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TECHNIQUES FOR ANALYSIS OF THE INTERRELATIONS BETWEEN MIGRATION AND FERTILITY

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This paper focuses on use of the life history component of the ESCAP survey instrument and relies for illustrations on research that used the life history matrix of the Malaysian Family Life Survey conducted by the Rand Corporation's Family in Economic Development Center. The full results of the analysis of the Malaysian data are available in Goldstein and Goldstein, 1981b. The valuable comments on the paper by Julie DaVanzo and Sally Findley are greatly appreciated.

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As the United Nations and other international organizations have recognized, among the most important problems that mankind will have to face and solve in the remaining decades of the twentieth century and probably well into the twenty-first are those related not so much to the absolute size and rate of population growth, important as these are, but rather to the particular pattern of settlement and the increasing rate of growth and concentration of population in the urban areas of less developed countries. Three interrelated situations--continuing rapid overall 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--present both researchers and policy makers with new challenges and opportunities. Yet, despite these developments, urbanization and population redistribution remain among the demographic phenomena about which the least is known (Goldstein and Sly, 1975).

A pressing need exists to assess the changing levels and rates of urbanization, the relation of urbanization to the ongoing economic, social and demographic changes, and the respective 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 non-migrant women in both urban and rural places. In part, such a comparison will indicate the relative contribution of native and migrant fertility to urban and rural growth; but in part, it will also show whether the migration process itself is associated with changes in fertility attitudes and

behavior as individuals move from one type of environment to another, and whether such differentials 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. To the extent that the fertility of urban residents has generally been found to be lower than that of rural women, strong interest focuses on whether urbanization and rural-to-urban migration may serve as a means for reducing 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 the migrants from rural locations maintain high rural fertility levels. On the other hand, if return migrants to rural areas and urban-to-rural migrants bring with them to rural places the lower fertility values and behavior of urban residents, they can serve as models for the non-migrant rural population and thereby help to lower rural fertility. Beyond the insights that an assessment of the relations between migration and fertility has for policy formation and for development of more effective planning programs, the results of such an assessment could prove valuable, too, in making subnational population projections. Given high rates of migration from rural to urban places, as well as between urban places of different size and between regions, the contribution of migrant fertility to total growth becomes an important concern. More exact information on this could greatly enhance the quality of population projections and, in turn, make such projections more useful for planning and policy purposes.

Numerous studies have attempted to gain insights into the possible interrelations between migration and fertility. Yet, a wide variety of conflicting evidence has been cumulated, 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). Different studies have concluded that migrant fertility is higher, lower, or the same as that of non-migrants. Many of the differences in conclusion reflect differences in study design, in analytic methods, in definitions of migrants, and in the measures of fertility used. Clarification is therefore essential of, among other matters, who the migrant is, who the urban native is, what inter-cultural differences may exist, what constitutes urban fertility, and what the effects of differences in urban size are before we can have a clearer assessment of the interaction between migration and fertility and their joint impact on growth rates in urban and rural places. Moreover, studies must be designed so that they allow clearer testing of the extent to which any differentials in fertility are attributable to selection at origin, to disruption in the process of movement, or adaptation at place of destination. The ESCAP National Migration Surveys have been designed in such a way as to provide new opportunities to obtain better answers to these questions. Before examining how the results of these proposed surveys can be used for such purposes, attention to the theoretical issues underlying research on migrant/non-migrant fertility differentials and to the strengths and limitations of existing data sources is necessary.

THEORETICAL ISSUES

Several theoretical perspectives or models have been suggested for explaining differentials in fertility attitudes and behavior between migrants and non-migrants (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 whether differentials arise in the place of destination 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 and/or destination.

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; but this model assumes that assimilation of the lower urban fertility levels will occur only after considerable length of residence at destination. In fact, the differentials will dissipate only after several generations of urban residence. The socialization model differs significantly from the adaptation model, which assumes that changes in fertility values occur among the migrants themselves and do not require several generations. Migrant fertility may therefore resemble native fertility within several years after the move.

