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A DEMONSTRATION OF THE EFFECT OF SEASONAL MIGRATION ON FERTILITY

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Abstract—Fertility estimates were calculated using own children data from the Mexican migrant town of Guadalupe, Michoacan. In this town, 75 percent of families have a member working in the United States, and wives are often regularly separated from their migrant husbands. Simulations by Menken (1979) and Bongaarts and Potter (1979) suggest that fertility among these women should be depressed. Our results confirmed this hypothesis, showing that the seasonal absence of migrant husbands disrupted both the level and timing of fertility. However, the effect was greater for legal than for illegal migrants, a pattern that stemmed from social factors as well as physical separation. A logistic regression analysis showed that reductions in birth probabilities are greater the longer a couple is separated, and that these reductions are in the range expected from prior simulations.

Two studies using simulated data have demonstrated that seasonal migration can significantly reduce annual birth probabilities (Menken, 1979; Bongaarts and Potter, 1979). Seasonally varying conception rates produced by short-term separations between migrant husbands and their wives can produce large swings in the distribution of conceptions by month of the year. The overall effect on birth rates is the same as that produced by lowering fecundability to a new constant level. Menken (1979:114) has estimated that a separation of eight months will lower annual birth probabilities between 33 percent and 43 percent, depending on assumptions made about fecundibility, the probability of fetal loss, and the duration of postpartum infecundity. In a population characterized by widespread and increasing seasonal outmigration, a decline in fertility is therefore expected.

Demographers know that many contemporary and historical populations have experienced seasonal out-migration over extended periods, but researchers have devoted little attention to the topic. F. van de Walle (1975) used historical data to link the low level of fertility recorded in late nineteenth century Ticino, Switzerland to regular seasonal outmigration of men for work in surrounding regions. Livi-Bacci (1977:81) indirectly demonstrated migration's effect on fertility by showing the effect of imbalanced sex ratios (produced by the systematic emigration of men) on fertility in historical data from Italy. Chen et al. (1974), studying more recent survey data from Bangladesh, found very large month-to-month swings in the probability of conception, which they and subsequent observers speculatively attributed to the effects of seasonal migration. In general, however, the theoretically expected inverse relationship between seasonal migration and fertility remains poorly documented, particularly in contemporary populations.

Mexico is an especially likely population within which to observe the effects we are considering. First, Mexican migration to the United States has a long history (Cardoso, 1980) and now involves millions of migrants, both legal (Massey and Schnabel, 1983a) and illegal (Bean et al., 1983; Heer, 1979; Passel and Warren, 1983; Warren, 1982). Second, this migration is highly seasonal. Regular periods of employment in the United States are followed by several months of inactivity in the home community (Cornelius, 1978; Mines, 1981; Mines and Massey, 1985; Reichert and Massey, 1979, 1980; Wiest, 1973; Zazueta, 1982). Finally, the outflow of seasonal Mexican workers is highly selective by sex, so that males predominate (Massey and Schnabel, 1983b; Mines and Massey, 1985).

Given these conditions, some Mexican women must experience periods of physical separation from their husbands each year. From the simulations of Menken (1979) and Bongaarts and Potter (1979) such separations can be expected to depress fertility. Indeed, during the 1970s, when U.S. migration was rapidly increasing, Mexican fertility fell sharply by some 21 percent (Rowe, 1979). Much has been made of this decline as an indication of changing attitudes among Mexican women (Haub, 1979), but some of this decline could stem from the growing prevalence of seasonal out-migration to the United States.

The purpose of this paper is to document the effect of seasonal migration on fertility using data from one rural Mexican town where the migrant status of husbands and wives is known. By studying the relationship between migration and fertility in this data set, we illustrate the potential magnitude of seasonal migration's effects, and demonstrate how it combines with other social variables to determine the fertility behavior of women. Because of the highly localized nature of the data, we do not seek to generalize specific fertility estimates to Mexico as a whole, but to show how basic social and demographic processes operate to influence levels of fertility in a migrant population.

DATA AND METHODS

The data for this paper were gathered in the Mexican community of Guadalupe, a rural town of 2,621 people located in the central plateau state of Michoacan. These data, and the methods used to collect them, have been extensively reviewed in a prior series of reports (Mines and Massey, 1985; Reichert and Massey, 1979, 1980; Reichert, 1981, 1982), and to avoid repetition they will not be described in detail. In brief, the data consist of basic social and demographic information gathered from residents of Guadalupe during the 12-month period ending in July 1978. The study included all people with houses in town, whether or not they were actually present during fieldwork. Data on migration were gathered from 26 informants, who provided detailed information on people with whom they were familiar. By carefully crosschecking information across informants, migration histories were compiled for all townspeople.

These data provide considerable detail on U.S. migration patterns of husbands and wives from Guadalupe. Current migration status (legal, illegal, or nonmigrant) was determined by a person's behavior during the three years prior to the survey. If a person went to the United States during this time, he or she was classified as a migrant of the appropriate legal status. Legal migrants possessed valid immigration papers (INS form I–151) while illegal migrants did not. In addition, the Guadalupe data include information on any previous migrant statuses a person may have occupied (e.g. bracero), the number of trips they have made, and the year in which they began migrating to the United States. Using these pieces of information we can classify women according to the nature and length of the separation they

are likely to have experienced from their husbands because of seasonal migration to the United States.

Unfortunately, information on childbearing was not gathered directly from women in the study. The only data we have are on the number and ages of children in the household and their relationship to the household head. A program was therefore written to link each married woman in the sample to her own children, and indirect methods were then used to estimate fertility.

