was at parity one.

In addition to these models estimating the risk of birth, we apply the same analysis strategy to generate preliminary results estimating the likelihood of migration. In doing so, we use age and education for both men and women, mother's employment status, and dummy variables for the presence of no child or one child to predict the likelihood of husband's migration[4]. This model informs us of the likelihood that a man will migrate by the time of survey. We estimate this likelihood separately for migration to Costa Rica, the United States, and general migration (to both countries).

This paper seeks to examine the effects of migration on fertility with birth intervals. Because changes in fertility rates can be attributed to changes in the length of exposure time in parity specific intervals, this approach is suitable for estimating the effect of migration. We use birth intervals to study how migration either increases or decreases the birth interval. Since not all of the women in this study have completed their reproductive cycles, it would be inappropriate to study the changes in the total number of children due to migration. For this reason, we attempt to understand the changes in tempo that are a result of husband's migration. The first transition period investigated spans from the year of marriage to the first birth; the second period begins with the first birth and continues until the year of the second birth.

RESULTS

Descriptive Results

Table I presents descriptive statistics for all of the measures used in our models of the transitions to first and second birth. The means/proportions and standard deviations (in person-years) are shown separately for the models to first and second birth. Sample size limitations are

[4] The reference category for these two measures is having two children or more.

pronounced in the figures presented for the migration variables. There was no migration to the United States and little to Costa Rica during the first transition. With regard to the transition to second birth, 3 percent of the sample migrated to either Costa Rica or the United States. Distributions across durations conform to our expectations. That is, the proportion of women at higher durations in the second transition is greater than in the first, which indicates that the duration of this period is consistently longer than the transition from union to first birth.

[TABLE I ABOUT HERE]

Men's and women's mean ages at marriage were higher for the second transition than the first. Individuals who married at older ages may be more likely to have longer transitions to second birth. Education replicates this pattern, where the mean for the second transition is greater than the first transition. Again, individuals who had longer duration periods, and thus contributed more observations, were slightly more educated.

To illustrate the relationship between migration and fertility, Table II presents analysis of variance test comparing those that migrated at any time before the survey to those that remained in Nicaragua. Non-migrants had significantly more children than migrants, suggesting that migration has a negative impact on fertility. Other factors known to influence fertility also help demonstrate the relationship between migration and fertility. Those who migrated are more likely to be employed in industrial occupations than non-migrants and have significantly higher socioeconomic status, as measure by the possession of more amenities. Household socioeconomic status may improve as a result of migration, which could translate into a subsequent decrease demand for children.

[TABLE II ABOUT HERE]

Table II is presented here for illustrative purposes and the findings shown should be interpreted with caution. It is important to note that the data for this table is from the time of interview, with migration measured retrospectively. This is problematic since the timing of the migration may have occurred after the birth of children. Therefore, we cannot draw conclusions regarding the direction of causality between migration and fertility. Furthermore, the measure of fertility in this model does not represent completed fertility for all women, since some are still of reproductive age. An additional concern with Table II is that the results do not adequately address the ways in which migration can affect fertility. For instance, the findings for education could be confounded by the fact that individuals with high levels of education may be more likely to migrate. Despite these limitations, this table represents an initial step in examining migration-fertility relationship.

Multivariate Results

Table III shows odds ratios from the discrete-time event history analysis of the transition to first birth. This table presents four models, beginning with the baseline model and then adding measures of migration to Costa Rica and the United States. The measures of migration included for the transition to first birth are based on migration prior to union formation, the starting point for this transition period since no one in the sample migrated in this interval. That is, measures for migration between union formation and first birth are not included because they are vectors of zeros.

[TABLE III ABOUT HERE]

The baseline model (Model 1) demonstrates a number of significant effects. First, age at marriage is positively associated with the likelihood of first birth. Men and women who marry at older ages have higher odds of shorter birth intervals. Employment status, which is lagged two

years, also demonstrates a significant effect. Women who work outside of the household appear to postpone having their first child. Because of added responsibilities from the occupation or differing expectations related to having a career, a woman with a job is approximately two-thirds not as likely to experience a first birth compared to those who are not employed for pay, holding all else constant. With regard to duration to first birth, we see that most women give birth within the second and third year of marriage, and the likelihood of having a child begins to decrease significantly after three years of marriage. The effects of the baseline covariates are consistent across all four models. That is, the inclusion of measures of husband's migration does not alter conclusions about the relationship between these variables and the likelihood of first birth.