Quite a different perspective characterizes the selectivity model, which 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 non-migrants. Ribe and Schultz (1980) maintain that those preferring large families relocate in rural areas whereas those preferring smaller families go to urban locations. This pattern helps to explain why rural-urban migrant fertility is less than that of natives at origin and sometimes even less than that of natives at destination, although the latter does not necessarily follow from the model. Others (Goldstein, 1978) 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. Such rationality therefore helps explain the lower fertility of migrants from rural to urban places compared to the women who remain behind. The selectivity model would hold that, even if the migrants had not migrated, their fertility at origin would likely have been lower than that of the other natives.

Related to the selectivity model is a corollary thesis which argues 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, the migrants become much more typical of the population at origin, and therefore also differ less from that population in their fertility behavior. Furthermore, it follows that early migrants are more likely to have lower fertility than natives at destination, whereas

later migrants, because of the mass character of the movement, are likely to have higher fertility than women at destination. On the other hand, it can also be argued that initial movements tend to be less selective so that migrant fertility is not differentiated from that at origin but 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.

The selectivity model can also be applied to return migrants, but then the situation becomes more complex since the relation between migration is affected both by whether selection operated initially in the move from rural to urban place and by whether adaptation occurred during residence at destination. Depending on whether return migrants are disproportionally concentrated among the successful or unsuccessful migrants to urban destinations (and this conclusion may be affected by the criteria used to judge success), selection might vary in opposite directions. The more successful migrants are more likely to have lower fertility and the least successful the highest, other things being equal. If so, then the successful return migrants may have even lower fertility than urban natives and can serve as particularly strong models of lower fertility norms in the rural setting.

In contrast to the selectivity model, the adaptation model assumes that migrants differ minimally from the population at place of origin; they therefore 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 anticipates that interaction with the urban population will in time lead to adoption by the migrants of the lower fertility characterizing the urban population. Among rural-to-rural migrants, minimal change would occur since the same high fertility values presumably characterize both origin and destination.

In discussing the adaptation model, Ribe and Schultz (1980) stress that fertility differentials are due in part to differential wages and differential price and income restraints between rural and urban areas, and that the regional labor market and price variables condition migrants to adopt the lower fertility patterns in urban settings. Others might argue that non-economic factors also have an effect. Regardless of what the particular conditioning factors are, this perspective expects that over time migrant fertility will converge toward native fertility. The model does not, however, specify the length of time that such adaptation requires. If it were to take several generations, then the socialization model seems more appropriate. This situation may especially pertain to migrants who move to cities after most of their children have been born. Adaptation also 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.

While the preceding perspectives point to conditions at place of origin or destination as the key variables affecting the fertility of migrants, it is also possible that the migration process itself may be disruptive of fertility. If so, the extent of migrant/non-migrant differentials will also vary by duration of residence, 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 to actually interfere with the physiological capacity to conceive and bear children (Baker, 1981; Prior, Joseph, and Salmond, 1981; Hanna and McGarvey, 1981). 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 the length of separation, 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/non-migrant differentials in fertility. To the extent that diseases such as malaria are endemic in rural areas, the physical ability of women to have children, because of their own condition or that of their husband, may be seriously impeded.

Variations in nutrition may be still another factor affecting fertility. Once women move to cities where health conditions are better and where the effects of diseases or malnutrition may change, the ability to bear children may also undergo change. These changes, rather than the variations in social, economic, and psychological conditions, may be particularly important in explaining both initial differentials and changes over time. The process may also work in the reverse direction, as diseases which 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 socio-economic and demographic variables as well as 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 non-migrants.