The original data set consisted of 379 households, within which were 465 families and 2,621 individuals. This household file was converted to one consisting of currently married women aged 15 through 49. Using the household relationship code, each woman was linked to her own children, classified by age and sex. From this data set we eliminated eight women migrants who did not return to Guadalupe during the period of fieldwork and two women whose ages were unknown, leaving a total of 341 women for analysis. The final file contained three kinds of data: demographic and socioeconomic information on each woman; the number, age, and sex of her children; and her husband's demographic and socioeconomic traits.

Current fertility was estimated using own-children methods popularized by Cho and his colleagues (Cho, 1973; Cho and Feeny, 1978; Grabill and Cho, 1965). These methods use information on the age of own children to estimate fertility in times past. For example, children reported as one year old on their last birthday were born, on average, one year prior to the survey date and, with appropriate adjustments, can be used to estimate fertility at that time.

Own-children methods usually require that three conditions be met. First, data on children's ages must be accurate. Second, most young children must live with their mothers and the relationship to the head of the family must be clear. Finally, recent child mortality should be low and measurable with reasonable accuracy, so as to be able to adjust for its effects.

The last condition is not relevant to our purposes. We are not interested in measuring Mexican fertility per se. Rather, we seek only to measure and understand differentials between migrant status groups. Therefore, we make no adjustments for the effect of child mortality and implicitly assume that there are no mortality differentials by migrant status. If this assumption is false, it is probably because migrant children have lower mortality rates than those of nonmigrants. Migrants generally have more money to spend on medical expenses and migrant children themselves have access to better medical facilities in the United States. Therefore, fertility estimates of migrants will be biased upwards compared to nonmigrants, a bias that is conservative with respect to the direction of effects hypothesized here.

Prior experience with the Guadalupe data and knowledge of field procedures suggest that the second condition for using own-children methods is met. Ethnographic techniques were used to collect the data and they were organized using a kin-based definition of the household which emphasized the role of consanguinity rather than de facto or transitory living situations (Reichert and Massey, 1979).

However, a problem emerged with respect to the first requirement for own-children estimation—accurate age reporting. Own children are classified by age and age of mother in Appendix Table A. Inspection of these data, and some trial estimates we performed, indicated overreporting of children's ages in the first year of life, with heaping into the next interval (age one instead of age zero). Fertility estimates based on own children aged zero are therefore biased downwards and those based on own children aged one upwards.

Normally one corrects for this problem by combining children aged zero and

one, and then taking the average. However, we had reason to believe that the number of own children in the first year of life was seriously underreported by migrant women. Women who migrate seasonally to the United States with their husbands could have an unrecorded birth between the time they left Guadalupe and July 1978, when fieldwork ended. Given prevailing patterns of migration this blind period would stretch from January or February to July and would affect children aged zero to six months. We therefore ignored children under one year of age and based our estimates on those aged one and two. To insure greater stability, we averaged the number of children in these two age groups. Thus our estimates of current fertility refer to a time, on average, approximately two years prior to the survey date, that is, July 1976.

These estimation procedures present several problems. First, by using data on children aged one and two, we overestimate current fertility because of heaping into age one. However, if we assume that migrants and nonmigrants are equally likely to overreport their children's ages, this bias cannot explain differences between the two groups. Second, permanent out-migration from Guadalupe could bias the estimates if those who settled in the United States had higher or lower fertility than purely seasonal migrants. However, this bias is probably negligible since only 11 families have left town permanently since 1910 (Reichert and Massey, 1979).

A serious problem also stems from the lack of correspondence between the time interval used to define migrant status and that used to estimate fertility. Unfortunately, the data tape for Guadalupe was not originally constructed in order to study childbearing. Nonetheless, we must use the migrant definitions it contains. A person was considered a migrant if he or she left Guadalupe at *any* time during 1976 through 1978, while fertility is estimated from children born in 1976 and 1977. This discrepancy means that some women classified as having migrant husbands may not have had them when the child was born. The effect of this bias is to increase the fertility of women with migrant husbands relative to those without, a bias that is conservative with respect to our hypotheses.

A related problem is that births during the first nine months of 1976 suggest a conception during 1975, which is outside the reference period for defining migrant status. This discrepancy is equally likely to increase as to decrease the gap between women classified as having and not having migrant husbands. While it introduces noise into the analysis, it does not a priori lead to a systematic bias. The problem of stochastic noise in the estimates is handled to some extent by the use of significance tests.

MIGRANT STATUS AND FERTILITY

Before considering the effect of migration on fertility, it is important to understand the nature of seasonal migration between Guadalupe and the United States. This information is summarized in Table 1. Families are defined as nuclear family units, plus additional relatives dependent on the family head for support. Migrant families contained at least one active migrant as defined above.

Guadalupe is a migrant town. About three-quarters of its families have at least one member working in the United States. Most of these migrants are documented. Indeed, legal migrant families are the largest single migrant status group in Guadalupe, comprising 42 percent of all families, compared to a frequency of only 27 percent for illegal and nonmigrant families.

It is important to realize that migrant status denotes an important social category in Guadalupe. Legals, illegals, and nonmigrants are differentiated from one another by standards of living (Reichert, 1981) and access to productive wealth (Reichert, 1982). Migrants have also been exposed to U.S. culture, which can

Table 1.—Selected Facets of Migration by Migrant Status of Family: Guadalupe, Michoacan, 1978

	Migrant Families				Nonmigrant Families
	Legal	Illegal	Mixed	Total	
Percentage with wives currently migrating	74.3	16.5	95.8	55.1	0.0
Mean number of months party spent in U.S.	9.4	12.4	12.6	10.7	0.0
Percentage of parties that returned within one year	94.3	81.4	91.0	89.5	0.0
Total number of families	194	124	24	342	123
Percentage	41.7	26.7	5.2	73.5	26.5

SOURCE: Reichert and Massey (1979).

have its own influence on values and perceptions (Reichert and Massey, 1982). Therefore, in tandem with the physical impact of migration on fertility, we will also consider its social effects.