Models 2 through 4 include measures of husband's migration to Costa Rica and the United States. They demonstrate that previous migration to Costa Rica has a significant impact upon the first transition. That is, the odds of having a first birth is more than three times higher for those women with husbands who migrated to Costa Rica before marriage, suggesting that perhaps individuals acquire additional resources and income from migration that are used in family formation. However, this evidence is indirect since the data do not permit us to test whether individuals migrate to Costa Rica intending to start a family upon return. Models 3 and 4 demonstrate that husband's migration to the United States does not significantly impact the likelihood of first birth.

Table IV presents analyses of the transition to second birth, including generally the same baseline measures used in Table III but adding a measure of the length of first birth interval. However, due to sample size constraints, the measure of migration employed here differs. Because little to no migration occurred during the previous period, we are unable to estimate the effects of migration between union and first birth on the risk of second birth. Additionally, there

were no cases where a second birth occurred in the first duration period (the same year as the occurrence of first birth). For this reason, we do not include this measure. Model 1 presents the findings for the baseline model. Models 2 and 3 add the measure for husband's migration to Costa Rica and the United States, respectively. Finally, Model 4 incorporates all baseline covariates and both measures of migration.

[TABLE IV ABOUT HERE]

Examining the transition from first to second birth in the baseline model, we see that women's and men's age at marriage is not significantly related to the likelihood of having a second birth. However, women's employment status (lagged 2 years) has a significant, negative impact on the odds of having a second child. This finding is consistent net of baseline covariates and measures of husband's migration. More specifically, women who are not employed are approximately one-third more likely than their employed counterparts to have a second child. With regard to women's education, results from these four models show a significant relationship between years of education and the risk of having a second birth. Specifically, more education lowers the likelihood of having a second child.

Focusing upon the migration variables, the findings suggest that migration effects fertility through by increasing the duration of the second birth interval. Contrary to the previous table estimating the duration of first birth interval, both of the measures for migration are significant and negative. Because migration may have an effect upon the duration of the transition through the separation of the husband and wife, these models excluded the person years where the man was in the country of destination. Even with those years excluded, a significant negative effect of migration on fertility appears.

In comparing the two measures of migration, we see that the migration to the United States has a stronger negative effect upon migration than does migration to Costa Rica (std. coeff. = -.140) is, women whose husbands migrated to the U.S. (std. coeff. = -.347) after the birth of their first child have a risk of second birth considerably lower than those without U.S. migration experience in this interval. Since these findings are for models without the years where husbands were absent due to migration, this indicates that migrants to the United States appear to have disincentives for having more children. One possible explanation is that the migrants who return from the United States may bring with them cultural norms specific to the United States, since the effect is much stronger than for Costa Rican migrants who do not meet cultures largely different from their own. The effect of Costa Rican migration, however, demonstrates that this experience lowers the odds of having a second birth. More specifically, when the husband migrated to Costa Rica, women were about half as likely to have a second child.

With the previous models, we have illustrated how fertility is affected by husbands' migration behavior. However, it could be possible that men migrate because of the birth of children. Indeed, research shows that individuals are more likely to migrate when there are changes to the household structure (Massey et. al. 1987). In particular, the addition of more individuals to the household could increase the burden upon the head of household and, as a result, compel them to migrate. For this reason, it would be important to examine the effects that birth order have on migration. Table V presents the findings from discrete-time logistic models to predict the occurrence of migration. Three models were estimated: any migration, U.S. migration, and Costa Rica migration. The purpose is to determine whether there is a general effect for migration and if this effect varies between the countries of destination.

[TABLE V ABOUT HERE]

In looking at the measures for having children, the coefficient for households with one child is significant and negative, where the odds of migrating decreases significantly when there is one child present. This conclusion can be drawn when predicting general migration and migration to Costa Rica. While the odds ratio is significant for any migration, the other two models indicate that this significance is a product of the impact of Costa Rican migration. Thus, we can conclude that migration to Costa Rica is not as likely to occur when there is one child present. The changes in household composition that result from the addition of a child do not appear to produce any significant changes in the demands within the household economy.