In all likelihood, not one but several or all of these models helps to explain the relation between migration and fertility; they are not mutually exclusive. Selection may occur at origin, migration itself may disrupt fertility, and at destination may lead to adaptation of urban fertility values and behavior among rural-to-urban migrants themselves or over the longer run by their children and/or grandchildren through the effects of socialization. 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

Discussions of the various explanatory models of the relation between migration and fertility make clear that the ideal study design for testing which of these models has the greater explanatory power, or whether a combination of models provides fuller explanations, calls for complete 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 non-migrants at origin, how they differ from the host population into which they move, and how these differences change with longer duration of residence. Such 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 at destination. To fully test the socialization hypothesis would require not only the kind of detailed data specified above, but comparable information for the next and/or preceding generations so that intergenerational changes could be identified and measured in relation to changing background characteristics and environmental conditions.

In virtually all of the studies undertaken to date, the data sets available for analysis have fallen far short of these ideals. In most countries where the census collects information on fertility it is generally only in terms of the number of children ever born, and often this information is asked only of ever married women. Such a cumulative measure of fertility does not distinguish between births occurring

before and after movement, nor does it provide information on intervals between births. Analyses based on children ever born therefore do not permit direct determination of the extent to which fertility patterns which characterize migrants in their place of origin persist after their move. Nor is it possible to determine whether the timing of births differs between migrants and non-migrants. All that can be learned is whether migrants, however defined, have more or fewer children than non-migrants at origin and destination at the time that the census or the survey was undertaken. Moreover, information on children ever born is likely to be of poorer quality, due to the memory problems of older women, whose children died in infancy or early childhood or who were no longer living at home. To the extent that this effect is different for migrants and non-migrants, it could distort the comparison of fertility differences.

The difficulties in using census data of this kind are compounded by the limited information generally available on migration. At best, such coverage usually does not exceed three questions: 1) A place of birth question allows individuals to be identified as migrants if at the time of the census (survey) they are living in a place different from that of birth. This lifetime measure of migration has serious limitations since it obscures all intervening moves and does not identify the timing of the move; and persons who returned to their place of birth by the time of the census are not identified as migrants (Radloff, 1981).

2) A fixed point question most often refers to place of residence five years before the census, although sometimes it is in terms of one year only. This question also precludes identification of intervening

moves and exact timing of the move, but this problem is less serious because of the shorter time interval encompassed. It has the particular disadvantage of identifying only one move and overlooks all moves which occurred earlier than five years before the census. To the extent that such moves may be more important in affecting fertility, their omission could create serious analytic problems. The shorter one-year interval reduces the likelihood that moves will be omitted, but it concurrently increases the problems inherent in the absence of information on moves prior to the fixed time.

3) The third migration question that often appears in censuses ascertains duration of residence at a given location. Although only the last move is covered, those moves are included which occurred earlier than a particular fixed point. The varying lengths of residence identified by the duration question results in greater heterogeneity in the classification of migrants but this information has the advantage of allowing the assessment of stability/mobility in relation to fertility.

The value of each of these types of questions is greatly affected by the amount of information collected on the rural/urban character of the place of origin. In many censuses, no such information is collected; only the province or state of previous residence is ascertained, and moves are restricted to those occurring between such large units. Even when information on rural/urban origin is collected, serious problems may arise with respect to the accuracy of the classification, depending on whether it is the respondent's definition, the current classification of the location, or the classification that existed at the time of the move or the census closest to the move.

Although such questions on migration have serious limitations, imaginative use of the information collected has allowed considerable assessment of the relation between migration and fertility. When censuses obtain information on both birthplace and residence at a fixed point, it becomes possible to classify individuals into 1) those who never moved, 2) those who were living in the same place at the fixed point as at the census, but had been born elsewhere, 3) those who changed residence between the fixed reference point and the time of the census, 4) those who were living in a different place than their birthplace at the fixed point but who had returned to their birthplace by the time of the census, and 5) those who live in a different location at each reference point. By classifying women in categories 3 through 5 as recent migrants and those in category 2 as long-term migrants, some insights can be gained on the effect of duration of residence after migration on fertility behavior.