Table 1 also indicates that different migrant statuses imply different conditions of separation between spouses. While almost three-quarters of legal families had wives who accompanied their husbands to the United States, the frequency of illegal families with wives who did so was only 17 percent. The table also demonstrates the overwhelmingly seasonal character of migration from Guadalupe. Roughly 90 percent of migrant parties from the town's families returned from the United States within one year of leaving. However, illegal migrants were somewhat less likely than legals to have returned so soon. Only 81 percent returned within one year compared to 94 percent of legals. The average length of stay of illegal migrants (12.4 months) was therefore longer than that of legals (9.4 months). Thus, on any single trip, physical separation of spouses is greatest among illegal migrants. However, illegals generally go with less frequency than do legals, so that over a period of two or three years, their total separation will be less.

Own-children methods were applied to estimate age-specific fertility rates among the 351 currently married women in Guadalupe. These rates are plotted by age and migrant status in Figure 1. The total fertility rates (TFRs) implied by these age specific fertility patterns are summarized in Table 2.

Although both figures are hampered by a small number of cases for comparison, they confirm the basic hypothesis that seasonal migration lowers fertility. Women with migrant husbands generally have fertility rates below those with nonmigrant husbands, although the size of the difference varies with the husband's legal status. With a TFR of 7.9 at age 49, women with legal migrant husbands have considerably fewer children than women whose husbands do not migrate (TFR = 10.3), a difference that is statistically significant.[1] The TFR of 9.8 for women with illegal husbands, while still smaller than that of women with nonmigrant husbands, is considerably greater than that for women with legal husbands. Indeed, the legal–illegal differential approaches significance ($p < .10$, one-tail

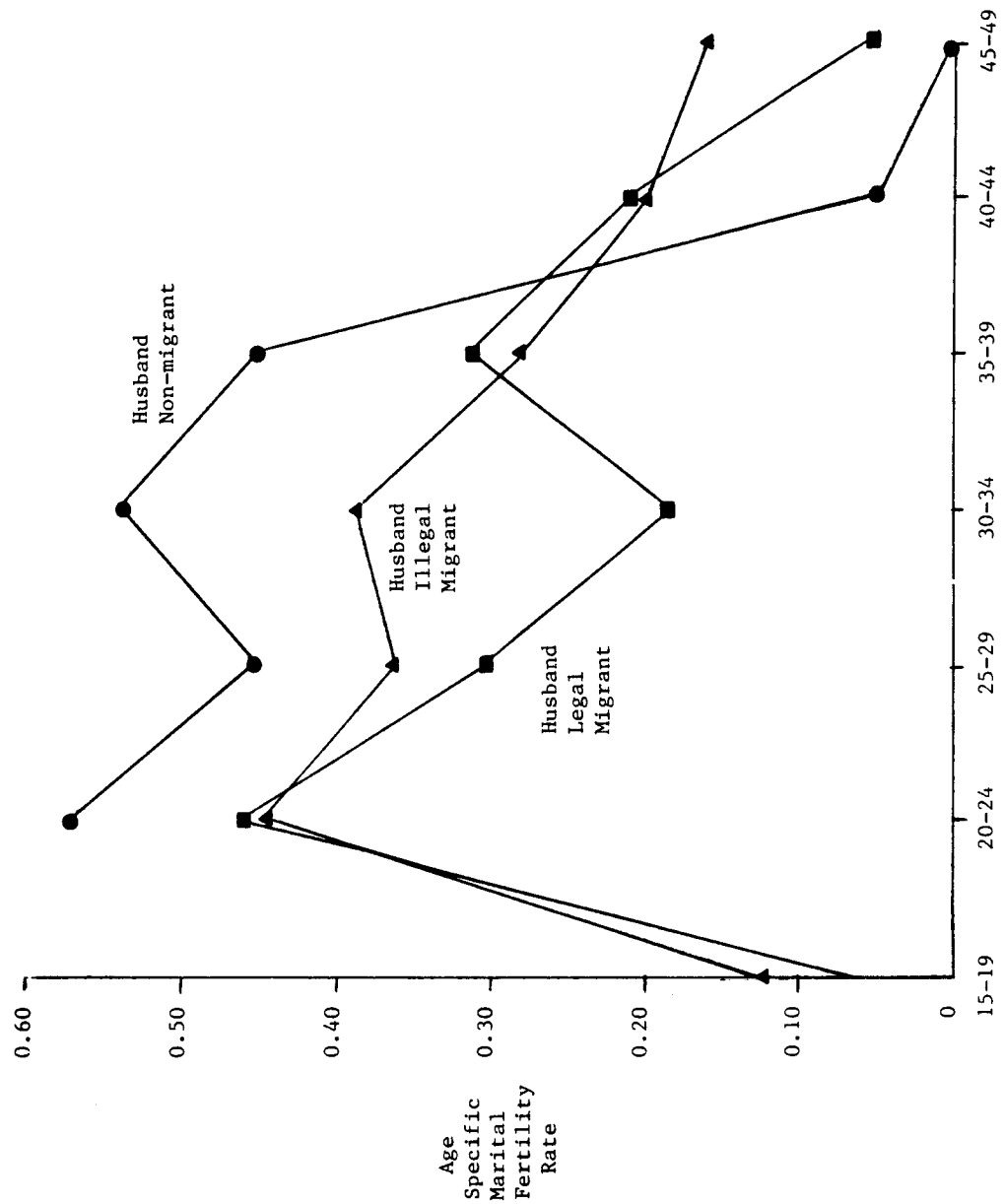

Figure 1.—Estimated Age-Specific Marital Fertility Rates by Migrant Status of Husband: Guadalupe, Michoacan 1978

Table 2.—Total Fertility Rates of Married Women by Age and Migrant Status: Guadalupe, Michoacan, 1976.

