A RAND NOTE

MIGRATION AND FERTILITY IN PENINSULAR MALAYSIA: AN ANALYSIS USING LIFE HISTORY DATA

Sidney and Alice Goldstein

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N-1860-AID

Prepared for

The Agency for International Development

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PREFACE

This Note was prepared under the auspices of The Rand Corporation's Family in Economic Development Center and funded through Grant No. OTR-G-1822 from the U.S. Agency for International Development. The purpose of the Center is to provide effective policy research through the integration of good technical research with training of, and collaboration with, Third World scholars and government officials. The research emphasizes the role of human resources in the process of economic development, and individual and family responses to programs and policies for promoting growth and development.

This Note reports on a study of the relationship between migration and fertility in Peninsular Malaysia. Using a unique body of retrospective data on both fertility and migration drawn from the Malaysian Family Life Survey, it seeks to distinguish cause and effect in the statistical association between migration and fertility. This research should be of interest to planners and policymakers concerned with migration *per se* and fertility.

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SUMMARY

The importance of migration and fertility and their interrelations in population growth and redistribution have been widely recognized. Most analyses to date, however, have had to rely on cumulative measures of fertility--usually children ever born--that provide no indication of when the births occurred in relation to migration. What is not clear from these data is whether migration is selective of women with low fertility values or disruptive of childbearing, or whether the differentials between migrants and nonmigrants narrow with the lengthening of the period since migration and, if so, whether this is caused by an adaptation process. This analysis uses data from the 1976-77 Malaysian Family Life Survey (MFLS) to initiate a more comprehensive assessment of these relations.

The availability of both migration and fertility histories as well as information on a host of other variables allows analysis in terms of both cumulative fertility (CEB), as has been done in other studies, and measures that exploit the life history data directly to assess the timing of migration in relation to the timing of births. Of special value is the possibility of exploring the topic for each of Malaysia's three ethnic groups, because ethnicity in Malaysia plays such a crucial role in determining behavior.

When the analysis is simply in terms of number of moves (controlling for a variety of background variables), without any controls for duration of residence or origin-destination, no significant differences appear in the fertility levels of migrants and nonmigrants

at destination. When duration of residence is considered, however, significant differences are found, although they tend to be mitigated as length of duration increases. These data thus point to the importance of the timing of migration on fertility and suggest that adaptation to fertility norms at destination occurs with increasing length of residence. The data on migration streams, without controls for duration of residence, suggest that for Malays, only urban-urban movement is associated with lower fertility. For Chinese and Indian women, rural-urban migration is significantly related, but in opposite ways--with lower fertility for the Chinese women and higher for the Indian women. Cultural factors thus seem to play an important role in determining how migration and fertility patterns are related, but timing of move may also be a factor in explaining these findings.

To examine the selection, adaptation, and disruption hypotheses more closely, we performed several analyses that took advantage of the unique opportunities available with the MFLS life histories. Use of a cohort approach indicated that women who had moved both when they were 20-29 and when they were 30-39 had substantially lower fertility than women who moved during only one of these age periods, and nonmigrants had among the highest fertility. The low fertility of the multiple migrant women strongly suggests that selection or disruption operates to affect fertility. We explored these suggested relations further by determining the fertility of migrants during selected periods for two years before and after migration; the fertility of nonmigrants was measured from a mid-point during each period. Limited support from this analysis was given to the selectivity hypothesis: Migrants from rural areas had consistently lower fertility before the move than nonmigrants

during a comparable period, especially in the earlier cohorts being considered. That the same finding did not hold for urban women suggests the importance of origin in determining who migrates.

Regression analyses used to test the effect of number of children born on the probability of migration indicate that some selectivity was operating, although with varying strength for the different ethnic groups. In every case, however, the probability of migrating was negatively affected by fertility, although not always at a statistically significant level. However, regression analysis failed to indicate any consistent effect of migration on subsequent fertility.

The strongest and most consistent findings of the analyses performed support the hypothesis that migration is related to disruptions in fertility. Determination of the average number of months between marriage and births of specific parities indicate that women who moved between two specified events (e.g., marriage and first birth, or second and third birth) experienced a substantially longer interval between the events interrupted by migration than did women who did not move. As a result, the total interval between marriage and specific parity births was significantly longer for migrants than for nonmigrants. This relation held even when "open intervals" (the time between a birth and the survey) were included in the calculations, when a number of variables, including contraceptive use and breastfeeding, were controlled through regression analysis, and when controls were introduced for temporary separation of spouses during the period of migration. This effect does not extend beyond the immediate post-migration period; when the length of intervals between births beyond the first birth after migration was examined, the birth spacing

by migrants appears to be very similar to that characterizing nonmigrants. Again, the adaptation of migrants to nonmigrant fertility patterns is suggested, within a very short time after migration.

Overall, the results provide some support for each hypothesis: Women of lower parity are more likely to migrate than women at higher fertility levels, so some selectivity does occur. Post-migrant fertility does not appreciably differ from the fertility of nonmigrants with similar characteristics, suggesting that adaptation of the fertility norms at destination may occur quite rapidly. Most clearly, migration is associated with disruptions in child spacing patterns, and this relation holds even for women reporting no temporary separations from husbands. The disruption does not appear to extend beyond the immediate migration period.

That all of these conclusions are possible indicates the very complex interplay between migration and fertility. Furthermore, the patterns are not uniform over time, and the effects of migration seem much stronger for earlier migration cohorts than for those moving within five years of the survey. Such differences may be particularly related to official government policies of resettlement in the 1950s and 1960s, when large numbers of people were resettled in small urban places and still others moved from urban places to newly developing rural areas. In addition, Malaysia's three ethnic groups exhibit quite different patterns, and often they are opposite in direction. Aggregate analyses thus prove inadequate for explaining the relations, because they often mask conflicting patterns. All of these factors--the temporal, contextual, and cultural--must therefore be considered in addition to the more traditional socioeconomic ones in any attempt to ascertain how migration and fertility interact.

Given the complexity of the relation between migration and fertility indicated by these findings, no clear set of policy implications emerge. Both selectivity and adaptation seem to operate so as to result in lower fertility among migrants than nonmigrants at origin and destination; and migrant fertility seems also to be affected by the disruption of moving. Geographic mobility therefore is likely to have some effect on overall fertility levels, but its extent will depend on the relative numbers of migrating women, their ethnic background, the point in their reproductive cycle at which they move, and the rural/urban character of their places of origin and destination.

These data do suggest that migration does not in itself raise urban fertility rates by bringing high fertility women to the cities. Yet, because migration is age selective and contributes to inflating the age groups in the peak reproductive years, even with their lower fertility, migrants can contribute to raising both the number of births in cities and the natural increase of urban growth. Rural to urban movement, by shifting births to cities, lowers the number of births in rural places; yet, if the process is selective of low fertility women, heavy rural out-migration may well lead to rising rates of rural fertility, reflecting the higher fertility of the non-mobile women. A consequence of such movement may well be the exacerbation of rural-urban fertility differentials as a result of the greater polarization of high and low fertility women in rural and urban places, respectively. Nonetheless, to the extent that selection, adaptation, and disruption are operating to lower the fertility of migrants, rural-to-urban migration may well be a factor in lowering overall national fertility rates.

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I. INTRODUCTION

Among the most important problems likely to be faced by mankind in the remaining decades of the twentieth century, and probably well into the twenty-first, are those related to patterns of settlement, especially the increasing rate of growth and concentration of population in the urban areas of less developed countries. Three interrelated situations present researchers and policymakers with new challenges and opportunities: continuing rapid population growth, massive increases in the size of the urban population and rising levels of urbanization, and a dramatic rise in the number of big cities and in the concentration of both the national and the urban populations in such cities. Yet, despite these developments, urbanization and population redistribution remain among the least known of demographic phenomena (Goldstein and Sly, 1975).

Assessment is urgently needed of the changing levels and rates of urbanization, the relation of urbanization to the ongoing economic, social, and demographic changes, and the roles of migration and fertility in the urbanization process. Moreover, in any concern with the components of urbanization, particular attention must be given to the comparative fertility of the migrant and nonmigrant women in both urban and rural places. In part, such a comparison will indicate the relative contributions of native and migrant fertility to urban and rural growth (Keyfitz and Philipov, 1981); but, in part, it will also show whether the migration process itself is associated with changes in fertility attitudes and behavior and whether differentials between

migrants and nonmigrants reflect selection at place of origin, adaptation at place of destination, or disruption of fertility associated with the process of movement.

The relation between migration and fertility has obvious relevance for population policy. Because the fertility of urban residents has generally been found to be lower than that of rural women, strong interest is directed to whether urbanization and rural-to-urban migration reduce the fertility of the general population. At the same time, migrant fertility in urban places may place added strains on educational facilities and provision of jobs, housing, and other urban services, especially if high rural fertility levels are maintained. However, if return migrants to rural areas and urban-to-rural migrants bring with them the lower fertility values and behavior of urban residents, they can serve as models for the nonmigrant rural population and thereby help to lower rural fertility.

Numerous studies have attempted to gain insights into the possible interrelations between migration and fertility. Yet, many conflicting conclusions have emerged, as documented by the comprehensive and critical review of the literature undertaken by Zarate and Zarate (1965) and more recently by Findley and Orr (1978). Many of the differences in conclusions about the existence and extent of differentials merely reflect differences in study design, in analytic methods, in definitions of migrants, and in the measures of fertility used. It is important to clarify who the migrant is, who the urban native is, what intercultural differences may affect fertility and migration, what constitutes urban fertility, and what the effects are of differences in urban size. A clearer assessment of the interaction between migration and fertility

and their joint effects on growth rates in urban and rural places may then be possible. Studies must also be designed to allow clearer testing of the extent to which any differentials in fertility are associated with selection at origin, with disruption due to the process of movement, or with adaptation at destination. One approach to data collection, the use of the life history matrix, mitigates many of the shortcomings of traditional census type of information because it distinguishes between events occurring before and after the move and thereby provides new opportunities to obtain better answers to these questions. The Malaysian Family Life Survey (MFLS), on which the present analysis is based, used such a technique. Before we turn to the analyses of data from the MFLS, however, we should give some attention to the theoretical issues underlying research on migrant/nonmigrant fertility differentials and to the strengths and limitations of existing data sources.

THEORETICAL ISSUES

Several theoretical perspectives or models have been suggested for explaining differentials in fertility attitudes and behavior between migrants and nonmigrants (Ribe and Schultz, 1980). These perspectives differ from each other largely in terms of whether they view the differentials in fertility as having existed before the migration occurred (the selectivity model) or as manifested after migration in response to the fertility norms of the host population (the socialization and adaptation models). Still another perspective, the disruption model, argues that the migration process itself largely accounts for whatever differentials exist between the fertility of migrants and natives at origin or destination.

The selectivity model assumes that migrants are not randomly selected at origin. This supposition is consistent with the general evidence that migration tends to be selective on such variables as age, education, occupation, and marital status. The selectivity model argues that, even when all the other relevant background characteristics are controlled, migrants continue to have different fertility attitudes and behavior than nonmigrants. Ribe and Schultz (1980) maintain that those preferring large families relocate in rural areas whereas those preferring smaller families go to urban locations. Others (e.g., Goldstein, 1978b) have suggested that the rational behavior that motivated individuals to move, especially to urban locations, may also have led them to restrict the size of their families. The selectivity model would hold that, even if the migrants had not migrated, their fertility at origin would probably have been lower than that of the other natives.

A corollary thesis holds that the character of the selection process itself changes with time in relation to levels of development. Early in the modernization/development process, the migrants from rural locations tend to be highly selective in their willingness to take risks in order to benefit by the opportunities at destination. With increasing time and development, and especially as migration becomes more widespread, the migrants become much more typical of the population at origin, and therefore also differ less from that population in their fertility behavior. On the other hand, it can be argued that initial movements tend to be less selective, so that migrant fertility is not differentiated from that at origin and is higher than that of natives at

destination. In contrast, more recent migrants, motivated by improved communication, more education, and higher levels of modernization, may be more innovative and willing to adopt new behavior patterns, including fertility that is lower than that of women at both origin and destination.

In contrast to the selectivity model, the socialization model is premised on the observation that rural fertility is generally greater than urban fertility. Rural migrants can thus be expected to have higher fertility than urban natives. This model assumes that assimilation of the lower urban fertility levels will occur, but only after considerable length of residence at destination. In fact, the differentials will dissipate only after several generations of urban residence.

The adaptation model, which differs considerably from the socialization model, assumes that changes in fertility values occur among the migrants themselves, so that migrant fertility may more closely resemble native fertility within several years after the move. This model assumes that migrants differ minimally from the population at place of origin and bring with them to their destinations the fertility norms that generally characterize the population at origin. (Both rural-to-urban and rural-to-rural migrants would thus have high fertility values.) For rural-to-urban migrants, the adaptation model therefore anticipates that interaction with the urban population will, in time, lead to adoption by the migrants of the lower urban fertility. Experts differ on which factors in the urban setting are most important in stimulating changes in fertility behavior. Some stress economic variables; others emphasize noneconomic factors. Among rural-to-rural

migrants, minimal change would occur because the same high fertility values presumably characterize both origin and destination.

Adaptation thus depends heavily on the relative rural and urban character of the places of migrant origin and destination. Presumably, the more different these places are, the longer the adaptation process will take, other things being equal. Information both on length of residence and on the rural and urban character of the places of origin and destination is needed to test this hypothesis. Ideally, one would also want data on the extent and character of migrant economic and social interaction with the modern sector within the larger urban environment as well as on other conditions in urban places that cause lower fertility.

The two preceding perspectives point to conditions at place of origin or destination as the key variables affecting the fertility of migrants. A third perspective, the disruption model, holds that the migration process itself may interfere with fertility. If so, the extent of migrant/nonmigrant differentials will be most apparent shortly after the move, since whatever disruptive effects migration may have are likely to dissipate over time. Several factors may help to explain the disruptive character of the migration process. The move itself may be sufficiently stressful, from a socio-psychological perspective, as actually to interfere with the physiological capacity to conceive and bear children. Migration may also involve an initial period of separation between spouses, reducing the fertility of the recent migrants (Visaria, 1969; Borrie and Cameron, 1969; Menken, 1979; Goldstein, Goldstein, and Piampiti, 1973). After the disruptive effects of migration have passed, the more normal pace of fertility may be

resumed, and, in fact, the pace may accelerate to compensate for earlier delays in childbearing. But depending on its severity, the disruption of fertility may nonetheless affect the total average number of children ever born.

Although each of the foregoing perspectives stresses social-psychological aspects of fertility behavior, differentials in the physiological capacity to bear children may be particularly relevant in explaining migrant/nonmigrant differentials in fertility (Baker, 1981; Prior, Joseph, and Salmond, 1981; Hanna and McGarvey, 1981). To the extent that such diseases as malaria are endemic in rural areas, the physical ability of women and men to have children may be seriously impeded. Variations in nutrition may be still another factor affecting fertility. Movement to cities, where health conditions are better, may enhance the ability to conceive and to bear children. These changes may be important in explaining both initial differentials and changes over time. The process may also work in the reverse direction, as diseases that tend to be concentrated in cities, such as venereal disease, are brought to rural areas by return migrants.

These considerations suggest that the various models outlined above should ideally incorporate attention both to the traditional socioeconomic and demographic variables and to health and physiological conditions. But to the extent that the latter may be much more difficult to identify through traditional census and survey procedures, they are likely to remain part of the unexplained variance that emerges from any study of fertility differentials between migrants and nonmigrants.

In all likelihood, several or all of these models help to explain the relation between migration and fertility; they are not mutually exclusive. Selection may occur at origin; migration itself may disrupt fertility; and adaptation of urban fertility values and behavior among rural-to-urban migrants may occur at destination or, over the longer run, by their children or grandchildren through the effects of socialization. Determining to what extent one or another or a combination of these processes offers the best explanation of observed patterns is the challenge researchers face.

PROBLEMS OF RESEARCH DESIGN AND DATA

The ideal study design for testing which of these models has the greater explanatory power, or whether a combination of models provides fuller explanation, calls for histories of migration and fertility with appropriate information on background characteristics at different points in the life cycle. Such data are essential to allow determination of whether migrants do, in fact, differ from nonmigrants at origin, how they differ from the host population into which they move, and how these differences change with duration of residence. Migration and fertility histories would also allow assessment of whether the move itself results in longer than average delays in childbearing by permitting comparisons of the fertility behavior of the migrants with women who did not move at point of origin as well as with women at destination. To fully test the socialization hypothesis would require not only the kind of detailed data specified above, but also comparable information for the next or preceding generations so that intergenerational changes could be identified and measured in relation to changing background characteristics and environmental conditions.

In most of the studies undertaken to date, the data sets available for analysis have fallen far short of these ideals. Census data, and survey data modeled on censuses, are impeded by both the definitions of migration and the measures of fertility used. (1) Reliance on children ever born as the index of fertility precludes determination of fertility before and after the move. (2) No information is provided on intervals between births, so spacing of fertility cannot be assessed in relation to the move. (3) The social and economic characteristics, including marital status, ascertained by the census or survey refer to the year in which data are collected, thereby making it very difficult to assess selection versus adaptation. (4) Fertility can be related to repeat or return moves in only a very restricted manner. (5) Finally, censuses rarely collect information on attitudes or use of contraceptives.

To the extent that survey questions are modeled on those asked by censuses, they have the same limitations. However, the survey approach still provides maximum possibility for obtaining the kinds of information needed for a fuller and more accurate assessment of the relation between migration and fertility, particularly if it incorporates complete pregnancy and migration histories in such a form that fertility events can be related in time and space to residential experience. Moreover, to the extent that such histories also collect information on background characteristics at various points in the life cycle, many serious difficulties engendered by the use of cross-sectional data are removed. Because the MFLS incorporated the life history matrix, which included attention to changes in residence, economic activity, education, marital status, and all births and deaths

of children, it offers unusual promise for the assessment of the relation between migration and fertility.

One problem common to all retrospective studies is the extent to which data collected at the time of the survey from respondents about their characteristics in the past are representative of the population as a whole in the past. Because the sampling units covered in a survey are selected on the basis of current criteria, they do not necessarily provide representative coverage of the various parts of the country at earlier points in time. Moreover, since the points of origin of the population encompassed in the survey will extend to places other than those actually sampled, the number of migrants originating in any particular location may be very few, and the nonmigrants in those locations would not be covered at all. In addition, selective mortality as well as continuous selective out-migration between any given time in the past and the time of the survey will affect the representativeness of the populations at places of origin and, therefore, the comparisons of migrants to nonmigrants. Mortality selection on the basis of parity levels might also bias comparisons between migrants and nonmigrants at destination. A retrospective survey cannot adequately correct for these problems. These limitations must be kept in mind in any use of the retrospective data generated by the MFLS. They will particularly affect attempts to assess the selectivity hypothesis, because the data do not permit full reconstruction of the population at origin from which the migrants came. Despite these limitations, the MFLS provides a very rich source with which to assess how much the fertility of migrants differs from that of nonmigrants and to explore the temporal relations between migration and fertility.

THE MFLS AS A DATA SOURCE

The Malaysian Family Life Survey was conducted in Peninsular Malaysia during 1976-1977. Designed primarily to collect data for estimating the magnitude of various economic and biological relations affecting fertility and breastfeeding patterns, the sample consisted of 1,262 private households containing at least one ever-married woman less than 50 years of age. (A description of the MFLS may be found in Butz and DaVanzo, 1978.) The survey relied on a sampling frame created by the Malaysian Department of Statistics, which defined 6,125 Primary Sampling Units (PSU) in Peninsular Malaysia. Of these, 52 PSUs were selected for the MFLS; 49 were randomly selected, and 3 were chosen to assure adequate representation to Indian families and families living in fishing communities. All of the PSUs in the sample are included in this analysis. (For fuller documentation of the sampling procedures, see Jones and Spoelstra, 1978.)