Almost invariably, however, such data allow only restricted comparisons between migrant fertility at place of destination with the fertility of non-migrants at origin. Non-migrants at origin are simply defined as women resident there at the time of the census rather than when the migrant left the community. Without knowing the extent to which the fertility of non-migrants at origin has changed over time, a full assessment of migrant/non-migrant fertility differentials is not feasible. Such an assessment is further complicated if there is no information on the background characteristics of the various migration status groups at key points in the life cycle and particularly at the points at which migration occurs. In addition to age itself, age at

marriage, education, and labor force status are key variables which must be controlled if the full impact of migration per se on fertility is to be assessed.

In an effort to overcome some of the foregoing limitations inherent in census data, use has been made of the own-children approach to the measurement of fertility (e.g., Goldstein and Goldstein, 1981a; Cho, 1973). In this method, all children under a specified age living in the same household as their mother are identified with special tabulations of census returns and are, in turn, related to the characteristics of the mother. Because the information used is based on census returns, children who have died before the census are not included. Also missed are any children of the mother who are living in and have been counted in a separate household. This latter omission may seriously affect the value of the measure of fertility for assessing the impact of migration on fertility, since migrant women are much more likely to leave their children, especially older children, behind when they move.

In sum, therefore, 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) This measure of fertility provides no information on intervals between births so that spacing of fertility cannot be assessed in relation to the move. 3) Virtually all of the social and economic characteristics, including marital status, collected by the census refer to the census year, 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 are characterized by 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 surveys incorporate 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, including changes in marital status, education, and occupation, a number of the serious difficulties engendered by the use of cross-sectional data are removed. Because the ESCAP survey proposes to incorporate the life history matrix that includes attention to changes in residence, economic activity, education, marital status, and also to record 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 is representative of the population as a whole in the past. Since 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 non-migrants 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 non-migrants. If women who have larger numbers of children are affected differentially by mortality and are concentrated differently among migrants and non-migrants, the sample populations would be biased because they are based on the surviving populations rather than on those alive at the time of out-migration. A retrospective survey cannot adequately correct for these problems. These limitations must be kept in mind in any use of retrospective data of the kind that would be generated by samples of the ESCAP survey. They will particularly affect attempts to assess the selectivity hypothesis, since the data do not permit full reconstruction of the population at origin from which the migrants came.

THE ESCAP LIFE HISTORY MATRIX

Single-round surveys of the migration behavior of respondents or members of their households must necessarily use a retrospective approach to the measurement of migration since such movement has already occurred by the time of the survey. A major decision facing researchers, therefore, is how best to collect the retrospective data and what points of time to use for reference. In recent years, noticeable efforts have been made to improve the quality and quantity of retrospective data on population movement both through the kinds of questions asked and through efforts to cope with the conceptual problems. These efforts have taken several forms. Paralleling the reliance on pregnancy and marriage histories in fertility research,

residential histories have been used by a growing number of scholars to recreate the migration experience of respondents and overcome the limitations inherent in the use of one or two census-type questions. Beginning with either birth or a key point in the life cycle, related usually to completion of education, entrance into the labor force, or marriage, respondents are asked to indicate all places in which they had lived for a specified minimum number of months. The detail requested varies from one study to another as does the specificity of the locational information. Introduction of other variables, including education, marital status, and occupation, into the residential history converts it into a life cycle matrix. By obtaining precise retrospective information on mobility as well as a range of other demographic and economic variables, the life history matrix serves as a concisely formulated instrument for ordering, stimulating, and cross-checking an individual's recall of a series of personal life events. Experience with the life history (cf. Balan et al, 1976; Corno, 1979; Lauro, 1979; Haaga, 1981) suggests that this format stimulates more accurate recall than do other types of questions and that it also has the great advantage of creating closer rapport with the respondents.