Migrant Status	Age						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Husband legal	0.33 (23)	2.61 (70)	4.13 (98)	5.05 (117)	6.58 (148)	7.64 (167)	7.89 (177)
Woman a migrant	0.47 (16)	2.73 (57)	4.43 (74)	5.63 (89)	7.11 (115)	8.47 (130)	8.79 (138)
Woman not a migrant	0.00 (7)	2.08 (13)	3.22 (24)	3.22 (28)	4.72 (33)	4.72 (37)	4.72 (39)
Husband illegal	0.56 (13)	2.81 (41)	4.59 (62)	6.56 (90)	7.95 (99)	8.95 (104)	9.78 (107)
Woman not a migrant	0.71 (7)	3.21 (25)	5.18 (44)	7.21 (65)	8.60 (74)	9.85 (78)	10.68 (81)
Husband nonmigrant	-- (0)	2.85 (7)	5.13 (18)	7.84 (30)	10.09 (40)	10.34 (50)	10.34 (57)
Total	0.42 (36)	2.73 (118)	4.48 (178)	6.26 (237)	7.91 (187)	8.72 (321)	9.00 (341)

NOTE: Number of cases is indicated in parentheses.

test), while the illegal–nonmigrant differential does not.

Part of the discrepancy between women with legal and illegal migrant husbands occurs because the fertility rates were estimated using two years of births. Whereas legal migrants typically migrate to the United States on a very regular annual basis, illegals go much more intermittently. Thus while an illegal migrant stays away slightly longer than a legal one, he also remains longer in the village during the subsequent year (Reichert and Massey, 1979). In estimating fertility using two years of births, then, the disruptive effects of seasonal migration would, on average, be greater for women with legal husbands.

Nevertheless, some other factor besides the extent of separation between spouses is obviously acting to affect the fertility pattern of women with legal migrant husbands. If only the factor of separation were affecting fertility, then we would expect the age schedule to be lower than, but more or less parallel to, the age schedule of nonmigrants, at least through the central childbearing ages. Indeed, such a pattern roughly characterizes the fertility pattern of women with illegal migrant husbands. However, among women with legal husbands there is a very pronounced dip in fertility within the central ages, one that is difficult to explain in terms of separation alone.

As we have said, migrant status is a social as well as an exposure category. Women with migrant husbands differ from other women in a variety of ways besides separation. Most important, women with migrant husbands often themselves go to the United States and

are therefore exposed to a vastly different cultural milieu than local village society, one with very different values about childbearing, contraception, and work. Moreover, by accompanying their husbands to the United States, they eliminate the effect of separation on their fertility. In an effort to disentangle the social effects of migration from those of spousal separation, Figure 2 shows age-specific fertility rates classified by the migrant status of wives, as well as husbands. As before, the associated TFRs are presented in Table 2.

The four groups depicted in the figure fall into one of two classes: those that imply a separation of spouses and those that do not. In the latter category are nonmigrant women with nonmigrant husbands, our reference category. In addition, it includes migrant women with legal husbands. Since women in the latter group are not separated from their husbands, any differences between them and those in the reference group must be attributed to other, principally social factors. (There were two few migrant women with illegal husbands to sustain analysis.) On the other hand, two other migrant status groups imply a separation of spouses: nonmigrant women with legal husbands and nonmigrant women with illegal migrant husbands. Differences between them and the reference