The Malaysian Family Life Survey collected retrospective life histories for the ever-married women and their present husbands. Included in the life histories of the women was information on pregnancies (including their spacing and outcome), contraceptive use, marital status changes, migration, household composition, education, and labor force participation; information on these variables was collected from age 15 of the respondent, the age of first marriage, or the age of first pregnancy, whichever came earliest (Butz et al., 1978). The availability of such detailed information on both migration and fertility histories provides a unique opportunity to assess the sequence in the timing of moves in relation to childbearing as well as the

concurrent effect of a host of socio-demographic variables. The data collected in these female life histories, then, form the core of the information analyzed in this report. Assessment of the validity and reliability of these data (Haaga, 1981) has indicated some bias due to errors in reporting that may be especially problematic in multivariate analyses. On the whole, however, the data on the timing and incidence of those events included in the evaluation (e.g., births, deaths, housing) appear good.

In this analysis, migration is defined as a move across a town boundary. Because the focus is on movement in relation to fertility, and since most children in Malaysia are born within marriage, only women who moved after marriage are defined as migrants. Women who never moved or who moved only before marriage are classified as nonmigrants, except for some initial attention to fertility differentials between the two groups. Those women who are classified as migrants (moved after marriage) are variously subdivided into those who moved once only and those who moved more than once. Analyses are also undertaken for migrants who moved within the one, five, or ten years preceding the survey or who moved during specified periods; in such cases, information is restricted to women who were continuously married during the period under consideration.

Previous research in other less developed countries has indicated the great importance of the urban character of place of residence in influencing fertility. To control for this factor in the MFLS data, current residence has been divided into three categories: market centers, other urban places, and rural locations. This classification is based on the characteristics of the PSUs at the time of the survey.

Market centers, as defined by Survey Research Malaysia (the survey research organization that carried out the MFLS), include three major urban centers with high density population: Kuala Lumpur/Petaling Jaya; Ipoh; and Penang. Other urban places consist of all other urban places so designated by the Department of Statistics on the basis of their total population size (10,000 or more) or in which at least 50 percent of the population is engaged in nonagricultural work. The rural stratum consists of the remainder of Peninsular Malaysia.

For the retrospective data, the classification used by Survey Research Malaysia was based on the characteristics of the mukim (sub-district) of residence rather than on the town of residence. (A mukim is a geographic unit larger than a town and can vary considerably in size.) Thus, if a sub-district is largely urban in character, the respondent will be classified as having lived in an urban place even though she, in fact, might have lived in the rural sector of the sub-district in question. As a result, findings using retrospective residence categories, such as analysis of fertility in terms of migration streams, must be interpreted with great caution because of lack of exact correspondence between the assigned residence category and the actual character of the specific place of residence. If the urban-rural classification of current PSU of residence is compared with the classification resulting from the use of sub-district of current residence, only a 60 percent correspondence is obtained.

One further word of caution is in order. Because the primary purpose of the Malaysian Family Life Survey was to collect information on fertility-related variables, no attempt was made to assure inclusion of adequate numbers of migrant women. As a result, the sample includes

only 453 identified as having ever moved after marriage. Although this number is large enough to allow for valid aggregate analyses, it severely restricts analysis by cross-tabulation; introduction of both current residence and age variables in addition to control for migration status results in fewer than 10 cases in a number of individual cells. Such analyses must therefore be interpreted with extreme caution. Greater reliance is placed on multivariate regression analyses when it is necessary to control for a variety of background variables.

The following analysis exploits the rich data available from the life histories collected by the MFLS in a variety of ways to obtain some insights into the selection, adaptation, and disruption hypotheses. First, however, we give some attention to levels of migration among women in Malaysia and to a short discussion of migrant/nonmigrant differentials in marriage patterns. These analyses will provide the background against which migrant/nonmigrant differentials in fertility can be assessed. The next section will examine children ever born as the key dependent variable. This approach will parallel assessments of previous analyses for other countries (e.g., Goldstein and Tirasawat, 1977; Hendershot, 1976; Visaria, 1969). However, we take advantage of the flexibility of the MFLS data by varying the definition of migration. As far as possible, we introduce controls for background variables, especially urban/rural residence, and assess migrant/nonmigrant differentials in use of contraceptives. The final section will then use the unique retrospective data available to analyze the temporal relations between migration and fertility.

THE SETTING

Malaysia is a useful setting for research on the interrelations between migration and fertility because in recent decades it has seen considerable development. Since the 1950s, Malaysia has experienced great improvement in living standards as indexed by consistent growth in per capita gross domestic product and per capita gross national income and by sharp declines in death rates, especially in infant mortality (Hirschman, 1980). Concomitantly, the total fertility rate fell by one third between 1955 and 1975, to 4,162. By far the most important factor in the changing levels of fertility was a rise in age at first marriage, although some changes in marital fertility rates are also apparent.

Population redistribution and the growth of urban places, resulting from a combination of natural increase, migration and reclassification of rural places, have led to an increasing level of urbanization (Radloff, 1982, pp. 60-67). The pace was especially accelerated during 1947-1957, caused in part by government policies that resettled rural Chinese in "new towns." The growth of larger urban places was due more to rural-urban migration, especially the movement of the Malays. After 1957 the pace of urbanization slowed considerably. By 1970, 28.7 percent of the population was living in places with 10,000 or more inhabitants and another 13.2 percent resided in towns with 1,000 to 9,999 population.

Available data on internal migration suggest complex patterns of streams and counter-streams and various forms of temporary mobility. In part, these patterns have been influenced by government policies that have actively sought rural development through such programs as the

Federal Land Development Authority (FELDA). These help especially to explain the substantial urban-rural migration flows. However, mechanization on the rubber estates has stimulated considerable migration of former rubber workers (primarily Indians) to more urban places. On the whole, the government policies that have produced changing geographic distributions of economic opportunities have been responsible for much of the migratory flows in Malaysia. And to the extent that these opportunities have been differentially available to the country's ethnic groups, different migration patterns characterize Malays, Chinese, and Indians. (For a fuller analyses of migration in Malaysia, see Radloff, 1982.)

Ethnicity, in general, plays an important role in differentiating behavior and characteristics in Malaysia. The country is predominantly Malay (53 percent), but 35 percent of the population is of Chinese descent, and another 11 percent is of Indian descent. These three groups not only generally adhere to different religious beliefs (Malays are predominantly Muslim, Chinese are Buddhist or Confucian, Indians are Hindu), but they are also differentially distributed in urban and rural places. In 1970, only 11.9 percent of the Malays lived in urban centers of 25,000 or more population, and 41.1 percent of the Chinese and 31.0 percent of the Indians did so. Traditionally, Chinese have placed much higher value on education than have Malays. Among women under age 50, 15 percent of the Chinese but only 9 percent of the Malays have had seven or more years of school. Indian women, too, have had more schooling; 18 percent reported seven or more years of education (Malaysia, 1979). The three ethnic groups differ, too, in their marriage patterns. Chinese women tend to marry at later ages than Malay

or Indian women, although in recent decades these patterns have been converging (DaVanzo and Haaga, 1981), as have fertility levels. In 1975, Malays had the highest total fertility rate (4,580), and the Chinese, with a rate of 3,537, were the lowest; Indian fertility (3,870) was closer to that of the Chinese than to the Malays. These ethnic differences on a whole range of characteristics must be kept in mind in the ensuing discussions, and in the multivariate analyses, ethnicity will be controlled for.

II. MIGRATION PATTERNS AND DIFFERENTIALS

LEVELS OF MIGRATION

Within Malaysia, the levels of mobility among ever-married women aged 15-50 did not vary substantially by place of current residence (Table 1). Between 31 and 39 percent of the women in market centers, other urban places, and rural areas qualified as migrants--that is, had changed town of residence since marriage. Thus, approximately one-third of all women made at least one move after marriage. A majority of the migrants had moved only once, but the extent of repeated movement varied by urban/rural residence at the time of the survey, from only 12 percent of those in market centers at the time of the survey to 17-19 percent of those in other urban locations. These data suggest that migration is a fairly common experience for ever married women and that a considerable number made more than one move.

The age differentials by migration status do not indicate a clear pattern. They suggest that stability is more characteristic of younger women, but this may simply be because they have had fewer years in which to move. There is also some indication of a lower level of post-marriage migration among the oldest women within the age span encompassed by this analysis. That age does account for significant differentials is evidenced by the comparison within residence groups. For example, in market centers, only a quarter of the women between ages 20-24 had moved, in contrast to 53 percent of the women aged 40-44. For reasons that are not clear, beyond the youngest age group, the lowest level of migration characterizes the 25-29 year old women in all three

Table 1

DISTRIBUTION BY MIGRATION STATUS, BY CURRENT RESIDENCE AND AGE

Age and Residence	Nonmigrants			Migrants			Total	
	Never Moved	Moved Before Marriage	Total	Moved Once	Multiple Moves	Total	Percent	Number
Market Center								
15 - 19	--	--	--	(a)	--	(a)	--	1
20 - 24	36.4	39.4	75.8	24.2	--	24.2	100.0	33
25 - 29	58.0	32.0	90.0	6.0	4.0	10.0	100.0	50
30 - 34	37.0	35.2	72.2	13.0	14.8	27.8	100.0	54
35 - 39	43.1	19.6	62.7	25.5	11.8	37.2	100.0	51
40 - 44	39.5	7.9	47.4	23.7	28.9	52.6	100.0	38
45 - 50	52.4	4.7	57.1	28.6	14.3	42.9	100.0	21
All ages	43.9	25.0	68.9	19.0	12.1	31.1	100.0	248
Other Urban Places								
15 - 19	70.0	10.0	80.0	20.0	--	20.0	100.0	10
20 - 24	42.9	17.1	60.0	31.4	8.6	40.0	100.0	35
25 - 29	51.9	23.1	75.0	19.2	5.8	25.0	100.0	52
30 - 34	43.6	20.0	63.6	18.2	18.2	36.4	100.0	55
35 - 39	27.5	13.7	41.2	17.6	41.2	58.8	100.0	51
40 - 44	35.7	23.8	59.5	16.7	23.8	40.5	100.0	42
45 - 50	48.5	15.2	63.7	21.2	15.2	36.4	100.0	33
All ages	42.5	18.7	61.2	20.1	18.7	38.8	100.0	278
Rural								
15 - 19	74.3	20.0	94.3	--	5.7	5.7	100.0	35
20 - 24	54.8	15.1	69.9	17.2	12.9	30.1	100.0	93
25 - 29	54.2	20.0	74.2	16.7	9.1	25.8	100.0	120
30 - 34	45.2	18.3	63.5	21.4	15.1	36.5	100.0	126
35 - 39	38.7	15.3	54.0	21.2	24.8	46.0	100.0	137
40 - 44	50.5	10.1	60.6	12.8	26.6	39.4	100.0	109
45 - 50	44.8	16.4	61.2	20.7	18.1	38.8	100.0	116
All ages	48.8	16.2	65.0	17.6	17.4	35.0	100.0	736

(a) Under 10 cases.

residence categories. The higher levels of movement among women aged 20-24 may be marriage-related and possibly reported with greater accuracy than movement that occurred earlier on the part of older women. The higher mobility of the 20-24 year old women may also reflect actual changes in the migration behavior of younger Malaysian women in relation to the development and modernization process and governmental policies introduced to achieve more balanced population distribution.

Levels of migration vary as well within residence categories by ethnic group. In each residence category, Chinese women are characterized by the highest levels of post-marital stability and Indian women by the lowest levels; Malays are intermediate (Table 2). In market centers, 79 percent of the Chinese had never migrated or had done so only before marriage, and of the 20.8 percent who moved after marriage, only 8.7 percent had moved more than once. By contrast, only 50 percent of the Indians can be classified as nonmigrants; 34.2 percent moved once after marriage and 15.8 percent twice or more. In other urban places, multiple moves were equally common for both Malay and Indian women, but almost twice as high a proportion of Indian women moved once after marriage than did Malays. Among Chinese women, only a slightly higher proportion moved only once after marriage than among Malays (19.5 rather than 16.5 percent), but a far smaller percentage of Chinese moved more than once (only 10.1 percent). Finally, in rural areas a still different pattern emerges. Although among Malay and Chinese women about one-third were classified as migrants, a higher percentage of Malays had moved more than once. But Indian women were by far more likely to move, and to do so more than once; 38 percent

Table 2

DISTRIBUTION BY MIGRATION STATUS, ETHNICITY, AND CURRENT RESIDENCE

Ethnicity and Residence	Nonmigrants			Migrants			Total	
	Never Moved	Before Marriage Only	Total	Moved Once	Multiple Moves	Total	Percent	Number
Market Center								
Malay	32.2	25.4	57.6	27.1	15.3	42.2	100.0	59
Chinese	51.7	27.5	79.2	12.1	8.7	20.8	100.0	149
Indian	34.2	15.8	50.0	34.2	15.8	50.0	100.0	38
Other Urban								
Malay	40.2	14.4	54.6	16.5	28.9	45.4	100.0	97
Chinese	48.3	22.1	70.4	19.5	10.1	29.6	100.0	149
Indian	22.6	12.9	35.5	35.5	29.0	64.5	100.0	31
Rural								
Malay	57.0	9.8	66.8	17.0	16.2	33.2	100.0	447
Chinese	36.4	30.8	67.2	20.2	12.6	32.8	100.0	198
Indian	30.4	17.7	48.1	13.9	38.0	51.9	100.0	79

reported multiple moves, compared with only 16.2 percent among Malays and 12.6 percent of the Chinese. Both ethnic identification and place of residence are thus important factors in determining migration patterns.

The level of migration also changes as the time period over which migration is measured lengthens (Table 3). Only a small percent of all continuously married women had moved in the one-year interval preceding the survey; this ranged from a high of just under 5 percent of women in other urban places to only 2.6 percent of those in rural places. These percentages at least doubled when migration was measured over a 5-year

Table 3

PERCENTAGE OF MIGRANTS DURING SPECIFIED INTERVALS (a), BY CURRENT RESIDENCE AND AGE

Residence and Age	1975-1976	1971-1976	1966-1976
Market Center			
15 - 19	(b)	--	--
20 - 24	3.6	(b)	--
25 - 29	7.3	0.0	(b)
30 - 34	1.9	8.3	17.9
35 - 39	0.0	4.3	7.9
40 - 44	3.4	10.3	28.6
45 - 50	5.3	10.5	15.8
All ages	3.2	7.7	17.8
Other Urban Places			
15 - 19	(b)	--	--
20 - 24	16.7	(b)	--
25 - 29	0.0	6.5	(b)
30 - 34	9.6	22.4	32.5
35 - 39	2.2	11.4	37.5
40 - 44	0.0	2.8	13.9
45 - 50	0.0	0.0	0.0
All ages	4.6	11.4	23.0
Rural			
15 - 19	4.8	--	--
20 - 24	9.1	17.1	(b)
25 - 29	1.9	10.3	28.1
30 - 34	1.9	7.7	24.7
35 - 39	2.9	8.8	18.6
40 - 44	1.3	5.1	15.2
45 - 50	0.0	4.6	5.7
All ages	2.8	8.1	17.2

(a) Restricted to women in their first marriage who were married during the entire interval under consideration.
(b) Under 10 cases.

interval, and they doubled again when the period was increased to encompass the ten years preceding 1976. These patterns are consistent with what is known about the effect of interval on migration levels (e.g., Radloff, 1982).

The data in Table 3 point to considerable age differences. With some exceptions, the proportion of migrants declines as age rises in both other urban places and rural locations; a much more irregular pattern characterizes women living in market centers, especially when migration is measured over five- and ten-year intervals. The inverse relationship between migration and age in other urban places and rural locations follows the general pattern of higher current mobility at younger ages. The question remains why this should not also be true in market centers.

AGE DISTRIBUTION OF MIGRANTS AND NONMIGRANTS

As the data on levels of migration suggest, sharp differences in age distribution obtain between women who moved after marriage and those who did not. The median age of migrant women is considerably higher than that of nonmigrants in each of the three residential categories (Table 4). Most notably, migrant women living in market centers in 1976 had a median age of 37.5 compared with only 32.0 for nonmigrants. For other urban places, the comparable medians were 35.8 and 32.4, and for rural places 36.7 and 33.3.

The differences in distribution are even sharper than the medians convey. For example, only 19 percent of the migrant women in market centers were under age 30 compared with 41 percent of the nonmigrants. Almost as large differentials characterize the other urban places and

Table 4

DISTRIBUTION OF EVER MARRIED WOMEN BY AGE, BY MIGRATION STATUS(a) AND CURRENT RESIDENCE

Age	Market Center		Other Urban		Rural	
	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant
15 - 19	--	1.3	4.7	1.8	6.9	0.8
20 - 24	14.6	10.4	12.4	13.0	13.6	10.9
25 - 29	26.3	6.4	22.9	12.0	18.6	12.0
30 - 34	22.8	19.5	20.6	18.5	16.7	17.8
35 - 39	18.7	24.7	12.3	27.8	15.5	24.4
40 - 44	10.5	26.0	14.7	15.8	13.8	16.7
45 - 50	7.0	11.7	12.4	11.1	14.9	17.4
Total percent	100.0	100.0	100.0	100.0	100.0	100.0
Total number	171	77	170	108	478	258
Median age	32.0	37.5	32.4	35.8	33.3	36.7

(a) Migration refers to after marriage only.

rural areas. Other things being equal, therefore, one would expect migrant women, as defined here, to have more children than nonmigrants. Control for age or for duration of marriage must therefore be introduced whenever feasible.

The extent of age differentials between migrants and nonmigrants varies when the interval during which migration occurs is changed. Table 5 shows the age distribution by migration status for the one-, five-, and ten-year intervals used in this analysis. The data refer to women who were in their first marriage and continuously married throughout the interval.

Table 5

DISTRIBUTION OF WOMEN(a) BY AGE, BY MIGRATION STATUS DURING SPECIFIED INTERVALS AND CURRENT RESIDENCE

Current Residence and Age	1975-76		1971-76		1966-76	
	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant
Market Center						
15 - 19	0.5	--	--	--	--	--
20 - 24	12.8	--	3.2	15.4	--	--
25 - 29	18.1	--	12.8	--	4.1	--
30 - 34	24.3	--	28.2	30.7	23.5	26.3
35 - 39	22.4	--	28.2	15.4	35.7	15.8
40 - 44	13.3	--	16.7	23.1	20.4	42.1
45 - 50	8.6	--	10.9	15.4	16.3	15.8
Total percent	100.0		100.0	100.0	100.0	100.0
Total number	210	7	156	13	98	19
Median age	33.8	--	36.0	36.3	38.1	40.9
Other Urban						
15 - 19	2.2	--	--	--	--	--
20 - 24	10.9	45.4	2.9	13.6	--	--
25 - 29	20.5	--	17.0	9.1	5.3	2.9
30 - 34	20.5	45.4	22.2	50.0	23.7	38.2
35 - 39	19.2	9.1	22.8	22.7	21.9	44.1
40 - 44	15.7	--	20.5	4.5	27.2	14.7
45 - 50	10.9	--	14.6	--	21.9	--
Total percent	100.0	100.0	100.0	100.0	100.0	100.0
Total number	229	11	171	22	114	34
Median age	34.0	30.5	36.7	32.7	39.8	36.0
Rural						
15 - 19	3.6	6.2	--	--	--	--
20 - 24	12.4	43.8	6.4	15.0	0.6	1.5
25 - 29	18.5	12.5	17.2	22.5	7.2	13.6
30 - 34	18.3	12.5	21.1	20.0	20.2	31.8
35 - 39	17.8	18.8	20.5	22.5	24.9	27.3
40 - 44	13.9	6.2	16.5	10.0	21.1	18.2
45 - 50	15.5	--	18.3	10.0	25.9	7.6
Total percent	100.0	100.0	100.0	100.0	100.0	100.0
Total number	562	16	454	40	317	66
Median age	34.2	25.0	36.3	33.1	39.4	35.6

(a) Restricted to women continuously married during the interval.