DISCUSSION

This paper illustrates the importance of international migration on the fertility behavior of Nicaraguan women by modeling the effects of migration to Costa Rica and the United States, net of fertility determinants. The primary goal of our study is to extend the dominant explanations offered in research on this relationship by examining the implications for return migrants. We focus on three of these explanations—assimilation/cultural adoption, separation, and selection. The results provide mixed support for these hypotheses and offer evidence of a relationship between migration and fertility, which varies between countries of destination.

With regard to the United States, we find that migration has a pronounced, negative impact upon second birth intervals but appears to have no effect on first birth intervals. These results suggest that, once married, men's U.S. experience discourages fertility, even controlling for periods of spousal separation. This may be a product of cultural adoption. Research on the migration-fertility relationship, which overwhelmingly looks at migrants resident in destination countries, often shows that fertility demand decreases gradually with exposure to the new

culture. The implication of this research is that an extended length of time in the host country is necessary for assimilation to occur. However, our findings suggest that even temporary migration of husbands may lead to a change in attitudes and values. Although we had not expected the impact of men's experience in the U.S. to yield such results, perhaps the process of assimilation is not as gender-dependent as the literature implies.

Unlike our findings for the United States, Nicaraguan migration to Costa Rica significantly affects both first and second birth intervals. Interestingly, the relationship between migration to Costa Rica and the length of first birth interval is positive, and the direction of this effect on second birth interval is negative. Because the first birth interval is shortened among migrants, it appears that these men are positively selected for motivations or intentions related to family formation. These findings remain significant even after controlling for men's age at marriage, which indicates that the effect is not a product of the age distribution of the migrating population. That is, the migration to Costa Rica provided a different and unique effect upon fertility that is independent of age. The proximity of Costa Rica provides a rather immediate opportunity for the accumulation of resources that aid in union and family formation.

Our findings do not lend support for the separation hypothesis. We come to this conclusion because the models in Table IV are consistent with results generated from models that include person-years when couples are separated (results not shown). In other words, even when we account for periods of disruption caused by migration of one spouse, our conclusions are substantively unchanged. Additionally, while this hypothesis would lead us to expect a shortened birth interval upon the spouse's return, the effects of international migration within the second birth interval appear to increase the duration of this transition.

In terms of the selection hypothesis, we are unable to directly test it, and our findings provide mixed conclusions. In Table III, we found that individuals who migrated to Costa Rica prior to marriage had shorter first birth intervals; the effect of the United States in this model was not found to be significant. The inference may be drawn that migrants who are successful with their travels to the United States and live the Horatio Alger dream are not as likely to return to their native country. For this reason, the anticipated negative effect of migration to the U.S. does not appear. Although indirect, these suggestions provide a cursory glance at the potential role of migration selectivity.

This study was largely limited by sample size constraints, since the dataset currently comprises only two communities. The updated LAMP study for Nicaragua, which will include five communities, will allow future drafts to: 1) address the selection hypothesis more directly by comparing settled migrants (in the U.S. and Costa Rica) with return migrants and non-migrants, 2) improve model specification, 3) include all eight measures of migration, 4) study community-level contextual effects, and 5) analyze marital fertility at all parities by studying birth spacing and birth stopping. In addition, an increases sample size will allow for the application of more appropriate estimation techniques (e.g. selection and multi-level models).

This study presents unique insight into the current demographic situation of one Latin American country and has implications for understanding the overall picture of this region. While the context of Nicaragua is somewhat unique due to its cultural, political and social institutions, our findings provide a starting point for demographic studies in this developing region. Additionally, this study contributes to the broader understanding of the link between migration and fertility. Future efforts should be directed towards overcoming the limitations realized in this study.

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Table I - Descriptives for all the Measures in the First and Second Transition

	1st Transition	2nd Transition
Have First Child	0.364	0.303
	(1.199)	(0.460)
Woman's Age at Marriage	18.163	19.510
	(4.431)	(5.471)
Man's Age at Marriage	21.844	23.126
	(2.823)	(4.972)
Woman's Employment Status	0.583	0.561
	(1.229)	(0.496)
Number of Years of Education (years)	6.132	6.905
	(10.958)	(4.813)
Duration to Birth		
1st Year	0.364	0.000
	(1.199)	(0.000)
Second Year	0.288	0.299
	(1.128)	(0.458)
Third Year	0.126	0.234
	(0.826)	(0.423)
Fourth Year	0.073	0.136
	(0.649)	(0.343)
Fifth Year	0.050	0.098
	(0.541)	(0.297)
Six or More Years	0.099	0.233
	(0.745)	(0.423)
Previous Migration to Costa Rica	0.022	0.015
	(0.364)	(0.184)
Migration to Costa Rica	0.004	0.030
	(0.163)	(0.171)
Previous Migration to the United States	0.023	0.000
	(0.375)	(0.000)
Migration to the United States	0.000	0.025
	(0.000)	(0.157)