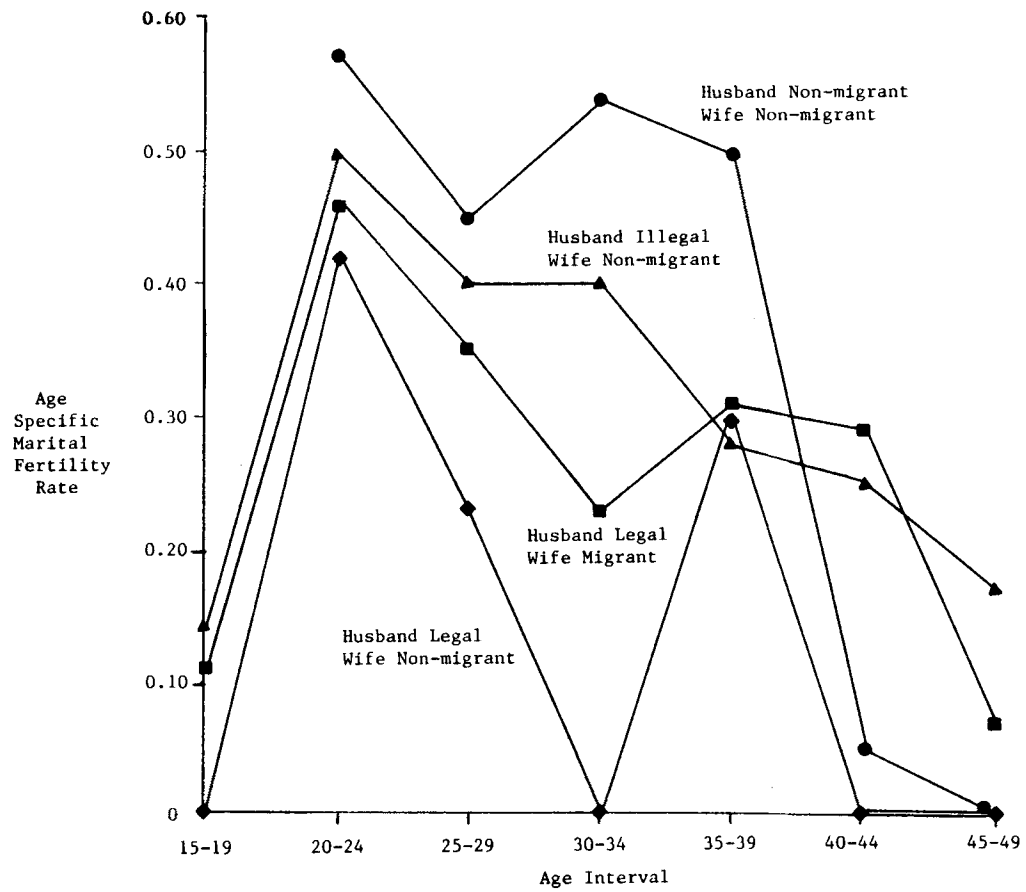

Figure 2.—Estimated Age-Specific Marital Fertility Rates by Migrant Status of Husbands and Wives: Guadalupe, Michoacan, 1978.

group will therefore reflect the influence of spousal separation, as well as any sociocultural differences which affect childbearing.

The lowest level of fertility is among women with legal husbands who themselves do not migrate. Their TFR of 4.7 children per women is substantially below the figure of 10.7 for nonmigrant women with nonmigrant husbands. This difference is highly significant ($p < .005$, one-tail test) and cannot reasonably be attributed to the small numbers involved. In addition, the age pattern of these women's childbearing is severely disrupted in the intervals 25–29 and 30–34. These are the core ages of labor migration, when migrant husbands are most likely to be away regularly, and for prolonged lengths of time (Reichert and Massey, 1979).

The next lowest level of fertility is among migrant women with legal husbands. The difference between their TFR of 8.8 and that of nonmigrants approaches the margins of statistical significance ($p < .10$, one-tail test). Since these women accompany their husbands to the United States, separation cannot account for their lower fertility. Nonetheless, as before, there is a well-defined trough in fertility during the central childbearing years. These ages are also central labor force ages, and 90 percent of legal migrant women worked during their time in the United States (Reichert and Massey, 1979). It may be that, in keeping with prevailing attitudes and practices in the United States, these women adopted contraceptive practices to facilitate their continued participation in the U.S. workforce. It is also possible that their fertility was dampened by disruptions of coital frequency brought about by housing in group quarters. However, informal knowledge of family migration from Guadalupe suggests this latter possibility is not very likely. When wives and children accompany male migrants to work in the United States, living quarters are not usually shared with those outside the family.

The hypothesis that legal migrant women use contraception to lower fertility during the peak labor force years receives further support from the rise in the birth rate during the older ages of childbearing. Although the fertility of nonmigrant women with nonmigrant husbands shows a monotonic decline from the age interval 30–34 onward, that of migrant women with legal husbands rises to a plateau in the intervals 35–39 and 40–44, and it remains above the reference group until age 50. Thus, deliberate limitation of births during the labor force years may be followed by conscious efforts to have children later in life, leading to an older average age of childbearing among legal migrant women. Indeed, old-age childbearing among these women goes a long way towards making up for the deficit of births in the earlier age intervals. While total fertility at age 40 is only 7.1 children per woman, by age 50 it has risen to 8.8; and at the former age, the differential between legal migrant women and nonmigrant women is highly significant ($p < .01$, one-tail test). Clearly, migration has affected the fertility of these women, albeit through a mechanism other than the separation of spouses.

The total fertility rate of nonmigrant women with illegal migrant husbands is roughly the same as that of the reference group (10.7 vs. 10.3 children per woman, respectively). Nevertheless, migration has a clear impact on childbearing when the age schedule of fertility is examined. In comparing these two groups, separation of spouses should be an important factor in depressing the fertility of nonmigrant women with illegal husbands; and as expected, throughout the central ages of childbearing and migration their fertility does parallel, at a lower level, that of the reference group. At age 40 the total fertility rate of nonmigrant women with illegal husbands is only 8.6, compared to 10.0 for those with nonmigrant husbands, a difference that approaches statistical significance ($p < .10$, one-tail test). However, as with migrant women

who have legal husbands, old-age fertility rises among nonmigrant women with illegal husbands, so that by age 50 their total is the same as that of nonmigrant women. Realizing that seasonal absences have lowered the number of their children compared to others in Guadalupe, perhaps in the older ages illegal migrants cut back on the length and frequency of trips as part of a special effort to have children.

In summary, data from Guadalupe clearly show that migration has had a significant effect on patterns on childbearing. Among women who accompany their husbands to the United States, fertility is reduced during the labor force ages by behavioral changes such as contraception, probably induced through exposure to U.S. culture and society. Among women who do not accompany their migrant husbands, fertility is lowered by physical separation, possibly in combination with behavioral or attitudinal changes. The fertility of nonmigrant women with legal husbands is probably most affected by separation, since over a period of several years, legal migrants will be gone most of the time. These women have the lowest level of fertility of any group in Guadalupe. Among nonmigrant women with illegal husbands, separation is still important, but its effect is not as pronounced since in a two-year period, illegal migrants are likely to spend a good deal of their time in the community. However, unlike women separated from legal husbands, these women make up for a deficit of births during the central migrant ages (20–39) with elevated birthrates thereafter. Thus, seasonal migration from Guadalupe to the United States affects both the level and timing of fertility.