Among women living in other urban and rural places, for each migration interval, the median age of migrants was below that of the nonmigrants. The difference was particularly sharp among rural women, when a one-year interval was considered. But for women in both other urban and rural places, a difference of 3-4 years obtained even when the 10-year interval was considered. For women living in market centers, the patterns were quite different: no differences characterized migrants and nonmigrants as defined by the 5-year migration interval, and for the 10-year interval, migrants had a higher median age. Again, the importance of controlling for age or duration of marriage is clearly indicated.

MARRIAGE PATTERNS

Like age differentials, differences in age at, duration of, and frequency of marriage may be important factors in explaining migrant/nonmigrant fertility levels. Delayed marriage can in itself have an important effect on fertility levels. A large number of studies (Coale and Tye, 1961; Lesthaege, 1971; DaVanzo and Haaga, 1981) have clearly documented that women who marry late tend to have fewer children than women who marry early. The causal relation is, of course, affected by the level of contraceptive use; as contraception becomes more widespread, age at marriage in itself takes on less importance. Therefore, those segments of the population that have adopted family planning are less likely, other things being equal, to have their fertility affected by age at marriage. These interrelations may be particularly relevant for the rural and urban segments of a developing country such as Malaysia.

Age at marriage can also be affected by changes in female education and labor force participation. As women stay in school longer, and as more enter the labor force--particularly the modern sector--delays in marriage are likely to occur. In turn, the effect of education and occupation on age at marriage may be closely linked to migration, because women may move either to further their education or to seek employment. Moreover, to the extent that migration represents a break in social ties at origin and requires a period of time before new ties can be developed at destination, it may further contribute to a delay in marriage. Such delays may be compounded by changes in social norms that result in fewer arranged marriages in more modern settings. Given these complex relations attention must be directed to how much age at marriage of migrants differs from that of nonmigrants when several characteristics are controlled for.

Before we turn to these data, however, it is worth noting the rise in age at marriage in Malaysia that has been an important factor in the nation's fertility decline (Hirschman and Fernandez, 1980; DaVanzo and Haaga, 1981). For example, the average age at marriage among the women sampled by the MFLS rose from about age 17 for those married in 1950-54 to almost 21 for those married in 1970-76 (DaVanzo and Haaga, 1981, pp. 11-12). Moreover, members of each of Malaysia's three major ethnic communities participated in the change.

Because this analysis of the interrelations between migration and fertility defines migration as movement after marriage, we first turn to an assessment of migrant/nonmigrant differentials in average age at first marriage. Table 6 presents such averages by current residence and

age. For all three locations the average age at marriage of nonmigrants is higher than that of migrants. The greatest difference characterizes women living in market centers, among whom nonmigrants married, on the average, over one year later than migrants. This differential declines to under one year for those in other urban places and in rural locations. With few exceptions, migrants in all age groups in all three locations tend to marry at a younger age than nonmigrants in the same age and residence category. However, no clear pattern of age differentials emerges between migrants and nonmigrants within each of the categories, so, on the basis of these data, one cannot conclude that the relation between migration and age at marriage has changed in any particular direction. To the extent that migrants tend to have a somewhat lower average age at marriage than nonmigrants at destination, they may have initiated their fertility somewhat earlier and therefore

Table 6

AVERAGE AGE AT FIRST MARRIAGE, BY MIGRATION STATUS(a), CURRENT RESIDENCE, AND CURRENT AGE

Age	Market Center		Other Urban		Rural	
	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant
20 - 24	19.8	(b)	19.6	20.1	18.2	18.2
25 - 29	22.3	(b)	21.0	20.7	19.1	19.7
30 - 34	21.5	18.6	20.2	18.4	18.5	18.2
35 - 39	22.2	20.3	21.2	19.2	18.5	17.0
40 - 44	22.1	21.0	18.5	18.2	17.5	17.3
45 - 50	19.3	(b)	17.3	17.6	17.6	16.4
All ages	21.5	20.2	19.7	19.0	18.2	17.6

(a) Migration refers to after marriage only.
(b) Under 10 cases

have somewhat higher overall fertility levels, as judged by children ever born.

A fuller assessment of the relation between migration and age at first marriage can be undertaken through a regression analysis of age at marriage, while controlling for a number of background variables (Table 7). That several of these socioeconomic characteristics affect age at marriage is apparent from the resulting data. More education, residence in a market center, and participation in the modern sector of the labor force are all associated with much later age at first marriage. This relation characterizes women in each ethnic group. Migration is also related to age at marriage, but migrants married somewhat younger than women classified as nonmigrants. Again, the differences are significant and characterize each ethnic group. Because younger age at marriage is often associated with larger completed family size, the somewhat earlier marriages of migrants may affect their fertility levels as measured by children ever born.

The foregoing data refer to first marriage. Also relevant to the current analysis is the question of whether migrants differ from nonmigrants in the number of marriages. Multiple marriages may be particularly prevalent among some segments of Malaysia's Muslim population, among whom divorce was not uncommon. Research has indicated, however, that even in those states with traditionally high divorce rates (and therefore a higher potential for multiple marriages), divorce has dropped sharply in the last twenty years (Jones, 1980:287). By 1975, the Malay population had a crude divorce rate of 3.1, which varied among the states from 6.1 to 0.5. Although the overall rate is

Table 7

REGRESSION ON AGE AT MARRIAGE CONTROLLING FOR SELECTED CHARACTERISTICS, INCLUDING MIGRATION STATUS, FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Current age	-0.009	-0.006	0.048(a)	-0.042
Education	0.306(a)	0.361(a)	0.241(a)	0.415(a)
Current Residence(b)				
Market center	0.883(a)	0.180	1.088(a)	1.444(a)
Other urban	0.017	0.171	0.009	-0.672
Labor Force Status(c)				
Modern	1.483(a)	1.649(a)	1.595(a)	1.208
Traditional	-0.083	0.084	-0.142	-0.175
Ethnicity(d)				
Chinese	3.200(a)			
Indian	0.480(a)			
Migration Status(e)				
Migrant	-0.503(a)	-0.424(a)	-0.560(a)	-0.667
R^2	0.34	0.17	0.16	0.35
N	1,245	603	495	147

(a) Significant at least at the .05 level.
(b) Reference group = rural residence
(c) Reference group = not in labor force
(d) Reference group = Malays
(e) Reference group = never migrated or migrated before marriage only

still somewhat higher than that prevailing in a number of other Moslem countries, it does not diverge sharply from the norm.

Although the research for this study is not concerned with divorce per se, we did explore the extent of remarriage. The data indicate that the vast majority of the women in this analysis were married only once (Table 8). Of the 248 women living in market centers, only 6 (2.4

percent) reported more than one marriage; in other urban locations, 6.1 percent were married more than once. In rural areas, the proportion of multiple marriages was higher, 11.1 percent, and almost one third of these women were married three or more times. Fairly sharp differentials in frequency of marriage thus emerge between urban and rural women. The higher rate in rural areas is most likely a function of the much higher concentration there of Malay Muslims, in contrast to the concentration of Chinese in the urban locations, especially market centers.

Table 8

DISTRIBUTION BY NUMBER OF TIMES MARRIED, BY MIGRATION STATUS(a) AND CURRENT RESIDENCE

Residence and Migration Status	Once	Twice	Three or More Times	Total Percent	Total Number
Market Center	97.6	2.0	0.4	100.0	248
Nonmigrant	98.8	0.6	0.6	100.0	171
Migrant	94.8	5.2	--	100.0	77
Other Urban	93.9	4.7	1.4	100.0	278
Nonmigrant	96.5	2.3	1.2	100.0	170
Migrant	89.8	8.3	1.9	100.0	108
Rural	88.9	7.4	3.7	100.0	738
Nonmigrant	92.3	5.6	2.1	100.0	480
Migrant	82.6	10.8	6.6	100.0	258

(a) Migration refers to post-marital moves only.

In all three residence categories more migrants reported several marriages than did nonmigrants, and the differential increased as level of urbanization decreased. In market centers, only about 1 percent of the nonmigrants but 5 percent of the migrants were married more than once. In other urban places, the differential between migrants and nonmigrants amounted to almost 7 percentage points. For rural areas, it increased to almost 10 percentage points, with almost one out of every five migrants reporting more than one marriage, and a considerable proportion three or more. Although the differences are not statistically significant, these findings do suggest that migration is associated with higher levels of remarriage, particularly in rural areas. It may well be that remarriage itself leads to a move and is therefore the cause of migration rather than the reverse.

III. MIGRATION DIFFERENTIALS IN CHILDREN EVER BORN

MIGRATION AND FERTILITY

By 1975, the total fertility rate in Malaysia had reached a low of 4,162, varying from 3,537 for Chinese women and 3,870 for Indians, to 4,580 for Malays (Hirschman, 1980, pp. 114). As in most less developed countries, fertility varies by urban-rural residence, reflecting the various features of urban living that stimulate lower fertility; these include education, participation of women in the labor force (especially in the modern sector), modernity, housing conditions and cost of living, and easier access to knowledge and methods of birth control. In part, it also reflects the different ethnic compositions of urban and rural places; Chinese are predominantly urban dwellers and Malays rural. The Malaysian Fertility and Family Survey (WFS) found, for example, that the average of children born to women in the metropolitan towns is significantly lower than in the small towns and rural areas, and that these differences are generally replicated in all groupings of years since first marriage (Malaysia, 1979, p. 82).

Based on the average number of children ever born, reported by respondents in the MFLS, the effect of urban residence on fertility levels is very largely restricted to the market centers (Table 9). There, the average number of children born to all women between ages 15 and 50 is 3.6, compared with 4.6 and 4.8 for other urban places and for rural locations. Standardizing for age among the three residential categories changes the relation only minimally; the fertility in the market centers remains about 25 percent below that of the rural

Table 9

AVERAGE NUMBER OF CHILDREN EVER BORN BY CURRENT RESIDENCE AND AGE(a)

Age	Market Center	Other Urban Places	Rural	Total Peninsular Malaysia
15 - 19	2.0(b)	0.5	0.7	0.7
20 - 24	1.7	1.5	1.8	1.7
25 - 29	1.6	2.8	3.1	2.7
30 - 34	3.8	4.6	4.5	4.3
35 - 39	4.3	5.4	6.1	5.6
40 - 44	5.2	7.1	6.4	6.3
45 - 50	5.9	7.1	7.3	7.1
All ages	3.6	4.6	4.8	4.5
Standardized for age	3.7	4.6	4.7	4.5

(a) Analysis of variance indicates that the F-value for residence categories is significant at the 0.001 level
(b) Based on under 10 cases.

locations, and the differential between women in smaller urban places and in rural places remains minimal. The same pattern of residential differences in fertility characterizes the other age groups as well.

Given these patterns of differentials in fertility level, and the fact that approximately one-third of the women in each of the locations were migrants, often having migrated within the last ten years, to what extent is migration itself associated with differences in fertility? On a gross level, some indication can be obtained from the average number of children ever born by migration status for each of the three residence categories (Table 10).

Table 10

AVERAGE NUMBER OF CHILDREN EVER BORN BY MIGRATION STATUS, BY AGE AND CURRENT RESIDENCE

Age	Market Center		Other Urban		Rural	
	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant
15 - 19	--	2.00(a)	0.50	0.50(a)	0.76	0.50(a)
20 - 24	1.72	1.75(a)	1.62	1.36	1.68	2.04
25 - 29	1.60	1.80(a)	2.85	2.69	3.26	2.65
30 - 34	3.87	3.60	4.83	4.15	4.54	4.37
35 - 39	4.12	4.48	4.81	5.87	6.08	6.21
40 - 44	5.06	5.25	7.32	6.82	6.48	6.38
45 - 50	6.17	5.55(a)	8.00	5.42	7.30	7.31
All ages	3.29	4.22	4.53	4.58	4.57	5.87
Standardized for age	3.73	3.67	4.71	4.30	4.77	4.67

(a) Based on under 10 cases.

For the initial analysis only two broad migration status categories are used. Nonmigrants consist of women who never moved or moved before marriage only, and migrants are defined as all women who moved at least once after marriage. Controls are introduced for current age and current residence. For each residence category, within specific age groups with enough cases to allow comparisons, migrants are more likely to have slightly lower fertility than nonmigrants; for a few age groups, migrants have higher fertility, but the differences in every instance but one are very small. Only among women aged 35-39 in other urban places do migrants have substantially higher fertility. The average number of children ever born for all ages combined suggests considerably

higher migrant fertility in market centers and just slightly higher fertility for migrants in other urban places and rural areas. When the data are standardized for age, however, the patterns are reversed: migrants have fertility just below that of nonmigrants in each of the residence categories.

These same comparisons of migrant/nonmigrant fertility in urban and rural locations suggest the operation of both adaptation and selectivity. The fact that migrants to each of the residence categories have fertility only slightly below that of nonmigrants in the same locations suggests that they adapt to the fertility norms and behavior at the place of destination. Concurrently, the fact that the fertility of migrants to market centers (3.7 children ever born) is about 20 percent below the average of nonmigrants in both the rural areas and the smaller urban places from which most of these migrants came points to the possible operation of a selectivity effect in movement to big cities. Exploitation of the life history data allows testing these suggested relations further.

Because of the importance of controlling for a series of other socio-demographic variables, further analysis of the relation between fertility as measured by CEB and migration (defined in a variety of ways) utilizes a multivariate approach. Use of regression analysis permits more careful attention to the effect of migration on the average number of children ever born while controlling for such key variables as age, education, place of residence, and labor force status. Because ethnicity also plays an important role in differentiating behavior and characteristics in Malaysia, the multivariate analyses that follow introduce controls for ethnicity when all ethnic groups are combined; the regressions are also performed for each group separately.

THE EFFECT OF MIGRATION STATUS

In the following regression analysis on children ever born, migration status is defined in terms of never moved, moved before marriage only, moved once after marriage, and moved more than once after marriage. Because this research mainly examines the relation between migration and fertility, in most of the ensuing discussion, we present only the regression coefficients of the migration terms. To indicate the influence of the background variables on fertility, however, these will be discussed briefly first. Their effect is generally similar in direction if not in degree or significance for each measure of migration used. (A set of tables containing all the variables entered into the various regression equations is included in Appendix Tables A-1 to A-12.)

The results of the regression analyses indicate, as expected, that the relation between age and fertility is positive and that between education and fertility is negative. The effect of residence in market centers on fertility is clear: Women in the most urban category have, on the average, fewer children than do those in rural areas. By contrast, residence in other urban places of itself has no significant effect on fertility. Labor force participation in the modern sector at the time of the survey also has a slight negative effect on fertility, but the relation is not significant; and in some cases, modern sector employment is associated with slightly higher fertility than employment in the traditional sector. For all women combined, Indian women have higher average fertility than Malays, and Chinese have slightly lower, when other variables are controlled for.

The major concern in this regression analysis is the effect of migration status on fertility. Using women who never moved as the reference group, the unstandardized regression coefficients suggest that migration has a slight negative effect on fertility, but for none of the migration status categories is the effect statistically significant when migration is defined in terms of number of moves after marriage (Table 11). The greatest difference appears for those who moved once after marriage, for whom the regression coefficient shows an average of 0.2 fewer children than those who never moved. Overall, therefore, the regression analysis fails to support the thesis that migration, as here defined, has had a very great effect on the average number of children ever born by the time of the survey. In combination, all of the variables considered here explain about 45 percent of the variation in fertility of all women; however, migration in itself contributes only a small fraction to the total explained variance. Nonetheless, it is the unique combination of characteristics of migrant women that helps to explain their lower fertility.

The relation between migration and fertility, controlling for other background characteristics, can be assessed for each of the ethnic groups. For Malays, the relation continues to be negative, both for women who moved before marriage and for those moving after marriage, regardless of frequency of move. Moreover, the negative relation, although not statistically significant, is more consistent among Malays than in any other ethnic group. Among Chinese women, the pattern is somewhat different. Only the fertility of those moving once after marriage seems to be affected by migration; and this reduction of 0.4

Table 11

REGRESSION ON CHILDREN EVER BORN: UNSTANDARDIZED REGRESSION COEFFICIENTS FOR MIGRATION STATUS, MIGRATION INTERVALS, AND MIGRATION STREAMS CONTROLLING FOR AGE, ETHNICITY, AND BACKGROUND CHARACTERISTICS(a)

	All Women	Malay	Chinese	Indian
Migration Status(b)				
Moved before marriage only	-0.108	-0.318	-0.045	-0.760
Moved once after marriage	-0.222	-0.341	-0.390(c)	0.233
Moved more than once after marriage	-0.050	-0.324	0.002	0.014
Migration Interval (overlapping)				
Moved 1975-76(d)	-0.558(c)	-1.063(c)	-0.395	-0.145
Moved 1971-76(e)	-0.002	-0.764(c)	-0.199	0.879(c)
Moved 1966-76(f)	-0.203	-0.850(c)	0.536	-0.143
Migration Interval (sequential)(f)				
Moved 1975-76	-0.645	-2.398(c)	0.266	1.155
Moved 1971-75	0.110	-0.673	0.078	0.854
Moved 1966-71	-0.363	-0.743(c)	0.259	-1.203
Migration Streams(g)				
Rural-rural	0.167	0.063	0.078	0.683
Rural-urban	0.014	-0.223	-0.784(c)	1.677(c)
Urban-rural	-0.160	-0.355	-0.369	0.576
Urban-urban	-0.505(c)	-0.633(c)	-0.381	-1.042(c)

(a) Background characteristics include education, current residence, labor force status, and for all women ethnicity.
(b) Reference group = never moved.
(c) Significant at least at the .05 level.
(d) Reference group = nonmigrants 1975-76.
(e) Reference group = nonmigrants 1971-76.
(f) Reference group = nonmigrants 1966-76.
(g) Reference group = never moved or moved before marriage only.

children was statistically significant. Women in the other two migration categories had virtually the same fertility as women who never moved. Indian women seem to be characterized by still another pattern, although, as for Malays, the relations are not significant. For them, only women moving before marriage showed a reduction in fertility, about

0.8 children; Indian women moving once after marriage, in contrast to Malays and Chinese, tend to have slightly more children. These findings may relate to the tendency of Indian women to return to their home community for childbirth, but the data do not strongly support such an explanation.

THE EFFECT OF DURATION OF RESIDENCE

Previous research has indicated that duration at residence is an important factor in influencing levels of fertility. Moreover, the adaptation hypothesis holds that migrant women, in time, will show the same fertility behavior as nonmigrants at destination. At the same time, the disruption hypothesis suggests that migrants in the period following their move may have lower fertility than nonmigrants, because migration has interrupted childbearing patterns. Some insights into these possible relations can be obtained by considering the average number of children ever born to nonmigrants and to migrants by varying the interval over which migration is measured.

The life history data allow intervals to be measured in a variety of ways. The two approaches used here consider (1) an overlapping definition (1975-76, 1971-76, 1966-76), in which the fertility of migrants in each interval is compared with that of nonmigrants in the corresponding interval; and (2) a sequential definition (1975-76, 1971-75, 1966-71), in which the fertility of migrants in each interval is compared with that of nonmigrants during 1966-76. All three sequential intervals are entered as dummy variables into a single regression equation; for the overlapping intervals, three separate regressions are performed. Only women who were continuously married during the intervals under consideration were included in the analysis

(Table 11). This was done to eliminate possible disruptions in fertility that may have been caused by marital dissolution through either divorce or death.

Using the overlapping measures of migration, a negative relation for the combined group of women (controlling for ethnic identity as a background variable) characterized all three intervals. But the difference is large and statistically significant only for those moving within one year preceding the survey; these migrants had 0.6 fewer children, on average, than those not moving during this period. Those moving any time between 1971 and 1976 had fertility virtually the same as nonmigrants during the period. The 1966-76 migrants showed a negative differential, but it was not statistically significant. Why the five-year interval group should deviate is not clear, but it may be related to the urban-rural migration stimulated by the FELDA program.