Note: Standard Deviations are in Parentheses

Table II -Mean Comparisons between Migrants and Non-Migrants

	Never Migrated	Migrated	Significant Difference
Children Ever Born	4.092	2.406	***
Woman's Age at Marriage	19.630	20.184	
Man's Age at Marriage	23.016	22.805	
Woman's Education	5.930	8.349	***
Man's Education	6.121	8.589	***
Amenities - Modernized Household	5.841	7.323	***
Occupation:			
Not Employed	0.030	0.057	
Primary Sector	0.117	0.040	*
Secondary Sector	0.309	0.440	***
Service Sector	0.237	0.283	

*** p <.001 ** p<.01 * p<.05

Table III. Discrete-Time Logit Models Predicting the Occurrence of First Birth, Latin American Migration Project--Nicaragua[a]

	Model 1	Model 2	Model 3	Model 4
Woman's Age at Marriage	1.036 ***	1.037 ***	1.035 ***	1.037 ***
Man's Age at Marriage	1.026 ***	1.024 ***	1.027 ***	1.024 ***
Woman's Employment Status	.674 ***	.702 ***	.678 ***	.705 ***
Woman's Education	1.011	1.007	1.012	1.008
Duration to birth (Ref. = 6+years)				
1st year	.356 ***	.362 ***	.358 ***	.334 ***
2nd year	1.737 ***	1.667 ***	1.752 ***	1.677 ***
3rd year	1.430 **	1.429 *	1.451 **	1.442 **
4th year	.686 *	.685 *	.690 *	.687 *
5th year	.802	.797	.807	.800
Man's Migration to Costa Rica		3.258 ***		3.245 ***
Man's Migration to the United States			.856	.897
-2 Log Likelihood	4828.068	4795.015	4827.506	4784.736
N (person-years)	646	646	646	646

*** p <.001 ** p<.01 * p<.05

[a] Measured as odds ratios.

Table IV. Discrete-Time Logit Models Predicting the Occurrence of Second Birth, Latin American Migration Project--Nicaragua[a]

	Model 1	Model 2	Model 3	Model 4
Woman's Age at Marriage	1.003	1.005	1.010	1.013 **
Man's Age at Marriage	.992	.992	.989	.989
Woman's Employment Status	.755 ***	.745 ***	.747 ***	.734 ***
Woman's Education	.954 ***	.954 ***	.958 ***	.959 ***
Length of first birth interval	.986	.985	.984	.983
Duration to birth (Ref. = 6+years)				
1st year[b]	—	—	—	—
2nd year	.478 ***	.471 ***	.444 ***	.436 ***
3rd year	1.229 ***	1.215 **	1.149	1.130
4th year	.711 ***	.705 ***	.665 ***	.656 ***
5th year	.845	.847	.794 *	.793 *
Man's Migration to Costa Rica		.495 ***		.441 ***
Man's Migration to the United States			.286 ***	.273 ***
-2 Log Likelihood	7480.658	7470.559	7431.323	7417.508
N (person-years)	1021	1021	1021	1021

*** p <.001 ** p<.01 * p<.05

[a] Measured as odds ratios.

[b] There are no cases for this measure.

Table V. Discrete-Time Logit Model Predicting the Occurrence of Migration, Latin American Migration Project--Nicaragua[a]

	General Migration	Migrated to United States	Migrated to Costa Rica
Woman's Age	1.042 ***	1.075 ***	1.025 **
Man's Age	.936 ***	.929 ***	.939 ***
Woman's Education	1.096 ***	1.130 ***	1.053 **
Man's Education	1.016	1.093 ***	.937 ***
Woman's Employment Status	.711 ***	.770 *	.614 ***
Have No Children	.751	.752	.770
Have One Child	.728 **	.979	.461 ***
-2 Log Likelihood	5071.331	2957.716	2662.274
N (person-years)	6122	6122	6122

*** p <.001 ** p<.01 * p<.05

[a] Results presented in odds ratios