A MULTIVARIATE ANALYSIS OF BIRTH PROBABILITIES

While demonstrating the main points of our theoretical argument, the problem with the forgoing analyses is that they only examine the effect of one or two variables. Part of the reason that we could not easily isolate the effects of physical separation from the social effects of U.S. migration was that the number of women was too small to sustain detailed tabular analysis. Therefore, we now move on to a regression analysis of own children designed to examine the effects of a variety of variables simultaneously.

To measure fertility we again used own children aged one and two. If a woman had children of these ages, the dependent variable was coded 1, and if not, 0. This variable was then regressed on a set of independent variables which included woman's age, her education, her husband's education, her migrant status, and her husband's migrant status. Because a dummy dependent variable violates the assumptions of ordinary least squares, a logistic regression procedure was employed (Hanushek and Jackson, 1977). The resulting regression coefficients and statistical tests are presented in Table 3 for two groups of women: all married women 15–49 and all married nonmigrant women 15–49 who had migrant husbands.

The regression for all married women estimates the independent contributions of age, education, and migrant status to the likelihood of having a birth during the two-year reference period. The age variable behaves as expected, rising to a peak near age 30, and then declining to zero by age 50, as the effect of the squared term becomes more prominent. The effect of education is consistent with previous studies of fertility in developing countries (Carleton, 1975). Education of both husbands and wives reduces the probability of having children, compared to the unschooled. However, in both groups, the strongest effect is found among men and women with four to five years of education. In rural Mexico, this represents a significant achievement, providing at least a rudimentary literacy in Spanish. The results suggest that it is

Table 3.—Presence or Absence of Own Children Aged One or Two Regressed on Selected Independent Variables: Married Women Aged 15–49 in Guadalupe, Michoacan, 1978.

Independent Variable	All Married Women				Nonmigrant Women with Migrant Husbands			
	B	SE		p	B	SE		p
Constant	-7.01	1.87	14.06	0.00	-4.29	3.28	1.71	0.19
Age	0.61	0.13	22.48	0.00	0.45	0.22	3.97	0.05
Age^2	-0.01	0.002	25.36	0.00	-0.01	0.004	4.60	0.03
Woman's Education								
0 years	ref	ref	ref	ref	ref	ref	ref	ref
1-3 years	-0.32	0.48	0.46	0.50	-0.32	0.78	0.17	0.68
4-5 years	-0.64	0.52	1.48	0.22	-1.48	0.94	2.47	0.12
6+ years	-0.41	0.54	0.57	0.45	-1.17	0.92	1.63	0.20
Husband's Education								
0 years	ref	ref	ref	ref	ref	ref	ref	ref
1-3 years	-0.24	0.36	0.43	0.51	-0.40	0.58	0.48	0.49
4-5 years	-0.53	0.45	1.40	0.24	-0.28	0.84	0.12	0.73
6+ years	-0.17	0.44	0.15	0.70	-0.76	0.78	0.97	0.32
Woman's migrant status								
Nonmigrant	ref	ref	ref	ref	NA	NA	NA	NA
Migrant	0.51	0.32	2.55	0.11	NA	NA	NA	NA
Husband's migrant status								
Nonmigrant	ref	ref	ref	ref	NA	NA	NA	NA
Illegal	-0.48	0.39	1.54	0.21	ref	ref	ref	ref
Legal	-0.80	0.42	3.54	0.06	-1.23	0.48	6.39	0.01
Duration of Last Trip								
1-6 months					ref	ref	ref	ref
7-12 months					-0.32	0.68	0.22	0.64
13+ months					-0.67	0.88	0.59	0.44
D	0.12				0.19			
N	341				120			

NOTES: "ref" indicates reference category. NA indicates not applicable.

this basic literacy which is primarily responsible for lowering fertility, not so much advanced education beyond the primary level (which is not very common anyway). However, none of the education coefficients are statistically significant, a fact which is not surprising, since age naturally explains most of the variance in individual fertility.

The migrant status variables display

coefficients that are consistent with earlier results in both direction and level. Having a legal migrant husband markedly reduces the probability of a woman having children, an effect that is statistically significant. The effect of having an illegal migrant husband is also negative, although it is only about 60 percent as strong as the effect of having a legal one, and is not itself significant ($p = .21$). If the woman herself is a migrant, the probability of a birth is increased, since separation is no longer acting to depress fertility. However, the effect of being a migrant woman is not strong enough to overcome the large negative effect of having a legal migrant husband. If a migrant woman is married to a legal husband, her fertility is still considerably below that of nonmigrant women with migrant husbands. On the other hand, the fertility of a migrant woman married to an illegal migrant is virtually the same as that of our reference group. Thus, multivariate regression results closely parallel those found when measures are computed directly, thereby reinforcing our earlier conclusions.

In order to isolate the independent effects of separation and legal status, we examined the fertility of nonmigrant women with migrant husbands. These women are regularly separated from their husbands for varying periods. By explicity introducing a proxy for separation time into the equation, we hope to better isolate the social from the physical effects of migrant status. Thus we regressed the own-children dummy on women's age and education, their husbands' education and legal status, and controlled for duration of husband's last trip to the United States. To the extent that this latter variable measures the general extent of separation faced by women with migrant husbands, we expect it to be negatively related to the likelihood of having a child. This regression is the second one presented in Table 3.

Age and education act pretty much as before, although the effect of mother's education on fertility is much more pronounced. The impact of maternal education is apparently much stronger among women with migrant husbands, especially education beyond the primary level. The duration variable also follows expectations. The longer the period of separation, the less the likelihood of having a child. Moreover, having a legal husband (compared to having an illegal one) strongly depresses a woman's fertility, an effect that is significant at the .01 level. But to the extent that duration of last trip measures the extent of separation between migrant husbands and their nonmigrant wives, this legal–illegal difference cannot be attributed to the physical effects of migration. Rather, we must interpret the results in terms of the social categories they imply.