When each ethnic group is analyzed separately, the differences are much sharper and also consistently significant for the Malay population. Migration clearly reduced fertility for these women. The effect is greatest for the shortest interval; women moving between 1975 and 1976 had one child less than the nonmigrants; but even for those moving between 1971 and 1976 and those moving during the entire ten-year interval before the survey, migrants had about 0.8 fewer children.

For Chinese and Indian women, the relation between migration and fertility, using these overlapping intervals, is different. Among the Chinese, the greatest negative effect, amounting to 0.4 fewer children, is also for those moving in the year before the survey. Migrants during 1971-76 also display lower fertility than nonmigrants, but the differential amounts to only 0.2 children. Neither difference is

significant. By contrast, for Chinese women moving between 1966 and 1976, the relation to fertility is positive, a very different relation than what characterized the Malays in this migration interval.

For Indian women, the shortest and longest intervals are both characterized by a negative relation between migration and fertility but lead to only a small reduction in the average number of children born. Those Indian women who moved between 1971 and 1976, however, had higher average fertility than nonmigrants, and the 0.9 difference was significant. This relation stands in especially sharp contrast to the Malay's reduction in fertility.

Overall then, although a number of the values are not statistically significant, these regressions suggest that the fertility-migration relation is by no means uniform for each of the three ethnic groups. Religious and cultural patterns may well account for some of the differences observed and should be included in further assessments. These data also indicate the danger in a multi-ethnic society of basing conclusions on data for all ethnic groups combined. Patterns characterizing one group may well cancel those of others.

The third panel of Table 11 presents the results of the regression analysis using sequential intervals to provide a more precise test of whether the effect of migration on fertility is strongest in the period immediately following the move and whether longer periods of stability following the move lead to narrowing of migrant/nonmigrant differentials. Only women who were continuously married during the entire decade are included in the analysis; the reference group is women who did not move during the ten years preceding the survey.

The results for all women show a pattern similar to that based on the overlapping intervals, although fewer of the differences are statistically significant. The greatest effect on fertility, a reduction of 0.6 children, characterizes women moving in the year before the survey; the women who had last moved 6-10 years before the survey also had somewhat lower fertility. Those whose move occurred one to five years earlier, however, actually had slightly higher fertility than the nonmigrants. These data thus point to the initially negative effect of migration on fertility; the pattern is mixed with increasing length of interval since the move. The disruptive effect of migration on fertility appears to dissipate fairly rapidly, although women who moved during 1966-71 seem to have somewhat lower fertility than the nonmigrants.

Again, however, the pattern is not uniform for all ethnic groups. For Malays, the effect of migration is strong and persists even into the longest interval. Women moving between 1975-76 had 2.4 children fewer than the migrant reference group. For those whose move occurred in the 1971-75 period, the reduction averaged 0.7 children; this was just below the difference characterizing migrants in the 1966-71 period. Among the Chinese, migration was associated with slightly higher fertility (although not statistically significant) for each interval. For Indian women the pattern was still different and the differences were more pronounced. Those moving between 1975 and 1976 and between 1971 and 1975 display fertility substantially higher than that of nonmigrants, whereas the migrants during 1966-71 averaged 1.2 fewer children.

In sum, the results for all ethnic groups combined and for Malay women separately support the hypothesis that migration is associated with lower fertility and that this effect is most pronounced in the period closest to migration. Migration seems somewhat less important in determining fertility after the one-year migration interval. This finding suggests that both selectivity and disruption may be affecting fertility levels. That the patterns for Chinese and Indian women are quite different suggests that ethnic identity affects the interrelations between migration and fertility in ways not detected through use of standard socioeconomic and demographic variables.

DIFFERENTIALS BY MIGRATION STREAMS

As earlier discussion has indicated, several theories about the relation between migration and fertility either specifically or implicitly state that migration between different types of residence (rural-urban or urban-rural) will have a greater effect on fertility levels than migration between similar types of places--i.e., between two urban or between two rural places. An underlying assumption of these theories is that migrants between different categories of residence will find themselves in a milieu substantially different from their place of origin and removed from the values and norms that characterize their previous residence. The place of destination may either have been chosen because of these contextual differences (selectivity of migrants) or it may affect migrant behavior subsequent to the move (adaptation). Also, the disparities between origin and destination may have been sufficiently great to disrupt normal behavior (including fertility) for some time after the move.

These relations can best be tested by incorporating attention to streams of movement into the analysis. However, in interpreting these data, consideration must be given to the limitations of the MFLS data pointed out earlier; there is considerable lack of correspondence between the coding of earlier residences from the retrospective histories (because of the somewhat crude classification of the urban/rural character of locations) and that of current residence based on the PSU. To overcome this problem, at least to some extent, only a dichotomous rural/urban coding scheme is used (based on category of residence at time of move for migrants, and current category for nonmigrants); market centers and other urban places are classified as "urban"; all other places are considered "rural." Such classification allows identification of four migration streams; rural-rural, rural-urban, urban-rural, and urban-urban. For women who moved more than once, origin of first move and destination of last move are used.

Contrary to expectation, movement between different types of residence does not significantly affect the number of children ever born when women in all ethnic groups are analyzed together (Table 11). Only urban-urban movement significantly lowers fertility. The same finding holds for Malay women, when the analysis is performed separately for each ethnic group. In marked contrast, among Chinese and Indian women, rural-urban migration shows a strong relation to fertility, but in opposite directions; Indian migrants have substantially more children than the nonmigrants. In addition, for Indian women, urban-urban movement also has a substantial effect, reducing fertility by one child, compared with nonmigrants. For Chinese women, only rural-urban migration has a significant, and negative, effect.

These mixed ethnic patterns suggest several conclusions about the relation between fertility and the various migration streams. The disparities between rural and urban residence apparently do not affect the fertility of Malays, who generally maintain close ties to their kin at place of origin and who tend to settle in enclaves within the cities (kampong) where traditional life styles can be maintained. Malays moving between urban places appear to be particularly selective, perhaps on characteristics not included in the regression analysis. These women are likely to be the wives of government officials who are transferred to new locations. Chinese women moving from rural to urban places do exhibit the expected lower fertility level; because many of these women may have been involved in the mandated relocation from farms to towns, their fertility may very well show the effects of disruptions associated with their migration. Indian women again are characterized by a different pattern. The significantly higher fertility of rural-urban migrants compared with nonmigrants may possibly be explained by the out-migration of Indians from the rubber estates; such women may be dominant in this rural-urban stream. Urban-urban Indian migrants, like the Malays, are characterized by much lower fertility than nonmigrants, and to a much greater degree than the Malays.

The data presented in these regressions do not take length of time since move into account, and this omission may affect CEB if disruption and adaptation are key factors in accounting for fertility levels. Unfortunately, with the exception of the rural-rural stream, the streams are composed of too few women to allow further disaggregation or restriction to movement between specified intervals such as five or ten

years. Inability to carry the stream analysis further, especially when attention turns to particular time-bound relations (such as post-migration fertility and birth intervals), therefore precludes a more in-depth examination of the specific effect of origin-destination on migration.

THE EFFECT OF DURATION OF MARRIAGE

Some research has indicated that duration of marriage is more critical than current age as a determinant of average number of children born (Lee, 1981). It may be particularly important in Malaysia where substantial ethnic differentials exist in age at marriage (e.g., DaVanzo and Haaga, 1981). To test its effect, we obtained a set of regressions on children ever born paralleling those just examined, except that duration of marriage is used instead of current age.

Control for duration of marriage explains somewhat more of the variance than when age was used, narrows the differences between migrants and nonmigrants, and somewhat changes the pattern of the relation between migration and fertility for all women and, in limited instances, for the specific ethnic groups (Table 12). Those who moved before marriage had slightly more children (0.1) on average than the nonmigrants, whereas those who moved after marriage had fewer.

Using overlapping intervals, recent movement (1975-76) has the greatest negative effect, 0.3 fewer children; five- and ten-year migration has only a minimal effect on fertility. Again, Malay women show a larger decline in fertility associated with migration, especially for the shortest and longest intervals. Within the Chinese group, women are most negatively affected by recent movement. For them, movement occurring between 1966 and 1976 is associated with fertility higher (0.7

Table 12

REGRESSION ON CHILDREN EVER BORN: UNSTANDARDIZED REGRESSION COEFFICIENTS FOR MIGRATION STATUS, MIGRATION INTERVALS, AND MIGRATION STREAMS CONTROLLING FOR DURATION OF MARRIAGE, ETHNICITY AND BACKGROUND CHARACTERISTICS(a)

	All Women	Malay	Chinese	Indian
Migration Status				
Moved before marriage only	0.132	-0.101	0.195	-0.444
Moved once after marriage	-0.168	-0.363	-0.281	0.245
Moved more than once after marriage	-0.006	-0.230	-0.064	-0.155
Migration Interval (overlapping)				
Moved 1975-76	-0.316	-0.813(b)	-0.578	0.359
Moved 1971-76	0.039	-0.566	-0.264	0.851(b)
Moved 1966-76	-0.108	-0.784(b)	0.684(b)	-0.117
Migration Interval (sequential)				
Moved 1975-76	-0.486	-2.153(b)	-0.094	1.362
Moved 1971-75	0.110	-0.693	0.166	0.821
Moved 1966-71	-0.241	-0.683(b)	0.565	-1.340
Migration Streams				
Rural-rural	0.010	-0.032	-0.005	0.216
Rural-urban	0.041	-0.185	-0.677(b)	1.514(b)
Urban-rural	0.019	-0.168	-0.059	0.524
Urban-urban	-0.502(b)	-0.723(b)	-0.342	-0.786

(a) See notes on Table 11.
(b) Significant at least at the .05 level.

children) than that of nonmigrants and is in sharp contrast to the 0.6 fewer children that one-year migrants had compared with their nonmigrant reference group. The pattern for Indian women remains mixed, with the significantly higher fertility of women who moved between 1971 and 1976 standing in marked contrast to that of the other Indian migration groups as well as the Malays and Chinese in the same migration category.

Use of sequential migration intervals also indicates that the sharpest reduction in fertility occurs for the most recent movers, 0.5 fewer children on average than among women who did not move during 1966-76. This contrasts with 0.1 more and 0.2 fewer for those who moved between 1971-75 and 1966-71, again suggesting that stability following a move to some extent diminishes the initial negative effect of migration on fertility. Malays display among the sharpest negative relations between migration and fertility, especially among recent migrant women who have over two fewer children than nonmigrants. This declines to 0.7 fewer for women who migrated between 1971 and 1975 and between 1966 and 1971, suggesting that, although stability following a move diminishes the negative effect of migration on Malay fertility, the effect is not further reduced beyond five years after the move.

Among Chinese migrants, the only group substantially differing from the nonmigrants are those who moved between 1966-1971 and for them the effect is positive (+0.6 children). As for the overlapping intervals, Indian women display a very different pattern, with migrants in the 1966-71 interval characterized by a substantial reduction in fertility and those moving more recently actually having more children than the nonmigrants. This pattern may reflect differences in types of migration patterns per se among Indian women, with migration having a very different meaning and effect for Indian women than for other ethnic groups.

This analysis of the effect of duration of residence on migrant fertility suggests that some initial disruption in fertility and selectivity of women with low fertility does occur, so that the

fertility of one-year migrants is below that of women who have lived at current residence for more than one year. This finding characterizes all women and each ethnic group separately for the overlapping migration interval; it characterizes all women and Malays for the sequential interval. The initial negative effect weakens considerably with duration at residence, but in no instance do migrants have significantly higher fertility than nonmigrants at destination. This suggests that migrants adapt to the fertility behavior of natives at destination, although such adaptation does not seem to be consistently related to length of interval and differs in extent by ethnic group.

When migration is defined in terms of streams of movement, the patterns observed earlier when age rather than duration of marriage was controlled remain largely unchanged. For Malays, only urban-urban migration significantly lowers fertility. For Chinese and Indian women, rural-urban migrants show substantial differences in children ever born, but the relations are again in opposite directions for the two groups: Chinese rural-urban migrants have 0.677 fewer children than Chinese nonmigrants; Indian rural-urban migrants have 1.514 more children than Indian nonmigrants. With duration of marriage controlled, urban-urban migration for Indian women is no longer significantly related to fertility although it still shows a negative relation. Again, the importance of the unique cultural and economic characteristics of the various ethnic groups for understanding the migration/fertility relation is emphasized.

IV. MIGRATION DIFFERENTIALS IN FAMILY PLANNING

The foregoing analyses of fertility, using children ever born as the dependent variable, indicate the importance of urban/rural residence on both migrant and nonmigrant fertility. One important contributory factor may be the extent of family planning among urban and rural women in Malaysia and among migrants compared with nonmigrants. If women leaving rural areas are rational in their decision to leave and innovative with respect to the types of opportunities and challenges they are seeking in urban places, they may also be more modern than the nonmigrants at origin in their family planning practices, and possibly even as modern as those women who have spent their lives in urban locations. However, if women move to cities because of pressures "forcing" them out of villages, they may well be bringing with them not only high rural fertility values but also more limited knowledge and practice of family planning; in the city, they are not likely in the short run to change these attitudes and practices. Differences in attitudes toward family planning may also characterize those women who move within rural areas; like rural-to-urban migrants, rural-to-rural movers may be moving for more or less rational reasons, and their family planning practices may very well reflect a general rationality in behavior that informs both their fertility and mobility.

Among the information collected by the MFLS in the women's life histories was a record of contraceptive usage. These data can be related sequentially to both pregnancies and changes in residence. Consequently, they allow determination of whether women adopt family

planning measures or whether they change the type of contraceptive used, and the timing of such changes in relation to a change in migration status. Because the MFLS collected information on breastfeeding from a question directed solely at this practice and as part of the question on contraceptive usage, some confusion resulted as to whether women used breastfeeding as a contraceptive measure. For the present analysis, breastfeeding is therefore not included as a contraceptive practice, and women who reported using only breastfeeding for contraception have been classified with women who reported using no contraception.

This analysis of family planning practices will focus on changes in practices for migrants and nonmigrants during one-, five-, and ten-year intervals, controlling for residence at the end of the interval (destination for migrants) but not for residence at the beginning (origin of migrants). As before, the sample for each interval is restricted to women who were continuously married during the time under consideration and not pregnant at either the beginning or end of the interval.

In Table 13 nonmigrants and migrants (defined by varying lengths of residence) are compared in terms of type of contraceptive used at the beginning of the interval. If migration is measured over the one-year interval preceding the survey, comparisons can be meaningfully made only for the rural women because of the small number of migrants in urban places. For the rural women, the evidence suggests that nonmigrants were less likely to rely on contraception than migrants, and most of the differential is attributable to the migrants' greater use of traditional methods. Six out of every ten nonmigrant women reported using no method of birth control compared with half of the migrant women. Whereas

Table 13

CONTRACEPTIVE USE AT BEGINNING OF MIGRATION INTERVAL, BY MIGRATION STATUS AND CURRENT RESIDENCE(a)

Residence and Contraceptive Use	1975-76		1971-76		1966-76	
	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant
Market Center						
None	31.9	(b)	38.6	54.5	58.8	38.9
Traditional	16.6	(b)	17.2	--	13.2	11.1
Modern	51.6	(b)	44.3	45.4	27.9	50.0
Other Urban						
None	42.3	(b)	50.4	46.1	67.8	80.0
Traditional	12.6	(b)	13.2	--	8.0	8.0
Modern	45.1	(b)	36.4	53.8	24.1	12.0
Rural						
None	60.4	50.0	73.2	58.8	84.6	86.3
Traditional	8.4	16.7	8.5	17.7	7.1	3.9
Modern	31.2	33.3	18.3	23.5	8.3	9.8

(a) Restricted to women continuously married during the interval and not pregnant at either the beginning or end of the interval.
(b) Under 10 migrants.

almost equal proportions of both groups reported using modern methods of birth control, twice as high a proportion of migrants as nonmigrants reported using traditional contraceptive methods.

When a five-year migration interval is used, the pattern of differentials in contraceptive use observed for the one-year interval still holds for rural women. In market centers, the opposite pattern emerges: Proportionally more nonmigrants use contraception, and the difference is wholly attributable to their use of traditional methods. In other urban centers almost half of both migrant and nonmigrant women use no contraceptive methods, but migrants more commonly use modern methods.

Use of a ten-year migration interval reveals yet other patterns of differentials and points most clearly to the limited use of contraceptive measures ten years before the survey. In rural areas only 15 percent of the nonmigrants and 14 percent of the migrants used any method at all; in other urban areas, 20 percent of the migrants and 32 percent of the nonmigrants did so, and the latter were more likely to rely on modern methods. Only in market centers, and especially among migrant women, was contraception widely practiced; here again, modern methods were more popular than traditional ones. In fact, the migrant women in this residence category show the greatest use of contraception of any group considered in the ten-year interval. The patterns for this interval are too mixed to allow for any firm conclusions about the relation between migration and contraceptive use. Part of the difficulty lies in the inability to control for age, parity, or ethnicity, because there are too few cases.

The advantage of the MFLS data is that they allow comparisons of changes in contraceptive behavior over varying intervals. In particular, we are interested in whether women who reported using no contraceptives at the beginning of a specified migration interval had adopted birth control by 1976, the time of the survey, and whether this differed for migrants and nonmigrants (Table 14). As before, the comparisons are restricted to women who were continuously married during the intervals and not pregnant at either the beginning or end of the intervals. Because of the few migrants who qualify for inclusion in this analysis, discussion will be limited to the five- and ten-year intervals.

Table 14

DISTRIBUTION BY TYPE OF CONTRACEPTIVE USED IN 1976 OF WOMEN(a) WHO USED NO CONTRACEPTION AT BEGINNING OF MIGRATION INTERVAL, BY MIGRATION STATUS AND CURRENT RESIDENCE

Migration Interval and Type Contraceptive Used in 1976	Nonmigrant			Migrant		
	Market Center	Other Urban	Rural	Market Center	Other Urban	Rural
1971-1976						
None	79.4	90.9	81.0	(b)	(b)	61.5
Traditional	8.8	0.0	2.0	(b)	(b)	0.0
Modern	11.8	9.1	17.0	(b)	(b)	38.5
1966-1976						
None	63.0	70.0	70.7	(b)	38.5	60.9
Traditional	3.7	3.3	6.7	(b)	7.7	13.0
Modern	33.3	26.7	22.6	(b)	53.8	26.1

(a) Restricted to women continuously married during the interval and not pregnant at either the beginning or end of the interval.
(b) Under 10 migrants.

For the five-year interval, somewhat greater change appears for migrants than for nonmigrants. Unfortunately, however, the small number of migrants in market centers and other urban places precludes any firm assessment. For the rural locations, 81 percent of the nonmigrant women who reported no birth control use in 1971 also reported being nonusers in 1976; among the migrants, however, this proportion was only 61 percent, and all of those using birth control were relying upon a modern method. The available evidence (not shown in table) also suggests that more of the migrants in urban places adopted contraception in the interval than did nonmigrants in these locations.

The evidence for the ten-year interval similarly indicates that migrants were more likely to adopt birth control than nonmigrants. In rural locations, 30 percent of the nonmigrants who were nonusers in 1966 were users by 1976, and three out of every four of these had adopted a modern method. Change was even greater for the migrants, with 39 percent of the 1966 nonusers reporting use in 1976; two out of every three of these reported a modern method. Even sharper changes characterized other urban places, where only 30 percent of the nonmigrants became users as contrasted with 62 percent of the migrants. In both groups, the proportion using modern methods was almost eight times greater than the small percent using traditional methods. Only in the market centers was there a lower rate of adoption of birth control among migrants than nonmigrants, but this may be a function of the small number of migrants in the market centers.

Overall, therefore, the data indicate that migrants adopt contraceptive practices more than nonmigrants in both urban and rural places, when migration is measured over a five- or ten-year interval, with a large proportion of both nonmigrant and migrant women adopting modern methods of birth control. The greater rate of birth control use by migrants who were former nonusers and the heavy reliance on modern methods suggest that part of the adaptation to movement, regardless of destination, may be greater restriction of childbearing through wider use of contraception. Unfortunately, the lack of adequate cases among the migrants, and especially for migrants to urban places, precludes fuller testing of whether movement between specific types of locations and especially from rural to urban locations results in greater change in contraceptive behavior.

V. TEMPORAL RELATIONS BETWEEN MIGRATION AND FERTILITY

The preceding sections of this Note have explored migrant/nonmigrant patterns of marriage and of fertility measured in terms of children ever born; we also investigated changes in contraceptive use. These analyses identified a number of important differences between the two groups and suggested, in particular, the importance of duration since move as a factor related to observed differentials in both fertility and contraceptive use. The life history matrices of the MFLS provide an opportunity to pursue these temporal relations in some depth, with specific attention to the theoretical issues posited earlier. A cohort analysis will be used to measure the effect of migration on fertility during specific age periods. The number of children born before migration will be analyzed to test the selectivity hypothesis; use of information on number of children born at specified points both before and after the move allows further evaluation of the disruptive effects of migration and the extent to which reductions in fertility before or in conjunction with the move are compensated for by accelerated childbearing after the move, as has been suggested by some previous research (Goldstein and Goldstein, 1981; Magnani, 1980). Fertility before and after migration will be further explored through regression analyses to provide additional tests of the selectivity hypothesis and to explore whether adaptation to the fertility norms at place of destination occurs within five years of migration. Finally, the disruption hypothesis will be addressed through a series of analyses measuring the intervals between marriage and births

of specified parities, comparing intervals that were interrupted by migration with those that were not.

COHORT ANALYSIS

In assessing the relation between migration and fertility, it is important to recognize that the relation may change over time, as the conditions that stimulate or retard migration change and as fertility-related attitudes and behavior change. One way to control for such varying conditions is through use of a cohort type of analysis; to do so here, women's migration and childbearing patterns are disaggregated into ten-year segments. The two cohorts considered are women aged 20-29 in 1956 and those of similar age in 1966 (Table 15). For the earlier cohort, the migration/fertility experience will be examined for ages 20-29 and then ages 30-39; for the second cohort, only ages 20-29 can be considered, because the survey was undertaken in 1976. The analysis is restricted to women in these two cohorts who were married (a) by age 20 and (b) by age 25. Women are classified according to their migration status during ages 20-29 and 30-39. In turn, the average number of children born during the ten-year periods can be ascertained. This procedure allows determination of whether a sequence of migration/nonmigration is related to fertility level.

For the 1956 cohort married by age 20, the data show that women who had not migrated during the entire 20-year interval had the highest average number of children born during ages 20-29. The lowest average was that of women who had migrated during ages 20-29 and again during ages 30-39. Intermediary were those women who had moved during only one of the ten-year periods, with those who moved in the earlier age range

Table 15

COHORT ANALYSIS OF FERTILITY BY MIGRATION STATUS

I. For Women Aged 20-29 in 1956:

	Married by age 20 (n=257)			Married by age 25 (n=320)		
	Average Children During			Average Children During		
	Ages 20-29	Ages 30-39	Ages 20-39	Ages 20-29	Ages 30-39	Ages 20-39
Nonmigrant ages 20-29 and 30-39	4.9	2.2	7.1	4.7	2.2	6.9
Nonmigrant ages 20-29, migrant ages 30-39	4.5	1.8	6.3	4.4	1.8	6.2
Migrant ages 20-29, nonmigrant ages 30-39	4.8	2.7	7.5	4.4	2.5	6.9
Migrant ages 20-29, migrant ages 30-39	4.3	1.5	5.8	4.1	1.5	5.6

II. For Women Aged 20-29 in 1966:

	Married by age 20 (n=309)	Married by age 25 (n=428)
	Average Children During Ages 20-29	Average Children During Ages 20-29
Nonmigrant during ages 20-29	4.8	4.5
Migrant during ages 20-29	4.6	4.0

having average fertility levels almost the same as nonmigrants for the whole period.

The relation changes somewhat if fertility is measured in terms of number of children born during ages 30-39. Women who moved at ages 20-29 but not during ages 30-39 had the highest average fertility. Among women who were nonmigrants during ages 20-29, those who moved in the succeeding ten years had lower fertility--an average of 0.4 fewer children--than those who remained in the same town of residence. The lowest fertility during ages 30-39, like during ages 20-29, characterizes those women who moved during both periods. This pattern supports the thesis that repeated movement is associated with lower fertility and that residential stability is generally conducive to higher fertility.

The net result of these sequences of moves and childbearing experiences is that by the end of the 20-year period, the highest average number of children were born to women who moved during the early years but not during the second period; women who have not moved at all in the period have the second highest fertility. Fertility is above seven children per woman for both groups. Women who moved only after a decade of stability had 6.3 children, and those who moved in both decades had by far the lowest average, only 5.8.

For women marrying by age 25, basically the same pattern emerges, in part because all of the women married by age 20 are included in this group; only those who married between ages 20 and 25 are added. The data for the 1956 cohort suggest that migration after marriage is associated with lower fertility near the end of childbearing, that this is more likely if the move occurs later rather than earlier in the

reproductive cycle, and particularly when the women move several times during the childbearing period.

Further support is provided by the data on women age 20-29 in 1966. For both those married by age 20 and those married by age 25, the average number of children ever born is lower for women who migrated during ages 20-29 than for those who did not, although the difference is slight for the former group. No comparisons are possible for ages 30-39, because this cohort reached those ages only after the survey.

Although the pattern is not entirely consistent, this cohort analysis suggests that migration is associated with lower fertility, especially if the move occurs later in the life cycle. Because women who moved during ages 30-39 also had the lowest fertility during ages 20-29, regardless of migration status, some selectivity must have been operating. The lower fertility of each migrant group, except women who moved only during ages 20-29, may also be due to the disruptive effect associated with migration. The combination of these effects is particularly evident for women who moved during both decades: Their fertility is well below that of any other group.

These findings must be seen only as suggestive, but they are considerably more refined than most of those used previously to assess the relation between migration and fertility. As such, they support the thesis that women who migrate are likely to be of lower fertility and that disruptions in fertility occur in conjunction with the migration process. Although the post-migration period does not seem to be associated with similar lower fertility, the differences that have already occurred are sufficiently great to result in continuing differentials in cumulative fertility as women proceed into the later stages of the reproductive cycle.

PRE- AND POST-MIGRATION FERTILITY

The preceding cohort analysis suggested that migration may indeed be selective of low fertility women, and that lower fertility often continues to characterize migrants in the period after the move. A more direct exploration of these relations is possible with the MFLS data. For such an evaluation to be meaningful, however, a control group of nonmigrants must be used to ascertain whether their fertility changes at the same pace as does that of migrants. As one way to undertake such an evaluation, the following procedure was developed. Three cohorts of migrants were identified--those who moved between 1968 and 1974, between 1963 and 1969, and between 1958 and 1964. Women included in each of these cohorts were continuously married for at least two years preceding and following the entire period, and all were aged 15-34 at the time of the move. We ascertained the average number of children ever born by two years before the move, one year before the move, and one and two years following the move separately for women of rural and urban origin. The control group were women who had not moved during the specified interval, but who were continuously married and aged 15-34 at the mid-point of the interval--the reference years 1971, 1966, and 1961. For these women, we determined number of children born two years before, one year before and one and two years after the reference year. Nonmigrant residence was defined at the reference year and by definition did not change over the interval. Although only a crude control, this comparison allows assessment of the rate of change in fertility during approximately the same interval for migrants and nonmigrants with similar marital and age characteristics. The results are presented in Table 16.

Table 16

CHILDREN EVER BORN IN RELATION TO TIME OF MIGRATION, FOR WOMEN CONTINUOUSLY MARRIED 1966-76, 1961-71, AND 1956-66 AND AGED 15-34 AT TIME OF MOVE (DURING 1968-74, 1963-69, 1958-64) OR REFERENCE YEAR FOR NONMIGRANTS (1971, 1966, 1961)

	Two Years Before Move	One Year Before Move	One Year After Move	Two Years After Move	Number of Women
		Migrants, 1968-1974			
Rural origin	3.3	3.7	4.5	4.7	24
Urban origin	3.4	3.6	4.2	4.4	16
		Nonmigrants, Reference Year 1971			
Rural residence	3.5	3.9	4.6	4.7	178
Urban residence	3.7	4.1	4.6	4.8	168
		Migrants, 1963-1969			
Rural origin	3.2	3.6	4.4	4.6	18
Urban origin	3.9	4.2	4.8	5.0	24
		Nonmigrants, Reference Year 1966			
Rural residence	3.7	4.1	4.6	4.9	170
Urban residence	3.6	4.0	4.7	4.9	165
		Migrants, 1958-1964			
Rural origin	2.8	3.2	3.9	4.1	27
Urban origin	3.9	4.2	4.9	5.3	14
		Nonmigrants, Reference Year 1961			
Rural residence	3.9	4.3	5.0	5.2	189
Urban residence	3.2	3.6	4.2	4.5	117

Within all three cohorts, the number of children born to migrants of rural origin two years before the move was below that of the nonmigrants in rural areas. These patterns continued to characterize fertility of migrants and nonmigrants one year before the move/reference year. These data on rural-origin women lend limited support to the selectivity hypothesis. However, the extent of selectivity has become progressively smaller from the earliest to the latest rural cohorts being considered. The narrowing differences may be due to a number of factors: (1) the stimuli for migration may have changed over time; (2) the direction of migration may have changed (i.e., more of recent migration may be between similar types of areas); (3) the fertility/migration relation may differ by ethnicity and the ethnic composition of the migrant groups has changed. Unfortunately, the MFLS data contain too few migrant women to allow disaggregation to test these possibilities in this type of analysis.

The patterns are by no means as clear for urban-origin women. Only migrants in the most recent cohort had lower fertility than urban nonmigrants. This suggests that migration from urban places has operated differently than for rural-origin women, except for the most recent cohort. Again, more attention than the data allow to changes in the causes, direction, and composition of migration are required before fuller explanations can be offered.

Two years after the move/reference year, the basic patterns of difference between migrants and nonmigrants in the respective rural and urban categories had changed only slightly, although the relative differences had narrowed; rural-origin migrants had experienced a

relatively larger increase in fertility than was true of rural nonmigrants. Taken together with the fact that the fertility of rural-origin migrants was also consistently below that of rural nonmigrants two years before the move, these data suggest that there may be a catch-up effect operating.

The patterns and pace of change can be assessed more easily by examining the ratios of children ever born two years after the move to the number born at specific points earlier (Table 17). Because of the short time over which change was possible, minimal differences are shown in the ratios of two years after the move to one year after, or in the ratios for two years after to one year before the move. Only when the interval is extended to four years--that is, two years after the move compared with two years before the move--do substantial differences emerge. The ratios consistently indicate a larger increase in fertility among rural-origin migrants than was true of rural nonmigrants. For urban-based women, the differences were mixed and not as great in magnitude. The changes in fertility over the four years encompassing migration were therefore strongest and most consistent for the rural-origin migrants. Together with the fact that the fertility of these migrants was also consistently below that of the rural nonmigrants two years before the move, the data suggest that there may be a "catch-up" effect.

Some insights into whether migration has a disruptive effect on fertility can be obtained through comparison of fertility one year after the move to fertility one year before the move. If migration does interfere with childbearing patterns, then the ratios should be lower for migrants than for nonmigrants, because migrants could be expected to

Table 17

RATIOS OF CHILDREN EVER BORN IN RELATION TO TIME OF MOVE OR REFERENCE YEAR FOR NONMIGRANTS

	Ratio of CEB 2 Years After Move to:			Ratio of CEB One Year After to One Year Before
	One Year After	One Year Before	Two Years Before	
Migrants, 1968-74				
Rural origin	1.04	1.27	1.45	1.22
Urban origin	1.05	1.24	1.31	1.18
Nonmigrants, reference year 1971				
Rural residence	1.03	1.20	1.34	1.15
Urban residence	1.06	1.18	1.29	1.11
Migrants, 1963-69				
Rural origin	1.05	1.30	1.43	1.24
Urban origin	1.05	1.20	1.29	1.14
Nonmigrants, reference year 1966				
Rural residence	1.07	1.22	1.32	1.14
Urban residence	1.04	1.23	1.35	1.18
Migrants, 1958-64				
Rural origin	1.06	1.28	1.45	1.21
Urban origin	1.09	1.25	1.35	1.15
Nonmigrants, reference year 1961				
Rural residence	1.05	1.22	1.34	1.16
Urban residence	1.07	1.27	1.40	1.19

have fewer children in the period during which migration occurs. Here again, no consistent pattern emerges. Rural-origin migrants had consistently greater increases in fertility level than did rural nonmigrants, suggesting that migration did not have a disruptive effect, or at least that disruption did not extend into the post-migration period. For the urban-based women, however, in two of the three cohorts, the increases were slightly greater for the nonmigrants than for the migrants.

PROBABILITY OF MIGRATING

A more direct and refined analysis of the selectivity hypothesis than was possible using the pre- and post-migration fertility level comparisons of the foregoing analysis can be undertaken with a multivariate analysis using the probability of migrating during a specific period as the dependent variable.[1] The key independent variable is the number of children born up to the beginning of the specified migration interval. Background characteristics incorporated as other independent variables include residence, labor force status, and migration status at the beginning of the interval, as well as education and ethnicity. The intervals considered are 1961-66, 1966-71, and 1971-76 (Tables 18, 19, and 20).

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[1] Ordinary least squares (OLS) regression is used because of its directness and the ease with which it can be used and interpreted, even though a dichotomous probability variable (migrated/did not migrate) is often analyzed through use of logit or probit analysis. Some research has indicated, however, that when an event is not rare, it can be incorporated in an OLS regression approach (Snedecor and Cochran, 1967, pp. 493-495); the resulting regression coefficients are similar to those obtained through the more elaborate statistical procedures of logit and probit analysis and can be interpreted as simple probabilities.

Table 18

REGRESSION ON PROBABILITY OF MIGRATING 1961-66, CONTROLLING FOR CHILDREN BORN BY 1961 AND BACKGROUND CHARACTERISTICS IN 1961, FOR ALL WOMEN AND BY ETHNICITY

(Restricted to women married during 1961-66)

	All Women	Malay	Chinese	Indian
Children born by 1961	-0.023(a)	-0.015(a)	-0.022(a)	-0.043(a)
Education	-0.001	-0.002	0.007	-0.008
Residence in 1961(b)				
Urban	-0.049	-0.010(a)	0.006	-0.208(a)
Labor force status in 1961(c)				
Not in labor force	0.008	-0.145	0.117	0.076
In traditional sector	-0.077	-0.254(a)	0.145(a)	-0.181
Migration status before 1961(d)				
Migrant	0.134(a)	0.224	0.054	-0.024
R^2	0.076	0.127	0.054	0.212
N	562	291	194	77

(a) Significant at least at the .05 level.
(b) Reference group = rural residence in 1961.
(c) Reference group = in modern sector in 1961.
(d) Reference group = nonmigrant before 1961.

Table 19

REGRESSION ON PROBABILITY OF MIGRATING 1966-71,
CONTROLLING FOR CHILDREN BORN BY 1966 AND BACKGROUND CHARACTERISTICS IN 1966,
FOR ALL WOMEN AND BY ETHNICITY

(Restricted to women married during 1966-71)

	All Women	Malay	Chinese	Indian
Children born by 1966	-0.011(a)	-0.011	-0.006	-0.047(a)
Education	0.013(a)	0.014(a)	0.009(a)	0.172
Residence in 1966(b)				
Urban	-0.026	-0.070	0.002	-0.004
Labor force status in 1966(c)				
Not in labor force	0.037	0.065	-0.022	0.072
In traditional sector	0.002	-0.022	-0.018	0.203
Migration status before 1966(d)				
Migrant	0.135(a)	0.124(a)	0.132(a)	0.084
R^2	0.079	0.096	0.057	0.087
N	732	366	275	91

(a) Significant at least at the .05 level.
(b) Reference group = rural residence in 1966.
(c) Reference group = in modern sector in 1966.
(d) Reference group = nonmigrant before 1966.

Table 20

REGRESSION ON PROBABILITY OF MIGRATING 1971-76, CONTROLLING FOR CHILDREN BORN BY 1971 AND BACKGROUND CHARACTERISTICS IN 1971, FOR ALL WOMEN AND BY ETHNICITY

(Restricted to women married during 1971-76)

	All Women	Malay	Chinese	Indian
Children born by 1971	-0.010(a)	-0.016(a)	0.001	-0.030
Education	0.008(a)	0.594	0.013(a)	-0.003
Residence in 1971(b)				
Urban	-0.046(a)	-0.011	-0.080(a)	-0.001
Labor force status in 1971(c)				
Not in labor force	-0.018	-0.010	-0.071	0.041
In traditional sector	-0.034	-0.081	-0.047	0.112
Migration status before 1971(d)				
Migrant	0.084(a)	0.076(a)	0.056(a)	0.190(a)
R^2	0.091	0.081	0.076	0.059
N	930	452	367	111

(a) Significant at least at the .05 level.
(b) Reference group = rural residence in 1971.
(c) Reference group = in modern sector in 1971.
(d) Reference group = nonmigrant before 1971.

The analyses indicate that for all ethnic groups combined, the number of children born by the beginning of the interval considerably affects the probability of migrating during the interval. For each child born by 1961, the probability of migrating during the next five years is reduced by 2.3 percent. In the two later five-year intervals, the reduction is only 1 percent per child, but even this small difference is significant. Of all the other variables included in the regression, only previous migration status has a consistently strong and positive effect on the probability of migrating again. Women who had migrated by 1961 and by 1966 were 13 percentage points more likely to migrate in the ensuing five years than women who had not migrated. The probability of migrating during 1971-76 was only 8 percentage points greater for pre-1971 migrants than for nonmigrants, but the effect was still significant. This finding is consistent with those of a number of other studies that have identified previous migration as a key variable in accounting for later movement (Radloff, 1981; DaVanzo and Morrison, 1981; Goldstein, 1964).

If each ethnic group is considered separately, the probability of migrating is similarly affected by the number of children born before the interval being considered and by the other background variables, but with varying levels of significance. Of the three groups, Chinese women's migration seems least affected by the number of children born and Indian women seem most affected. Despite these differences, some selectivity seems to be operating: Women with fewer children are more likely to migrate than women with larger families. At the same time, the relatively low values of R^2 indicate that fertility level is not of

primary importance in determining migration. Other variables, undoubtedly including the household economic situation, are more important in explaining the probability of migrating in Malaysia.

POST-MIGRATION FERTILITY

To test whether the fertility behavior of migrants in the post-migration period differs from that of nonmigrants with similar characteristics during the same interval we used a regression approach. The dependent variable is defined as the number of children born during specific five-year periods (1971-76, 1966-71, and 1961-66) and women are defined as migrants if they had moved in the preceding five years (1966-71, 1961-66, 1956-61). Two restrictions are imposed: (1) Only women who were continuously married during the entire periods (1966-76, 1961-71, and 1956-66) are included, and (2) all women who are included were nonmigrants during the second five years, during which childbearing is measured. The background variables, age and education, are entered into the regression to examine the characteristics that pertain at the beginning of the childbearing period being analyzed (1971, 1966, and 1961, respectively); additionally, the number of children already born at the beginning of the period is entered into the regression equation, because parity is an important variable for explaining subsequent fertility. Residence is entered in terms of the urban or rural destination of the migrants. The key variable to test whether migration is related to differentials in fertility behavior after the move is migration status. As in previous regression analyses, these will be performed for all women who meet the qualifications, and separately for each ethnic group.

For all ethnic groups combined, only age is consistently significantly and negatively related to fertility in each of the three periods under consideration (Table 21). Previous fertility and urban residence also show a negative relation, but the effect is not significant in most instances. Being a migrant during 1966-71 or 1961-66 results in higher fertility than for nonmigrants. Migrants during 1956-61 had slightly lower fertility. For no period was the regression coefficient statistically significant.