Why should wives of legal migrants have such low fertility compared to wives of illegal migrants, once separation time is controlled? In Guadalupe, families of legal migrants comprise a very different class of people than families of illegal migrants (Reichert, 1981, 1982). Legal and illegal families are separated by a gulf of wealth, income, and outlook. Most important, legal migrants have acquired a concept of upward mobility. Legal migrants readily conceive of a better life for themselves and their children, and they have the ability to realize these aspirations through regular seasonal migration for work in the United States. They have an instrumental approach to life, since migration has allowed them to improve their situation dramatically through their own efforts. Among these families, reduced fertility may simply be another way couples act instrumentally to improve their economic and social situation. Because the husband possesses a green card, mobility is not only possible, it is likely. So why not do all that is possible to enhance the family's economic prospects? Namely, reduce childbearing to cut down on dependency and enhance the prospects for mobility through migration.

Families of illegal migrants, on the

other hand, do not have such a ready path to upward mobility. While some illegal migrants are quite successful, as a group they cannot compete with legal migrants (Reichert, 1982). Illegal migrants go to the United States not so much to get ahead, but to keep from falling behind. They come from poor families with few prospects. Long-term opportunities in the United States are dim because of their illegal status, and their chances in the local economy are limited by the lack of work and land. In many ways, illegal migrants are more "pushed" into migration than "pulled" by the lure of the United States. Compared to legal migrants, they lack an instrumental attitude towards life, and social mobility remains an elusive concept for them. Under such circumstances, control of fertility is less likely because, according to the prevailing view of life, behavior does not affect one's station. Thus in order to fully interpret patterns of fertility in Guadalupe, one has to understand the social, as well as the physical, impacts of migration.

In achieving this understanding, the regressions shown in Table 3 are somewhat abstract and difficult to interpret, since they are hard to visualize in terms of real world processes. However, each equation can be used to predict the probability of having a birth during the period under consideration using relevant social and demographic variables. In an effort to make the discussion more concrete, Table 4 cross-tabulates these birth probabilities by migrant status and age, assuming modal categories of husbands' and wives' education.

Age naturally exerts the strongest effect on birth probabilities. The likelihood of having a birth varies by age within all migrant status groups, rising to a peak at about age 30, and then falling to a small value by age 50. Within each age interval, migration tends to reduce the birth probability, but the amount of this reduction is strongly conditioned by age. In general, the effect of migration is greatest at ages where fertility is lowest, below 20 and above 35. However, the degree of migration's effect also depends on the husband's legal status and whether or not the woman herself migrates. Migrant statuses that do not imply a separation of spouses generally exhibit the least contrast with the birth probabilities of nonmigrants. For example, when a woman migrates with an illegal husband, the two-year birth probabilities are not much different from those of women with nonmigrant husbands. In fact, they are slightly higher. This group is rare in Guadalupe, as illegal migrants typically migrate without their wives. However, among women who migrate with legal husbands, birth probabilities are reduced

Table 4.—Estimated Probability of Having a Birth in the Two-Year Period from July 1975 to July 1977 by Age and Migrant Status of Mother: Guadalupe, Michoacan.

		Husband Illegal				Husband Legal			
		Woman Migrant		Woman Nonmigrant		Woman Migrant		Woman Nonmigrant	
Age	Husband Nonmigrant	Probability	Percentage Reduction[a]	Probability	Percentage Reduction[a]	Probability	Percentage Reduction[a]	Probability	Percentage Reduction[a]
15	.478	.485	-1.5	.361	24.5	.406	15.1	.291	39.1
20	.733	.739	-0.8	.630	14.1	.673	8.2	.552	24.7
25	.833	.838	-0.6	.756	9.2	.789	5.3	.692	16.9
30	.847	.851	-0.5	.774	8.6	.805	5.0	.713	13.4
35	.788	.793	-0.6	.696	11.7	.735	6.7	.625	20.7
40	.601	.608	-1.2	.483	19.6	.530	11.8	.404	32.8
45	.271	.277	-2.2	.187	31.0	.218	19.6	.143	47.2
50	.053	.054	-1.9	.033	37.7	.040	24.5	.024	54.7

[a]Compared to women with nonmigrant husbands.

by 5 percent to 25 percent depending on age, with the smallest reductions generally occurring near ages of peak fertility.

The strongest impacts occur in statuses that imply a separation of spouses. Nonmigrant women married to illegal husbands display a level of fertility between 9 percent and 38 percent lower than that of women with nonmigrant husbands. Among legals, separation leads to even more pronounced declines in birth probabilities, with reductions ranging from 13 percent to 55 percent. Overall, in these two migrant status groups, where separation is presumably the preeminent effect, the average decline in birth probabilities was 15 percent for illegals and 25 percent for legals. The simulations provided by Menken (1979:14) implied reductions in *annual* birth probabilities of between 33 percent and 43 percent, assuming a separation of eight months. Our estimated reductions in *two-year* birth probabilities are therefore quite reasonable.

Finally, Table 5 demonstrates the inverse relationship between length of separation and the probability of having a child. Among women separated from their migrant husbands, the probability of having a birth declines markedly as the husband spends more time away from Guadalupe. Among women with illegal migrant husbands, birth probabilities decline by 8 percent to 26 percent when the husband is gone from seven to 12 months, compared to those absent six months or less, and by 17 percent to 47 percent if he is gone for more than a year. Among wives of legal migrants, the reductions are even greater. In this group, an absence of seven to 12 months is associated with a reduction in birth probabilities of from 15 percent to 27 percent, and for absences of one year or longer, from 32 percent to 48 percent.