The three ethnic groups display somewhat different patterns. Malays who moved during 1966-71 had somewhat higher fertility in the post-migration period than nonmigrants, but the reverse relation was true for 1961-66 and 1956-61 migrants. Chinese women who migrated during 1966-71 and 1956-61 had a higher number of births in the following five years, and those who moved during 1966-71 had fewer births. Indian women show the reverse patterns from the Chinese; moreover, for Indian women, the relation between migration and subsequent fertility is strong and significant.

These differing patterns indicate that post-migration fertility is very much affected by both cultural and temporal factors. Whether fertility in the post-migration period is higher or lower for migrants than nonmigrants varies both among ethnic groups for the same time span and across time within any given group. In general, the regression coefficients for migrants are negative more often than positive, except among the most recent cohorts. These findings suggest that the disruptive effect of migration may be manifested to some degree for as long as five years after migration. Further, if migrants arrive at

Table 21

REGRESSION ON CHILDREN BORN IN THE FIVE-YEAR PERIOD AFTER MIGRATION, CONTROLLING FOR MIGRATION STATUS AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Five-Year Period After Migration = 1971-76				
Age in 1971	-0.071(a)	-0.074(a)	-0.063(a)	-0.049(a)
Education	0.002	0.024	-0.012	-0.019
Number of children in 1971	-0.070(a)	-0.015	-0.139(a)	-0.220(a)
Urban residence 1976(b)	-0.070	-0.039	-0.066	-0.299(a)
Migrant, 1966-71(c)	0.083	0.153	0.171	-0.483(a)
R^2	0.290	0.312	0.279	0.363
N	410	196	167	47
Restricted to women continuously married during 1966-76, and not migrant 1971-76.				
Five-Year Period After Migration = 1966-71				
Age in 1966	-0.061(a)	-0.063(a)	-0.064(a)	-0.046(a)
Education	0.002	-0.001	-0.017	0.034
Number of children in 1966	-0.046	0.028	-0.129(a)	-0.190(a)
Urban residence 1971(b)	-0.088	-0.038	-0.149	-0.617(a)
Migrant, 1961-66(c)	0.047	-0.186	-0.083	1.136(a)
R^2	0.215	0.219	0.256	0.489
N	258	132	93	33
Restricted to women continuously married during 1961-71, and not migrant 1966-71.				
Five-Year Period After Migration = 1961-66				
Age in 1961	-0.059(a)	-0.049(a)	-0.047	-0.096(a)
Education	-0.015	-0.006	-0.032(a)	0.017
Number of children in 1961	-0.033	0.011	-0.131	0.142
Urban residence 1966(b)	-0.011	-0.060	-0.150	0.624(a)
Migrant, 1956-61(c)	-0.110	-0.082	0.203	-0.632(a)
R^2	0.172	0.098	0.135	0.545
N	143	76	48	19
Restricted to women continuously married during 1956-66, and not migrant 1961-66.				

(a) Significant at least at the .05 level.
(b) Reference group = rural residence.
(c) Reference group = nonmigrants.

destination with high fertility values, their behavior is modified sufficiently so that they do not have significantly more children during the specified years than nonmigrants with similar characteristics. Notably excepted are Indian women who migrated during 1961-66 and whose subsequent fertility was substantially higher than that of nonmigrants.

MIGRATION AND THE SPACING OF BIRTHS

Several of the foregoing analyses, including those on the effect of duration of residence and the cohort approach, have suggested that migration is associated with disruptions in the childbearing pattern. Using the MFLS residence history data in conjunction with marriage and fertility histories has the particular advantage of allowing assessment of the interrelations between migration on the one hand, and the timing and parity levels of fertility on the other. These data permit measurement of the average number of months between specified events--marriage, migration, and birth of a child--for women of different parity levels at time of migration. In turn, the average interval between marriage and birth of a child of a given parity for migrants is compared with the length of the interval for nonmigrants to assess more fully how much migration itself affects this interval. Again, the analysis is limited to women who have been continuously married, because marital discontinuity at any point during the childbearing years would affect the length of interval between births. Such control is especially necessary in analyzing data for Malaysia, where considerable differentials exist in number of times married and where Malay migrant women have particularly high rates of remarriage. In the analyses that follow, therefore, the universe will be restricted to women who were

married only once. Controls are also instituted first for rural/urban origin and then for rural/urban destination of the migrants; for nonmigrants control for rural/urban residence is introduced. Because parity level is held constant in these initial assessments, no control for age is introduced, although it would be desirable to have one if the number of cases allowed. Later regression analyses will have such a control and introduce other background variables as well.

The patterns for women with no children at migration will illustrate the manner in which the assessment proceeds; thereafter, the patterns observed for higher order parities will be discussed (Table 22). For women with no children who migrated from rural areas, an average interval of 9.9 months elapsed between marriage and migration; for those originating in an urban location 8.6 months intervened between these two events. On the average, at least a year elapsed following migration before the first child was born, but this interval was about three months longer for rural- than for urban-origin migrants. In combination, these somewhat different intervals result in an average of 25 months between marriage and the first birth for rural migrants and 20.7 months for urban migrants. Nonmigrant women in rural places averaged only 19.1 months between marriage and the birth of a first child; for urban women, the period averaged only 17.9 months. Both of these averages support the conclusion that migration contributes to delaying the birth of a first child.

Table 22 presents comparable information on the intervals between marriage, childbearing, and migration for women at higher parities. For women who migrated after the birth of their first child, the interval between marriage and first birth was somewhat lower than the comparable

Table 22

AVERAGE MONTHS BETWEEN EVENTS FOR MIGRANTS AND NONMIGRANTS AT GIVEN PARITIES, BY RESIDENCE

(Women married only once)

	Migrants				Nonmigrants	
	Residence at Origin		Residence at Destination		Residence	
	Rural	Urban	Rural	Urban	Rural	Urban
0 Parity at migr (n=100)					Nonmigr at b1 (n=935)	
Marr → migr	9.9	8.6	9.8	8.7		
Migr → b1	15.1	12.1	14.2	13.0		
Marr → b1	25.0	20.7	24.0	21.7	Marr → b1	19.1 17.9
Parity 1 at migr (n=81)					Nonmigr at b2 (n=753)	
Marr → b1	16.0	15.7	15.9	16.0	Marr → b1	19.9 17.3
B1 → migr	9.7	11.5	10.5	10.2		
Migr → b2	21.7	21.9	23.1	20.2		
B1 → b2	31.4	33.4	33.6	30.4	B1 → b2	25.9 25.0
Marr → b2	47.5	49.1	49.5	46.4	Marr → b2	45.8 42.3
Parity 2 at migr (n=27)			Based on 8 cases		Nonmigr at b3 (n=605)	
Marr → b1	15.9	26.2	16.4	31.6	Marr → b1	19.3 17.1
B1 → b2	21.3	20.6	21.3	20.1	B1 → b2	24.4 24.1
B2 → migr	13.5	13.9	17.7	15.3		
Migr → b3	18.0	20.2	21.8	12.5		
B2 → b3	31.5	34.1	39.5	27.8	B2 → b3	26.6 27.9
Marr → b3	68.7	80.9	77.2	79.5	Marr → b3	70.3 69.1
Parity 3 at migr (n=38)					Nonmigr at b4 (n=454)	
Marr → b2	50.8	40.5	45.7	46.3	Marr → b2	42.9 40.1
B2 → b3	19.0	31.3	21.9	31.0	B2 → b3	25.5 25.0
B3 → migr	13.0	14.9	14.2	13.3		
Migr → b4	15.0	18.7	18.5	12.9		
B3 → b4	28.0	33.6	32.7	26.2	B3 → b4	28.5 27.9
Marr → b4	97.8	105.4	100.3	103.5	Marr → b4	96.9 93.0

Note: Marr = marriage
Migr = migration
b = birth (e.g., b1 = first birth
b2 = second birth)

interval for nonmigrants in the same residence category. However, for migrants, almost a year elapsed between the birth of the first child and migration, and almost two years passed between migration and the birth of the second child. In all, therefore, there were two and a half years between the birth of the first and second child; and for urban-origin women the interval was two months longer than for rural-origin women. Again, among nonmigrant women a considerably shorter period elapsed between birth of the first and second child. As a result, the total interval from marriage to the birth of the second child was also lower for nonmigrants than for migrants.

Comparisons between nonmigrants and women with two and three children at the time of migration show similar patterns. Migrants generally have somewhat accelerated childbearing for those births occurring before migration, but the interval between births is substantially longer if it is interrupted by migration. Morever, when comparisons are made between migrants at destination and nonmigrants in these same places, the same patterns emerge. Such consistency lends weight to the conclusion that migration is associated with a longer spacing between children during the interval in which migration occurs and that this in turn contributes to a longer total interval between marriage and the birth of the child of a particular parity following migration. The small number of cases in the MFLS who were migrants precludes assessment of the effect of this differential in spacing on eventual completed fertility, because such analyses would have to be restricted to women over age 45.

The interval data presented here are limited to "closed intervals"--the intervals between events. This limitation may bias the estimates, because women who moved and did not give birth by the time of the survey in 1976 or women who had reached a given parity and did not have an additional birth by 1976 are not included in the analysis; these "open intervals" may be considerably longer than the closed intervals and may differentially change the patterns for migrants and nonmigrants. To test this possible distortion of the data, the open intervals were calculated for women in 1976 who were married, had not given birth in the year preceding the survey, and had not reached menopause. The averages of the open intervals were then merged with the averages for the closed intervals. This procedure results in a lower-bound estimate of the ultimate length of now-open intervals.

The results of this procedure do not change the patterns of spacing between migrants and nonmigrants at given parities (Appendix Table A.13). Addition of the open interval increases the average number of months between specified events (the next birth or the survey), but migrants continue to be characterized by substantially longer intervals if the time is interrupted by migration than nonmigrants at similar parities. For example, rural-origin migrants who moved between their first and second births had an average interval of 31.4 months; if the open interval is included (for women who moved after their first child was born but who had no second child by 1976), the average increases to 32.6 months. Comparable averages for rural nonmigrants are 25.9 and 27.3 months. On the basis of these data, no bias in the pattern of relations between child spacing and migration appears to be introduced

through omission of the open intervals. Because the following analyses examine intervals between actual events, open intervals will not be included.

Certain factors other than migration per se may, of course, affect the length of time between events. To control for some of these, we undertook a series of regressions with the length of interval between specified births as the dependent variable; again, the universe was restricted to women who were married only once. Controls included age at the beginning of the particular interval, whether the woman breastfed during the interval, contraceptive use during the interval--the method used longest if more than one was used, and migration during the interval. We performed the regressions for all women, controlling for ethnicity (regression coefficients not presented in the tables) and for each ethnic group separately (Table 23).

As anticipated, breastfeeding and use of any contraceptive method, but especially modern techniques, generally lengthened the time between events. Except for the interval from marriage to first birth, increasing age tended to increase the time between births. The negative effect for the marriage to first birth interval is not surprising for two reasons: (1) women who marry in their early teens seem to be somewhat less fecund at these very early ages, and in some cases, their marriage may not even be consummated until later; and (2) a high premium is placed by all three ethnic groups on a first child as soon as possible after marriage, especially if the marriage takes place at a later than average age (cf. DaVanzo and Haaga, 1981).

With all of the controls, migration still lengthens the birth interval in which the move occurs, and in most instances and for each

Table 23

REGRESSION ON INTERVALS (IN MONTHS) BETWEEN EVENTS, CONTROLLING FOR MIGRATION STATUS AND SELECTED VARIABLES(a), FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Parity 0 at migration:	Interval between marriage and birth 1:			
Age at marriage	-0.589(b)	-0.937(b)	-0.267(b)	-0.687(b)
Breastfeeding	NA	NA	NA	NA
Contraceptive use:				
Traditional	3.318	--	5.374	--
Modern	5.810	--	7.626(b)	--
Migration status:				
Migrant	3.545(b)	2.945	5.471(b)	3.340
R^2	0.066	0.024	0.030	0.037
N	1.063	470	457	136
Parity 1 at migration:	Interval between birth 1 and birth 2:			
Age at birth 1	0.029	-0.228	0.236	0.206
Breastfeeding	0.295	3.320	-0.786	5.018
Contraceptive use:				
Traditional	5.144(b)	6.230(b)	3.241	2.146
Modern	6.699(b)	5.912	7.331(b)	-1.164(b)
Migration status:				
Migrant	7.859(b)	4.706	11.603(b)	8.050(b)
R^2	0.060	0.016	0.078	0.061
N	836	358	374	104
Parity 2 at migration:	Interval between birth 2 and birth 3:			
Age at birth 2	0.694(b)	0.749(b)	0.446	1.539(b)
Breastfeeding	1.534	10.497(b)	-0.930	7.795
Contraceptive use:				
Traditional	1.997	-0.194	6.849(b)	--
Modern	4.431(b)	4.284	5.868(b)	--
Migration status:				
Migrant	6.837(b)	15.248(b)	7.626(b)	-7.999(b)
R^2	0.043	0.077	0.050	0.056
N	634	263	288	83
Parity 3 at migration:	Interval between birth 3 and birth 4:			
Age at birth 3	0.542(b)	0.553	0.520	0.677(b)
Breastfeeding	4.406(b)	3.624	3.209	9.817(b)
Contraceptual use:				
Traditional	2.468	-0.327	2.882	19.641(b)
Modern	10.998(b)	20.528(b)	8.810(b)	19.344(b)
Migration status:				
Migrant	3.156	2.618	0.098	9.000(b)
R^2	0.079	0.036	0.045	0.304
N	494	203	224	67

(a) Variables refer to characteristics during the specified interval. Breastfeeding reference group = did not breastfeed, contraceptive use reference group = no contraceptive used, migration status reference group = nonmigrant.

(b) Significant at least at the .05 level.

ethnic group the effect is significant. For example, the interval between first and second birth is 7.9 months longer for migrants than nonmigrants when all women are considered. Among Malays the interval is 4.7 months longer for migrants; it is increased by 11.6 months among Chinese and 8.1 months among Indians. The consistency of this pattern and the strength of the relation strongly support the hypothesis that migration disrupts fertility.

Whether migration per se or some other factor causes the disruption is not ascertainable from the data presented here. One possible reason for the disruption may be the increased temporary separation of spouses that characterizes the period surrounding migration. Such separation has been found to be associated with migration in Thailand, where migrant fertility is lower than that of nonmigrants, and especially among women who have had some marital separation (Goldstein, Goldstein, and Piampiti, 1973). The MFLS ascertained whether spouses were ever separated, when the separation occurred, and the duration of each temporary separation. Although there is no way to check the accuracy or completeness of the reporting of temporary separations, these data do allow some assessment of the extent to which separation of spouses affected the intervals between specified events.

Separations were defined as "complete" or "incomplete": complete separations lasted for a period of three months or more; incomplete were separations for several days each week during a period of three months or more. The respondent was asked to estimate what proportion of that time she was actually separated from her husband if the separation was incomplete. The information obtained on incomplete separations was

weighted by the proportion of time spouses were in fact separated to allow these data to be combined with information on complete separations for an estimate of "total" separation of spouses. In the following analyses we consider all three measures of separation--complete, incomplete, and total--to assess the extent of migrant/nonmigrant differentials.

If migrant/nonmigrant patterns of total separation are determined for intervals between specified parities, the data indicate that a higher proportion of migrants than nonmigrants experienced some marital separation, although the proportion of separations is low for both groups (Appendix Table A.16). The greatest degree of separation (16.3 percent) was reported by migrant women moving to urban places between migration and the birth of the second child. Among nonmigrants, no more than 6.6 percent reported any separations during a given birth interval. If separations are disaggregated into complete and incomplete, migrants are characterized by somewhat higher levels of incomplete separations than are nonmigrants, especially in the birth interval during which the move occurred. For example, among women who migrated to rural places between parities one and two, none reported incomplete separations between marriage and first birth, 4.2 percent experienced separations between first birth and migration, and 8.3 percent between migration and second birth. Among urban nonmigrants, 0.9 percent were separated between marriage and first birth and 5.2 percent between first and second birth. Complete separations appear to be somewhat more prevalent among nonmigrants than migrants, but for both groups the reported level is very low, never rising as high as 4 percent.

The question then arises whether temporary separation of spouses accounts for the differentials in intervals between specified parities when the interval is interrupted by migration compared with similar intervals for nonmigrants. To test this assumption, the regression analyses on intervals between events have been repeated, but the sample is restricted to once-married women who had no marital separations. Comparisons of the results from these regressions (Table 24) with those performed earlier (Table 23) show no appreciable difference in the effect of migration on the length of interval. Migration continues to have a lengthening effect on birth spacing, and in most cases the difference is significant. As before, only for the interval between third and fourth birth does migration have only a minimal effect on spacing. Assuming that temporary separations were accurately reported, these data do not support the hypothesis that greater separation of spouses in connection with migration is responsible for the disruptive effect demonstrated by the birth interval data. Disruption associated with migration is still clearly evident, but its cause must lie elsewhere.

The lengths of intervals can also be used to determine whether post-migration child spacing differs from that of nonmigrants of similar parity. This can be done by extending the analysis to include two births after migration; for example, for women who migrated at parity one, the length of interval between the second and third births will be measured. Such a procedure can provide some indication of whether child spacing in the post-migration period is accelerated so that the gap between migrants and nonmigrants in the time from marriage to births of

Table 24

REGRESSION ON INTERVALS (IN MONTHS) BETWEEN EVENTS, CONTROLLING FOR MIGRATION STATUS AND SELECTED VARIABLES(a), BY ETHNICITY, FOR WOMEN WHO EXPERIENCED NO SEPARATIONS

	All Women	Malay	Chinese	Indian
Parity 0 at migration:	Interval between marriage and birth 1:			
Age at marriage	-0.578(b)	-0.941(b)	-0.232	-0.650(b)
Breastfeeding	NA	NA	NA	NA
Contraceptive use:				
Traditional	3.379	--	5.310	--
Modern	5.925	--	7.665(b)	--
Migration status:				
Migrant	3.602(b)	2.993	6.000(b)	3.359
R^2	0.066	0.024	0.031	0.035
N	1,034	458	443	133
Parity 1 at migration:	Interval between birth 1 and birth 2:			
Age at birth 1	0.070	-0.231	0.296	0.311
Breastfeeding	0.165	2.769	-0.979	5.418
Contraceptive use:				
Traditional	4.555(b)	5.250	2.936	--
Modern	6.818(b)	10.366	6.156(b)	--
Migration status:				
Migrant	4.987(b)	6.371(b)	2.047	8.392 (b)
R^2	0.061	0.018	0.044	0.066
N	776	334	348	94
Parity 2 at migration:	Interval between birth 2 and birth 3:			
Age at birth 2	0.691(b)	0.812(b)	0.473	1.345(b)
Breastfeeding	0.645	9.932(b)	-1.552	5.177
Contraceptive use:				
Traditional	1.116	0.043	4.302	--
Modern	4.544(b)	4.537	5.946(b)	--
Migration status:				
Migrant	6.799(b)	16.118(b)	5.856	-5.544
R^2	0.058	0.076	0.041	0.063
N	585	243	265	77
Parity 3 at migration:	Interval between birth 3 and birth 4:			
Age at birth 3	0.743(b)	0.885(b)	0.611(b)	0.797(b)
Breastfeeding	4.273(b)	9.071	2.515	6.759(b)
Contraceptive use:				
Traditional	0.877	-0.620	-1.019	2.271
Modern	9.182(b)	--	7.764(b)	18.668(b)
Migration status:				
Migrant	3.435	3.980	-0.374	10.078(b)
R^2	0.083	0.047	0.040	0.258
N	445	186	199	60

(a) Variables refer to characteristics during the specified interval. Breastfeeding reference group = did not breastfeed, contraceptive use reference group = no contraceptive used, migration status reference group = nonmigrant.

(b) Significant at least at the .05 level.

specific parities is narrowed. Because interest lies particularly in whether migrants adapt the fertility behavior at destination, the intervals for migrants will be presented separately by urban/rural destination; residence of nonmigrants will also be controlled. Unfortunately, the number of migrants is too small to allow meaningful analysis for all parity/destination groups.

In general, women moving to rural areas have just slightly shorter intervals in the post-migration period than do nonmigrant rural residents; 24.4 rather than 25.9 months, from birth one to birth two; 25.5 and 26.6 months for second to third birth; 28.1 and 28.5 months for third to fourth birth; and 28.4 and 28.2 months for fourth to fifth births (Table 25). These very small differences suggest that the disruptive effects associated with migration do not extend beyond the first birth in place of destination. Neither do these patterns indicate any sharp acceleration in childbearing to compensate for previous lags. For urbanward migrants, only two groups can be compared. Those moving before first birth had a slightly shorter birth interval (24.2 months) between first and second birth than did nonmigrants (25.0 months); women moving after first birth experienced a longer birth interval between second and third births (32.9 months) than did nonmigrants (27.9 months). At the same time, birth intervals before migration tended to be somewhat shorter for migrants than for nonmigrants, but only for rural-destination migrants moving after birth two was the difference more than two months.

Within the limits of the small number of cases, then, there is no indication of acceleration in childbearing after migration. Migrants

Table 25

AVERAGE MONTHS BETWEEN EVENTS FOR MIGRANTS WITH AT LEAST TWO BIRTHS AFTER MIGRATION AND NONMIGRANTS OF EQUIVALENT PARITY, BY RESIDENCE

	Migrants Destination			Nonmigrants Residence	
	Rural	Urban		Rural	Urban
0 Parity at migr (n=47)			Nonmigr at b2 (n=753)		
Marr → migr	10.6	8.5			
Migr → b1	13.8	10.6	Marr → b1	19.9	17.3
B1 → b2	24.4	24.2	B1 → b2	25.9	25.0
Marr → b2	48.8	43.3	Marr → b2	45.8	42.3
Parity 1 at migr (n=48)			Nonmigr at b3 (n=605)		
Marr → b1	17.8	16.1	Marr → b1	19.3	17.1
B1 → migr	9.5	10.0			
Migr → b2	17.4	18.2	B1 → b2	24.4	24.1
B2 → b3	25.5	32.9	B2 → b3	26.6	27.9
Marr → b3	70.2	77.2	Marr → b3	70.3	69.1
Parity 2 at migr (n=16)		n=6	Nonmigr at b4 (n=454)		
Marr → b2	32.5	57.8	Marr → b2	42.9	40.1
B2 → migr	11.0	14.6			
Migr → b3	16.1	11.2	B2 → b3	25.5	25.0
B3 → b4	28.1	55.3	B3 → b4	28.5	27.9
Marr → b4	87.7	138.9	Marr → b4	96.9	93.0
Parity 3 at migr (n=27)		n=9	Nonmigr at b5 (n=340)		
Marr → b3	65.9	83.2	Marr → b3	67.2	63.5
B3 → migr	11.0	14.6			
Migr → b4	18.9	14.3	B3 → b4	26.3	25.0
B4 → b5	28.4	33.6	B4 → b5	28.2	29.7
Marr → b5	124.2	145.7	Marr → b5	121.7	118.2

Note: Restricted to women who were married only once.

seem to have the same spacing patterns at places of destination as the nonmigrants in these areas. Whether this represents adaptation on the part of migrants cannot be determined directly, because the few cases available preclude controls for migrant origins. The evidence from these data on birth intervals for nonmigrants suggests, in fact, that urban residents space their children somewhat more closely than rural residents. Again, however, without controls for ethnicity and other background characteristics, we can draw no definitive conclusion, nor do these data provide information on completed fertility, which has been shown to be significantly different for women in rural and urban places. In sum, all of the data on intervals considered together do show migration is clearly associated with disruptions in childbearing patterns, but that such disruption is restricted to the actual period of migration.

VI. CONCLUSIONS

The importance of migration and fertility in population growth and redistribution has been widely recognized. Nonetheless, data available to date have been of limited value in making any comprehensive assessment of their interrelations. Nor have they allowed evaluating the extent to which selection, adaptation, and disruption operate to produce migrant/nonmigrant fertility differentials. Most analyses have had to rely on cumulative measures of fertility--usually children ever born--that provide no indication of when the births occurred in relation to migration. Using such data, a number of studies have suggested that migrants have fertility levels lower than those of nonmigrants, especially in the period close to migration. What is not clear from these data is whether migration is selective of women with low fertility values, or whether migration is disruptive of childbearing, or whether the differentials between migrants and nonmigrants narrow with the lengthening of the period since migration and, if so, whether this is an adaptation process. To what degree one or a combination of these factors account for observed differences remains to be fully documented.

The present analysis uses data from the 1976-77 Malaysian Family Life Survey to initiate a more comprehensive assessment of these relations. Despite the limitations inherent in this data set because of the small number of migrant women included, the availability of both migration and fertility histories as well as information on a host of other variables allows analysis both in terms of cumulative fertility (CEB), as has been done in other studies, and in terms of measures that

exploit the life history data directly to assess the timing of migration in relation to the timing of births. Moreover, migration is variously defined in terms of once-only and multiple moves; migration within one, five, and ten years of the survey; and migration streams. In all instances, comparisons are possible with those women who did not move at all after marriage, or who did not move in the specified time intervals.

RESEARCH FINDINGS

When the analysis is simply in terms of number of moves (controlling for a variety of background variables), without any controls for duration of residence or origin-destination, no significant differences appear in the fertility levels of migrants and nonmigrants. When duration of residence is considered, however, significant differences are found, although they tend to be mitigated with duration. These data thus point to the importance of the timing of migration on fertility and suggest that adaptation to fertility norms at destination occurs with increasing length of residence. The streams of migration data, without controls for duration of residence, suggest that for Malays only, urban-urban movement is associated with lower fertility. For Chinese and Indian women, rural-urban migration is significantly related, but in opposite ways--with lower fertility for Chinese and higher for Indian women. Cultural factors thus seem to play an important role in determining how migration and fertility patterns are related, but timing of move may also be a factor in explaining these findings.

In an attempt to examine more closely the validity of the selection, adaptation, and disruption hypotheses, several analyses were undertaken that took advantage of the unique opportunities available

with the MFLS life histories. Using a cohort approach, we examined the fertility of women aged 20-29 in 1956 and in 1966, controlling for their migration experience during ages 20-29 and 30-39 for the earlier cohort and during ages 20-29 for the later one. Women who had moved during both these decades had substantially lower fertility, and nonmigrants in both periods had among the highest. The low fertility of the multiple migrant women strongly suggests that selection or disruption operates to affect fertility.

To explore these suggested relations further, we determined the fertility of migrants during selected periods for two years before and two years after migration; the fertility of nonmigrants was measured from a mid-point during each period. Limited support from this analysis was given to the selectivity hypothesis: Migrants from rural areas had consistently lower fertility before the move than nonmigrants during a comparable period, especially in the earlier cohorts being considered. That the same finding did not hold for urban women suggests the importance of origin in determining who migrates.

When we used regression analyses to test the effect of number of children born on the probability of migrating, the data show that some selectivity was operating, although with varying strengths for the different ethnic groups. In every case, however, the probability of migrating was negatively affected by fertility, although not always at a statistically significant level. Regression analysis failed to indicate any consistent effect of migration on subsequent fertility. In some cases, the effect was positive, in others negative, and only for Indian women was the effect significant. For them, it varied in direction as

well. This finding suggests that migrants were adapting to the fertility values of women at destination within five years of migration.

The strongest and most consistent findings of the analyses performed support the hypothesis that migration is related to disruptions in fertility. Determination of the average number of months between marriage and births of specific parities indicate that women who moved between two specified events (e.g., marriage and first birth, or second and third birth) experienced a substantially longer interval between the events interrupted by migration than did women who did not move. As a result, the total interval between marriage and specific parity births was significantly longer for migrants than for nonmigrants. This relation held even when "open intervals" (the time between a birth and the survey) were included in the calculations, and when a number of variables, including contraceptive use and breastfeeding, were controlled through regression analysis. To test whether disruption was due to the temporary separation of spouses during the period of migration, we performed the regressions again for only those women who did not report such separations. Migration continued to be associated with substantially longer intervals between births. That this effect does not extend beyond the immediate post-migration period became apparent when we examined the length of intervals between births beyond the first birth after migration. Such subsequent birth spacing by migrants appears to be similar to that characterizing nonmigrants. Again, the adaptation of migrants to nonmigrant fertility patterns is suggested, within a very short time after migration. It is not, of course, possible with these data on birth intervals to ascertain whether completed fertility is at the same level as that of nonmigrants.

background characteristics with which it is closely associated. This relation suggests that, to the extent that migration remains highly selective on these background characteristics, it will substantially affect fertility levels at both origin and destination through the combined effects of the process of movement and of the differential characteristics of the migrants.

A key question related to how much migration affects fertility levels is whether migrants who are selected with respect to lower fertility at origin would, in fact, have had lower fertility if they did not move. If so, then migration itself could not be credited with reducing fertility. However, if such selectivity is part of a larger process in which both the decision to move and the decision to reduce fertility are interrelated, then movement may well be closely intertwined with other factors leading to a reduction in fertility. To the extent that such a reduction is reenforced or even enhanced by the disruptive effects of migration and by adaptation to the lower fertility norms at urban destination (for rural-urban migrants), migration's effect on fertility levels becomes stronger.

Given the complexity of the relation between migration and fertility indicated by these findings, no clear set of policy implications emerge. Both selectivity and adaptation seem to operate so as to result in somewhat lower fertility among migrants than nonmigrants at origin and destination; and migrant fertility seems also to be affected by the disruptive effects of movement. Geographic mobility is therefore likely to have some effect on overall fertility levels, but the extent of the effect will depend on the relative numbers of migrating women, their ethnic background, the point in their

These findings based on Malaysian data generally support those of earlier research, which relied exclusively on children ever born and own children measures of fertility. They do, however, carry the research further by exploring more directly the temporal relations between migration and fertility, within a general framework of three migration-fertility hypotheses. The results provide some support for each hypothesis: Women of lower parity are more likely to migrate than women at higher fertility levels, so some selectivity does occur. Post-migration fertility does not appreciably differ from the fertility of nonmigrants with similar characteristics, suggesting that adaptation of the fertility norms at destination may occur quite rapidly. Most clearly, migration is associated with disruptions in child spacing patterns, and this relation holds even for women reporting no temporary separations from husbands. The disruption does not appear to extend beyond the immediate migration period.

That all of these conclusions are possible indicates the complex interplay between migration and fertility. Furthermore, the patterns are not uniform over time, and the effects of migration seem much stronger for earlier migration cohorts than for those moving within five years of the survey. Such differences may be particularly related to official government policies of resettlement in the 1950s and 1960s, when large numbers of people were resettled in small urban places and still others moved from urban places to newly developing rural areas. In addition, Malaysia's three ethnic groups exhibit quite differing patterns, and often they are opposite in direction. Aggregate analyses thus prove inadequate for explaining the relations, because they often mask conflicting patterns.

All of these factors--the temporal, contextual, and cultural--must therefore be considered in addition to the more traditional socio-economic ones in any attempt to ascertain how migration and fertility interact. Data such as those available from the life history matrices of the Malaysian Family Life Survey are particularly useful for doing so. The value of such data would, however, be greatly enhanced with larger samples that would provide a firmer basis for comparing the fertility of respondents with different migration experiences. The analytic experience and the insights gained in this research on the data from the Malaysian Family Life Survey should prove valuable in any future efforts to exploit life history data for assessing the relation between migration and fertility.

POLICY IMPLICATIONS

The direct effect of migration on fertility, exclusive of other variables, seems limited, as judged by the contribution of migration to the R^2 values identified in this analysis. This finding might be taken as evidence that the various hypotheses regarding the effects of population movement on childbearing and on natural increase in areas of origin and destination are not given strong support. But such a conclsuion may not be so clear. Migrants, as the vast literature on the subject indicates, tend to be highly concentrated in selected age and socioeconomic groups. Taking these background characteristics into account together with migration status explains up to 59 percent of the total variation in children ever born at point of destination. Although migration per se may not consistently and substantially affect fertility levels, it can and does affect fertility in conjunction with the other

reproductive cycle at which they move, and the character of their places of origin and destination.

These data do suggest that migration does not in itself raise urban fertility rates by bringing high-fertility women to the cities. Whether as a result of selection, adaptation, or disruption, or a combination of these, rural-urban migrant fertility does not generally exceed that of nonmigrants at destination. Yet, because migration is age selective and contributes to inflating the age groups in the peak reproductive years, even with their lower fertility migrants can both raise the number of births in cities and contribute to the natural increase in urban growth. This situation may not have been as important a problem in Malaysia, where rural to urban migration has not been a major stream, as it is in many other less developed countries. Concurrently, rural to urban movement, by shifting such births to cities, lowers the absolute number of births in rural places; yet, if the process is selective of low fertility women, heavy rural out-migration may well lead to rising rates of rural fertility, reflecting the higher fertility of the non-mobile women. A consequence of such movement may well be the exacerbation of rural-urban fertility differentials as a result of the greater polarization of high fertility women in rural and low fertility women in urban places. Nonetheless, to the extent that selection, adaptation, and disruption are operating to lower the fertility of migrants, rural-to-urban migration may well be a factor in lowering overall national fertility rates.

If migration had no costs to either place of origin or destination, but did result in lowering the fertility of migrants, a strong argument could be developed that movement should be encouraged as a mechanism for

achieving lower national fertility levels. Such costs do exist, however, despite the benefits to both the places and the individuals involved. As a result, no simple policy recommendation seems appropriate. Recommendations must be made in the context of the more general costs and benefits of migration for individual migrants, for places of origin and destination, and for the society as a whole. Movement encouraged exclusively as a mechanism for reducing fertility seems unlikely to realize its goal; it may well have the opposite effect.

If selectivity or adaptation can be shown clearly to lower fertility, then special efforts might well be made to expedite and increase the reductions that are associated with the process of residential change, whether these be through educational programs directed at movers or through providing them with easier access to family planning facilities. Concurrently there should be recognition that the extensive circular and return migration that seems to occur in many countries between urban and rural areas (Goldstein, 1978a) provides additional means by which to spread more favorable attitudes toward lower fertility and fuller knowledge of the means to achieve it. Movers who have themselves adopted lower fertility norms and behavior or who have been exposed to such values and behavior through residence in low fertility environments may well serve as models for modernization as they shift back and forth between low and high fertility areas. In this way, the contribution of migration to fertility reduction may extend beyond the effects achieved through disruption and adaptation to include diffusion as well.

APPENDIX

Table A.1

REGRESSION OF CHILDREN EVER BORN, ON MIGRATION STATUS, AGE, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Current age	0.199*	0.199*	0.210*	0.207*
Education	-0.147*	-0.133*	-0.119*	-0.255*
Current Residence(a)				
Market center	-0.713	-0.060	-1.071*	-0.793*
Other urban	0.107	0.285	-0.156	0.439
Labor force status(b)				
Not in labor force	0.402*	0.487	0.480	0.101
In traditional sector	-0.137	-0.206	0.579*	0.388
Ethnicity(c)				
Chinese	-0.044			
Indian	0.891*			
Migration status(d)				
Moved before marriage only	-0.108	-0.318	-0.045	-0.760
Moved once after marriage	-0.222	-0.341	-0.390*	0.233
Multiple moves after marriage	-0.050	-0.324	-0.002	0.014
R^2	0.450	0.399	0.545	0.502
N	1,245	603	495	147

*Significant at least at the .05 level.

(a) Reference group = rural residence.
(b) Reference group = in modern sector.
(c) Reference group = Malays.
(d) Reference group = never migrated.

Table A-2

REGRESSION OF CHILDREN EVER BORN, ON 1975-76 MIGRATION INTERVAL, AGE, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Age	0.204*	0.217*	0.212*	0.199*
Education	-0.160*	-0.140*	-0.133*	-0.263*
Current residence				
Market center	-0.704*	-0.153	-0.977*	-0.791
Other urban	0.098	0.203	-0.145	0.439
Labor force status				
Not in labor force	0.477*	0.845*	0.458*	0.096
In traditional sector	0.165	-0.029	0.710*	0.006
Ethnicity				
Chinese	-0.228*			
Indian	0.561*			
Migration interval(b)				
1975-76 migrant	-0.558*	-1.063*	-0.395	-0.145
R^2	0.486	0.483	0.536	0.457
N	1,033	458	447	128

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1975-1976.
(b) Reference group = nonmigrants 1975-76; see Notes to Table A-1 for definition of other dummy variables.

Table A-3

REGRESSION OF CHILDREN EVER BORN, ON 1971-76 MIGRATION INTERVAL, AGE, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Age	0.179*	0.192*	0.181*	0.146*
Education	-0.162*	-0.151*	-0.125*	-0.275*
Current residence				
Market center	-0.832*	-0.252	-1.171*	-0.465
Other urban	0.146	0.358	-0.131	0.340
Labor force status				
Not in labor force	0.572*	0.625	0.404	0.626
In traditional sector	0.143	-0.411	0.629	0.321
Ethnicity				
Chinese	-0.134			
Indian	0.716*			
Migration interval(b)				
1971-76 migrant	0.002	-0.764*	-0.199	0.879*
R^2	0.592	0.363	0.405	0.317
N	854	384	363	107

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1971-1976.
(b) Reference group = nonmigrants 1971-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.4

REGRESSION OF CHILDREN EVER BORN, ON 1966-76 MIGRATION INTERVAL, AGE, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Age	0.137*	0.151*	0.150*	0.072*
Education	-0.175*	-0.162*	-0.141*	-0.264*
Current residence				
Market center	-0.921*	-0.300	-1.180*	-0.889
Other urban	0.163	0.348	0.004	0.091
Labor force status				
Not in labor force	-0.438	0.473	0.705	0.112
In traditional sector	-0.097	-0.725	0.835	-0.322
Ethnicity				
Chinese	-0.067			
Indian	0.700*			
Migration interval(b)				
1966-76 migrant	-0.203	-0.850*	0.536	-0.143
R^2	0.212	0.229	0.267	0.206
N	646	295	266	85

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1966-1976.
(b) Reference group = nonmigrants 1966-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.5

REGRESSION OF CHILDREN EVER BORN, ON SEQUENTIAL MIGRATION INTERVALS, AGE, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Age	0.137*	0.153*	0.149*	0.080*
Education	-0.176*	-0.160*	-0.135*	-0.256*
Current residence				
Market center	-0.905*	-0.191	-1.187*	-0.479
Other urban	0.169	0.323	-0.021	0.174
Labor force status				
Not in labor force	0.438	0.449	0.689	0.037
In traditional sector	-0.108	-0.736	0.809	-0.234
Ethnicity				
Chinese	-0.076			
Indian	0.657*			
Migration interval(b)				
1975-76	-0.645	-2.398*	0.266	1.155
1971-75	0.110	-0.673*	0.078	0.854
1966-71	-0.363	-0.743*	0.259	-1.203
R^2	0.214	0.236	0.263	0.241
N	646	295	266	85

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1966-1976.
(b) Reference group = nonmigrants 1966-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.6

REGRESSION OF CHILDREN EVER BORN, ON MIGRATION STREAMS, AGE, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Age	0.199*	0.199*	0.210*	0.204*
Education	-0.148*	-0.134*	-0.122*	-0.257*
Current residence				
Market center	-0.638*	-0.003	-1.008*	-0.070
Other urban	0.132	0.269	-0.155	0.720
Labor force status (a)				
Modern sector	-0.442*	-0.577	-0.457	0.130
Traditional sector	-0.261*	-0.675*	0.132	0.473
Ethnicity				
Chinese	-0.054			
Indian	0.867*			
Migration stream (b)				
Rural-rural	0.167	0.063	0.078	0.683
Rural-urban	0.014	-0.223	-0.784*	1.677*
Urban-rural	-0.160	-0.355	-0.369	0.576
Urban-urban	-0.505*	-0.633*	-0.381	-1.042*
R^2	0.451	0.400	0.547	0.520
N	1,245	603	495	147

*Significant at least at the .05 level.