These declines imply substantial cuts in the probability of childbearing during the peak years of fertility. For 30 year old wives of illegal migrants, the two-year birth probability falls from .77 in the shortest separation group to .63 in the longest; and for legal wives of the same age, the decline is from .49 to .33. In short, not only does seasonal migration produce reductions in birth probabilities similar in magnitude to those suggested by Menken (1979), but these reductions behave in expected ways with respect to duration of separation.

CONCLUSION

In spite of the problems inherent in using own-children estimation methods on such a small local sample, results clearly demonstrate the important impact that seasonal migration can have on fertility. In the Mexican sending community under study, migration is a way of life for a majority of families, and it affects childbearing through a combination of social and physical effects.

On the physical side, about 42 percent of couples are separated for varying periods each year because the husband is temporarily working in the United States. Among these couples, fertility is considerably depressed within the central childbearing ages, and the normal age pattern of fertility is disrupted. Migration's effects are especially pronounced for wives of legal migrants, who are absent more regularly than illegal migrants. As one would expect, reductions in fertility increase the longer a couple is separated.

On the social side, migration alters the socioeconomic situation of the family and affects the perceptions of its members, especially when the wife herself is a migrant. Migration to the United States brings greater female labor force participation and exposure to a vastly different cultural milieu than that of rural Mexico. It also changes expectations about what life has to offer. Because social mobility is possible, some migrants come to believe that they can affect their situations through their own efforts. Legal migrants, in particular, develop an instrumental world view that lends itself to the control of fertility. In contrast, illegal

Table 5.—Estimated Probability of Having a Birth in the Two-Year Period from July 1975 to July 1977 by Age of Mother, Legal Status of Husband and Duration of Last Trip to the United States: Married Nonmigrant Women with Migrant Husbands in Guadalupe, Michoacan.

	Duration of Illegal Husband's Last Trip					Duration of Legal Husband's Last Trip				
	0-6 Months	7-12 Months		13+ Months		0-6 Months	7=12 Months		13+ Months	
Age	Proba-bility	Proba-bility	Percentage Reduction[a]	Proba-bility	Percentage Reduction[a]	Proba-bility	Proba-bility	Percentage Reduction[a]	Proba-bility	Percentage Reduction[a]
15	.581	.502	13.6	.415	28.6	.289	.228	21.1	.172	40.5
20	.735	.668	9.1	.586	20.3	.447	.370	17.2	.293	34.4
25	.787	.729	7.4	.654	16.9	.520	.440	15.4	.356	31.5
30	.768	.706	8.1	.629	18.1	.492	.413	16.1	.331	32.7
35	.666	.591	11.3	.505	24.2	.368	.297	19.3	.229	37.8
40	.445	.368	17.3	.291	34.6	.190	.145	23.7	.107	43.7
45	.178	.136	23.6	.100	43.8	.059	.044	25.4	.031	47.5
50	.038	.028	26.3	.020	47.4	.011	.008	27.3	.006	45.5

[a]Compared to women with husbands gone from zero to six months.

migrants have little chance of upward mobility and less control over their lives, so there is less motivation to reduce fertility, and among nonmigrants there is even less.

The combination of physical and social effects of migration produce reductions in birth probabilities within the range one would expect from prior simulations. Depending on factors such as age of mother, length of separation, and legal status, two-year birth probabilities were reduced between 17 percent and 50 percent.

According to recent information, the number of Mexican women of childbearing age is now about 17 million. If the yearly average number of women separated from their husbands grew by one million during the 1970s, and their fertility were consequently reduced by 33 percent (Menken's lower bound), then Mexico's fertility would be reduced by 2 percent or 10 percent of the decline observed between 1970 and 1978. If two million women were affected, the reduction would be 4 percent, or 20 percent of the observed total. These speculations do not consider the ancillary social effects of U.S. migration. Given indications that Mexican migration to the United States is large and growing, the possibility that seasonal migration is a contributing factor to Mexico's fertility decline cannot be ignored.

The interrelationship between migration and fertility has not received much attention from demographers. Because of the highly localized nature of the current data, we do not seek to generalize our specific estimates to Mexico as a whole. Rather, we emphasize how migration, operating through basic demographic and sociological mechanisms, can dramatically affect the level and timing of fertility. We suggest that the topic merits more and better attention from demographers.

NOTE

[1]Our test of significance for the difference between two total fertility rates was developed by Douglas C. Ewbank (personal communication). Its formula is

$$t = \frac{TFR_1 - TFR_2}{\sqrt{\frac{N_1 S_1^2 + N_2 S_2^2}{N_1 + N_2}}}$$

where TFR_1 and TFR_2 are the total fertility rates of the two groups under consideration, N_1 and N_2 are the number of women in these groups, and S_1^2 and S^2_2 are the variances associated with each TFR. If f_i represents the age-specific fertility rate in age interval i, and N_i is the number of women in this age interval, then the variance of the TFR may be approximated as

$$S_{TFR}^2 = 25 \sum_{i=1}^{7} \frac{f_i(1 - f_i)}{N_i}$$

for i-one to 7 age intervals (i.e., intervals 15–19, 20–24, . . . 45–49).

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Appendix Table A.—Own Children under Five Years of Age by Age of Mother.

Age of Mother	Number of Women	Own Children under Five Years of Age						Total Children
		0	1	2	3	4	5	
Total	341	57	106	106	77	96	100	542
15–19	36	12	3	3	0	1	0	19
20–24	82	10	40	36	21	24	19	150
25–29	60	11	24	18	19	21	28	121
30–34	59	14	18	24	15	19	25	115
35–39	50	6	18	15	16	17	16	88
40–44	34	2	3	8	4	9	11	37
45–49	20	2	0	2	2	5	1	12