(a) Reference group = not in labor force.
(b) Reference group = nonmigrants; see Notes to Table A-1 for definition of other dummy variables.

Table A.7

REGRESSION OF CHILDREN EVER BORN, ON MIGRATION STATUS, MONTHS MARRIED, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Months married	0.019*	0.019*	0.019*	0.018*
Education	-0.094*	-0.067*	-0.074*	-0.180*
Current residence				
Market center	-0.455*	0.031	-0.705*	-0.460
Other urban	0.112	0.246	-0.116	0.367
Labor force status				
Not in labor force	0.112	0.402	0.113	-0.269
In traditional sector	-0.166	-0.333	0.288	-0.205
Ethnicity				
Chinese	0.410*			
Indian	0.632*			
Migration status				
Moved before marriage only	0.132	-0.101	0.195	-0.444
Moved once after marriage	-0.168	-0.363	-0.281	0.245
Multiple moves after marriage	-0.006	-0.230	-0.064	-0.155
R^2	0.590	0.565	0.661	0.557
N	1,245	482	470	132

*Significant at least at the .05 level.

See Notes to Table A-1 for definition of dummy variables.

Table A.8

REGRESSION OF CHILDREN EVER BORN, ON 1975-76 MIGRATION INTERVAL, MONTHS MARRIED, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Months married	0.018*	0.018*	0.018*	0.018*
Education	-0.095*	-0.070*	-0.077*	-0.180*
Current residence				
Market center	-0.505*	-0.068	-0.760*	-0.466
Other urban	0.116	0.277	-0.144	0.411
Labor force status				
Not in labor force	0.178	0.472	0.177	-0.244
In traditional sector	-0.119	-0.297	0.365	-0.253
Ethnicity				
Chinese	0.428*			
Indian	0.644*			
Migration interval(b)				
1975-76 migrant	-0.316	-0.813	-0.578	0.359
R^2	0.555	0.529	0.628	0.525
N	1,033	458	447	128

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1975-1976.
(b) Reference group = nonmigrants 1975-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.9

REGRESSION OF CHILDREN EVER BORN, ON 1971-76 MIGRATION INTERVAL, MONTHS MARRIED, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Months married	0.016*	0.017*	0.017*	0.014*
Education	-0.106*	-0.089*	-0.080*	-0.211*
Current residence				
Market center	-0.671*	-0.163	-0.972*	-0.308
Other urban	0.115	0.349	-0.165	0.291
Labor force status				
Not in labor force	0.258	0.319	0.098	0.234
In traditional sector	-0.147	-0.607	0.261	0.018
Ethnicity				
Chinese	0.466*			
Indian	0.772*			
Migration interval(b)				
1971-76 migrant	0.039	-0.566	-0.264	0.851*
R^2	0.419	0.406	0.500	0.371
N	854	384	363	107

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1971-1976.
(b) Reference group = nonmigrants 1971-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.10

REGRESSION OF CHILDREN EVER BORN, ON 1966-76 MIGRATION INTERVAL, MONTHS MARRIED, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Months married	0.014*	-0.014*	0.016*	0.009*
Education	-0.127*	-0.102*	-0.104*	-0.228*
Current residence				
Market center	-0.777*	-0.261	-0.988*	0.811
Other urban	0.155	0.375	-0.034	0.201
Labor force status				
Not in labor force	0.229	0.294	0.401	-0.034
In traditional sector	-0.269	-0.806	0.545	-0.496
Ethnicity				
Chinese	0.432*			
Indian	0.747*			
Migration interval(b)				
1966-76 migrant	-0.108	-0.784*	0.684*	-0.117
R^2	0.268	0.263	0.357	0.241
N	646	295	266	85

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1966-1976.
(b) Reference group = nonmigrants 1966-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.11

REGRESSION OF CHILDREN EVER BORN, ON SEQUENTIAL MIGRATION INTERVALS, MONTHS MARRIED, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN(a) AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Months married	0.014*	0.014*	0.016*	0.010*
Education	-0.128*	-0.101*	-0.098*	-0.215*
Current residence				
Market center	-0.767*	-0.165	-0.989*	-0.389
Other urban	0.161	0.354	-0.068	0.297
Labor force status				
Not in labor force	0.229	0.263	0.349	-0.118
In traditional sector	-0.279	-0.823	0.480	-0.404
Ethnicity				
Chinese	0.423*			
Indian	0.718*			
Migration interval(b)				
1975-76	-0.486	-2.153*	-0.094	1.362
1971-76	-0.241	-0.683	0.565	-1.340
1966-76	0.110	-0.693	0.166	0.821
R^2	0.269	0.268	0.352	0.281
N	646	295	266	85

*Significant at least at the .05 level.

(a) Women continuously married in first marriage, 1966-1976.
(b) Reference group = nonmigrants 1966-76; see Notes to Table A-1 for definition of other dummy variables.

Table A.12

REGRESSION OF CHILDREN EVER BORN, ON MIGRATION STREAMS, MONTHS MARRIED, AND BACKGROUND CHARACTERISTICS, FOR ALL WOMEN AND BY ETHNICITY

	All Women	Malay	Chinese	Indian
Months married	0.018*	0.018*	0.019*	0.018*
Education	-0.083*	-0.060*	-0.071*	-0.173*
Current residence				
Market center	-0.401*	-0.057	-0.639*	0.095
Other urban	0.117	0.241	-0.133	0.596
Labor force status (a)				
Modern sector	-0.097	-0.133	-0.166	0.397
Traditional sector	-0.227*	-0.629*	0.165	0.530
Ethnicity				
Chinese	0.500*			
Indian	0.855*			
Migration stream (b)				
Rural-rural	0.010	-0.032	-0.005	0.216
Rural-urban	0.041	-0.185	-0.677*	1.514*
Urban-rural	0.019	-0.168	-0.059	0.524
Urban-urban	-0.502*	-0.723*	-0.342	-0.786
R^2	0.542	0.486	0.651	0.570
N	1,245	603	495	147

*Significant at least at the .05 level.

(a) Reference group = not in labor force.
(b) Reference group = nonmigrants; see Notes to Table A-1 for definition of other dummy variables.

Table A.13

AVERAGE MONTHS BETWEEN EVENTS FOR MIGRANTS AND NONMIGRANTS AT GIVEN PARITIES, BY RESIDENCE
(Includes open intervals)

	Migrants				Nonmigrants	
	Residence at Origin		Residence at Destination		Residence	
	Rural	Urban	Rural	Urban	Rural	Urban
0 Parity at migr (n=106)						
Marr → migr	10.1	12.6	14.0	8.5		
Migr → b1*	18.3	16.7	17.4	17.6		
Marr → b1*	28.4	29.5	31.4	26.1		
Nonmigr at b1 (n=973)						
Marr → b1*					19.4	18.8
Parity 1 at migr (n=87)						
Marr → b1	15.8	14.9	15.1	15.8		
B1 → migr	10.6	12.7	12.1	10.1		
Migr → b2*	22.0	28.8	28.2	20.4		
B1 → b2*	32.6	41.5	40.3	30.5		
Marr → b2*	48.4	56.4	55.4	46.3		
Nonmigr at b2 (n=791)						
Marr → b1					20.0	17.6
B1 → b2*					27.3	25.2
Marr → b2*					47.3	42.8
Parity 2 at migr (n=31)				Based on 9 cases		
Marr → b1	17.5	25.1	16.6	31.3		
B1 → b2	23.1	20.4	22.9	19.3		
B2 → migr	15.7	13.2	14.4	15.0		
Migr → b3*	37.1	34.9	37.4	33.1		
B2 → b3*	52.8	48.1	51.8	48.1		
Marr → b3*	93.4	93.6	91.3	98.7		
Nonmigr at b3 (n=667)						
Marr → b1					21.1	18.2
B1 → b2					31.4	26.2
B2 → b3*					31.8	30.6
Marr → b3*					84.3	75.0
Parity 3 at migr (n=41)						
Marr → b2	52.2	41.1	47.3	46.5		
B2 → b3	25.8	30.4	27.1	30.5		
B3 → migr	12.8	16.9	15.6	12.7		
Migr → b4*	19.2	18.4	20.2	15.7		
B3 → b4*	32.0	35.3	35.8	28.4		
Marr → b4*	110.0	106.8	110.2	105.4		
Nonmigr at b4 (n=516)						
Marr → b2					44.4	40.1
B2 → b3					26.3	26.4
B3 → b4*					31.7	34.2
Marr → b4*					102.4	100.7

*Since this table includes open intervals, averages for highest parities include the number of months to the date of the survey for women who have not yet had a child of the specified parity. For restrictions on who is included in these calculations, see text p. 80.

Table A.14

PERCENTAGE OF WOMEN REPORTING TEMPORARY SEPARATION (COMPLETE) FROM SPOUSE, BY MIGRATION STATUS, SPECIFIED INTERVAL, AND RURAL-URBAN DESTINATION/RESIDENCE

	Migrants Destination			Nonmigrants Residence	
	Rural	Urban		Rural	Urban
0 Parity at migration			Nonmigrant at birth 1		
Marr → migr	0.0	0.0	Marr → b1	1.0	1.4
Migr → b1	1.6	0.0			
Parity 1 at migration			Nonmigrant at birth 2		
Marr → b1	0.0	0.0	Marr → b1	1.0	1.2
B1 → migr	2.1	2.6	B1 → b2	1.6	1.2
Migr → b2	2.1	2.6			
Parity 2 at migration			Nonmigrant at birth 3		
Marr → b1	0.0	0.0	Marr → b1	1.0	1.6
B1 → b2	0.0	0.0	B1 → b2	1.3	1.6
B2 → migr	0.0	0.0	B2 → b3	0.5	2.3
Migr → b3	0.0	0.0			
Parity 3 at migration			Nonmigrant at birth 4		
Marr → b1	0.0	0.0	Marr → b1	1.3	2.2
B1 → b2	3.4	0.0	B1 → b2	1.3	2.2
B2 → b3	0.0	0.0	B2 → b3	0.3	1.6
B3 → migr	0.0	0.0	B3 → b4	1.3	1.1
Migr → b4	0.0	0.0			

Table A.15

PERCENTAGE OF WOMEN REPORTING TEMPORARY SEPARATION (INCOMPLETE) FROM SPOUSE, BY MIGRATION STATUS, SPECIFIED INTERVAL, AND RURAL-URBAN DESTINATION/RESIDENCE

	Migrants Destination			Nonmigrants Residence	
	Rural	Urban		Rural	Urban
0 Parity at migration			Nonmigrant at birth 1		
Marr → migr	1.6	0.0	Marr → b1	0.8	1.2
Migr → b1	4.7	3.8			
Parity 1 at migration			Nonmigrant at birth 2		
Marr → b1	0.0	2.6	Marr → b1	0.8	0.9
B1 → migr	4.2	5.1	B1 → b2	2.6	5.2
Migr → b2	8.3	2.6			
Parity 2 at migration			Nonmigrant at birth 3		
Marr → b1	0.0	0.0	Marr → b1	0.8	1.2
B1 → b2	7.4	0.0	B1 → b2	2.3	4.3
B2 → migr	7.4	0.0	B2 → b3	2.8	3.9
Migr → b3	0.0	11.1			
Parity 3 at migration			Nonmigrant at birth 4		
Marr → b1	0.0	0.0	Marr → b1	1.0	0.0
B1 → b2	3.4	0.0	B1 → b2	1.9	2.7
B2 → b3	3.4	0.0	B2 → b3	2.7	2.9
B3 → migr	3.4	0.0	B3 → b4	5.5	4.5
Migr → b4	10.3	0.0			

Table A.16

PERCENTAGE OF WOMEN REPORTING TEMPORARY SEPARATION (TOTAL) FROM SPOUSE, BY MIGRATION STATUS, SPECIFIED INTERVAL, AND RURAL-URBAN DESTINATION/RESIDENCE

	Migrants Destination			Nonmigrants Residence	
	Rural	Urban		Rural	Urban
0 Parity at migration			Nonmigrant at birth 1		
Marr → migr	1.2	1.5	Marr → b1	1.8	2.6
Migr → b1	5.8	6.0			
Parity 1 at migration			Nonmigrant at birth 2		
Marr → b1	0.0	7.0	Marr → b1	1.8	2.1
B1 → migr	8.8	11.6	B1 → b2	4.1	6.4
Migr → b2	1.8	16.3			
Parity 2 at migration			Nonmigrant at birth 3		
Marr → b1	0.0	0.0	Marr → b1	1.8	2.7
B1 → b2	4.2	6.2	B1 → b2	3.3	5.1
B2 → migr	4.2	6.2	B2 → b3	3.3	6.2
Migr → b3	0.0	12.5			
Parity 3 at migration			Nonmigrant at birth 4		
Marr → b1	0.0	0.0	Marr → b1	2.1	2.2
B1 → b2	3.4	6.2	B1 → b2	2.9	4.9
B2 → b3	0.0	12.5	B2 → b3	3.2	4.4
B3 → migr	0.0	6.2	B3 → b4	5.8	6.6
Migr → b4	3.4	12.5			

REFERENCES

Baker, Paul T., "Modernization, Migration, and Health: A Methodological Puzzle with Examples from the Samoans," paper presented at Conference on Consequences of Migration, East-West Population Institute, Honolulu, August 1981.

Borrie, W. D., and Morag Cameron (eds.), Population Change: Asia and Oceania, Department of Demography, Australian National University, Canberra, 1969.

Butz, William P. et al, The Malaysian Family Life Survey: Appendix A, Questionnaires and Interviewer Instructions, The Rand Corporation, R-2351/1-AID, March 1978.

Butz, William P., and Julie DaVanzo, The Malaysian Family Life Survey: Summary Report, The Rand Corporation, R-2351-AID, March 1978.

Cho, Lee-Jay, "The Own-Children Approach to Fertility Estimation: An Elaboration," International Population Conference, Liege, 1973, Vol. 2, International Union for the Scientific Study of Population, Liege, 1973, pp. 263-280.

Coale, Ansley J., and C. Y. Tye, "The Significance of Age Patterns of Fertility in High Fertility Populations," Milbank Memorial Fund Quarterly 39 (October 1961):631-646.

DaVanzo, Julie, and John Haaga, "Anatomy of a Fertility Decline: Ethnic Differences in the Experience of Malaysian Women, 1950-76," The Rand Corporation, N-1639-AID, 1981.

DaVanzo, Julie, and Peter Morrison, "Return and Other Sequences of Migration in the United States," Demography 18 (February 1981): 85-101.

Findley, Sally E., and Ann C. Orr, Patterns of Rural-Urban Fertility Differentials in Developing Countries: A Suggested Framework, Report GE 77TMP-53, Office of Urban Development, Agency for International Development, Washington, D.C., 1978.

Goldstein, Sidney, "The Extent of Repeat Migration: An Analysis Based on the Danish Population Register," Journal of The American Statistical Association 59 (December 1964): 1121-1132.

----, Circulation in the Context of Total Mobility in Southeast Asia, Paper No. 53, East-West Population Institute, East-West Center, Honolulu, 1978a.

----, "Migration and Fertility in Thailand, 1960-1970," Canadian Studies in Population 5 (1978b): 167-180.

----, and Alice Goldstein, "The Impact of Migration on Fertility: An 'Own Children' Analysis for Thailand," Population Studies 35 (July 1981): 265-284.

Goldstein, Sidney, Alice Goldstein, and Sauvaluk Piampiti, "The Effect of Broken Marriage on Fertility Levels in Thailand," Journal of Social Sciences (Thailand) 10 (July 1973): 47-87.

Goldstein, Sidney, and Penporn Tirasawat, The Fertility of Migrants to Urban Places in Thailand, Paper No. 43, East-West Population Institute, East-West Center, Honolulu, 1977.

Goldstein, Sidney, and David F. Sly (eds.), Basic Data Needed for the Study of Urbanization, International Union for the Scientific Study of Population, Liege, 1975.

Haaga, John, "Validity and Reliability of Retrospective Life History Data from the Malaysian Family Life Survey," paper presented at the Population Association of America, Washington, D.C., 1981.

Hanna, Joel M., and Stephen T. McGarvey, "The Biomedical Characteristics of the Samoan Community in Hawaii," paper presented at Conference on Consequences of Migration, East-West Population Institute, Honolulu, August 1981.

Hendershot, Gerry E., "Social Class, Migration, and Fertility in the Philippines," in The Dynamics of Migration: Internal Migration and Migration and Fertility, Occasional Monograph Series, No. 5, Vol. 1, Interdisciplinary Communications Program, Smithsonian Institution, Washington, D.C., 1976, pp. 197-257.

Hirschman, Charles, "Demographic Trends in Peninsular Malaysia, 1947-75," Population and Development Review 6 (March 1980):103-125.

----, and Dorothy Z. Fernandez, "The Decline of Fertility in Peninsular Malaysia," Genus 36 (January/June 1980):93-127.

Jones, Gavin W., "Trends in Marriage and Divorce in Peninsular Malaysia," Population Studies 34 (July 1980):279-292.

Jones, Robert, and Nyle Spoelstra, The Malaysian Family Life Survey: Appendix C: Field and Technical Report, The Rand Corporation, R-2351/3-AID, March 1978.

----, Multidimensionality in Population Analysis, RR-80-33, International Institute for Applied Systems Analysis, Laxenburg, Austria, 1980.

Keyfitz, Nathan and Dimiter Philipov, "Migration and Natural Increase in the Growth of Cities," Geographical Analysis 13 (October 1981): 287-297.

Lee, Bun Song, The Influence of Rural-Urban Migration on the Fertility of Migrants in Developing Countries: Analysis of Korean Data, Division of Research, College of Business Administration, Louisiana State University, Baton Rouge, 1981.

Lesthaege, Ron, "Nuptiality and Population Growth," Population Studies 25 (November 1971): 415-432.

Magnani, Robert J., "Migrant and Nonmigrant Fertility Differentials in Urban Areas: Results for Bangkok and Bogota," Ph.D. dissertation, Department of Sociology, Brown University, 1980.

Malaysia, Department of Statistics and National Family Planning Board Malaysia, Malaysia Fertility and Family Survey, 1974, Department of Statistics, Kuala Lumpur, 1979.

Menken, Jane, "Seasonal Migration and Seasonal Variation in Fecundability: Effects on Birth Rates and Birth Intervals," Demography 16 (February 1979): 103-119.

Myers, George C., and John J. Macisco, "Revised Bibliography on Migration and Fertility," International Migration Review 49 (Summer 1975): 221-231.

Prior, Ian, Jill G. Joseph, and Clare E. Salmond, "Health Consequences of Migration of Pacific Islanders to New Zealand," paper presented at Conference on Consequences of Migration, East-West Population Institute, Honolulu, August 1981.

Radloff, Scott, "Measuring Migration: A Sensitivity Analysis of Traditional Measurement Approaches Based on the Malaysian Family Life Survey," Ph.D. dissertation, Department of Sociology, Brown University, 1982.

Ribe, Helena, and T. Paul Schultz, "Migrant and Native Fertility in Colombia in 1973: Are Migrants Selected According to Their Reproducitve Preference?" Center Discussion Paper No. 355, Economic Growth Center, Yale University, New Haven, 1980.

Snedecor, George W. and William G. Cochran, Statistical Methods, 6th Ed., Iowa State University Press, Ames, 1967.

Visaria, Pravin, "Urbanization, Migration, and Fertility in India," in The Family in Transition, Fogarty International Center Proceedings No. 3, Washington, D.C., 1969, pp. 257-283.

Zarate, Alvan, and Alicia Unger de Zarate, "On the Reconciliation of Research Findings of Migrant-Nonmigrant Fertility Differentials in Urban Areas," International Migration Review 9 (1965): 115-157.

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