A major advantage of the life history matrix is that all of the events for which data are collected can be entered into an analysis to assess their interaction. This advantage is especially important for assessing the determinants and consequences of mobility, since the life history matrix permits meaningful analysis of the relation between movement and other life cycle events and changes in environmental conditions. The life history matrix is thus a particularly valuable tool in efforts to link migration and fertility and to assess their linkages, in turn, with other life cycle events.

Although the life history matrix holds particular promise because of the wealth of material it collects, the potentially greater accuracy of information, and the opportunities to link residential and other changes, experience with this approach to date is still limited; particularly challenging is the need to develop methods that allow fuller exploitation of the data. In studies completed so far (e.g., Balan, Browning, and Jelin, 1973; Lauro, 1979; Perlman, 1976), only a small fraction of the material collected has been analyzed, often only in the form of simple cross-tabulations that do not take full advantage of the opportunities provided. Fortunately, growing attention has been given to the methodological concerns associated with the life history approach in migration research (Pryor, 1979). The new methods, coupled with the increasing use of the approach in ongoing or planned surveys, should provide ample opportunities for exploiting the material and assessing the value of the life history matrix for the study of population movement and its relation to fertility and other demographic variables.

One of the major reasons for incorporating retrospective questions in a migration survey is to assess the migrants' characteristics before and after the move in order to assess whether migration has led to positive or negative changes, and to relate these changes to those experienced by non-migrants in both places of origin and destination who are at comparable stages of the life cycle. The ESCAP survey core questionnaire incorporates a life history matrix as the major mechanism for obtaining information on migration and residential mobility and other life cycle events. Collecting, as it does, information on all

moves of at least one year duration (and less if the move was for work, looking for work, or study), information on change in labor force status and occupation, information on all births and deaths of children, and change in marital status, all since the age of 15, the ESCAP survey potentially provides the basis for one of the most thorough analyses possible of the way in which residential movement affects and is affected by fertility.

By having data on virtually all residences since age 15, in addition to information on birthplace, the researcher will be able to ascertain the number of moves an individual has made during his or her adult lifetime, the exact year in which the moves occurred, the nature of the moves as defined by both origin and destination as well as by the length of residence in the prior or succeeding location. The basis is thereby provided for a much fuller typology of migrants than is possible on the basis of census information. Migrants can be classified by frequency of move, by duration of move, by origin/destination of each move, by whether moves have followed a stepping stone process from smaller to larger places, by whether they have been circular or onward in character, and by whether they were preceded by a short or long period of residence in given locations.

Although both men and women are eligible to be respondents in the ESCAP survey, this discussion of the survey's applicability for analysis of fertility in relation to migration assumes that only the life histories of female respondents will be used. This approach has been adopted for several reasons: 1) It allows more direct comparisons with the results of other surveys that have exclusively used female respondents for fertility data. 2) It allows linkage of fertility

events with the characteristics of the mother, including migration status, at the time of childbirth. 3) The data on births as reported by the mother may be more accurate than those reported by the husband, especially if not all children survived and/or are living at home, or if more than one marriage had taken place.

The present reliance on female respondents does not, of course, preclude similar analyses using the male life histories. In fact, use of both the male and female histories may result in particularly valuable comparative analyses and provide important insights into the differential impact of migration on the fertility of men and women. It may well be that linkages of migration and fertility events to husband's economic status are more meaningful than when they are related to wife's economic status. This may be especially true if migration is a family decision and if the husband's position carries more weight than the wife's in the decision-making process. Ideally, complete life histories for both husband and wife should be available to allow assessment of the impact of changes in both their statuses on the migration/fertility relation.

Most important for assessment of the relation between migration and fertility is the ability to order sequentially the information on occupational, educational, and residential changes in relation to fertility. It will be possible, within limits discussed later, to ascertain how the timing of moves relates to the timing of childbearing over the entire period of the woman's life cycle from age 15 to the time of the survey. Information will be available on the number and specifics of children born before and after each move and in relation to changes in background characteristics. By having comparable data on the

childbearing experience of non-migrants, it then becomes possible to ascertain the extent to which the fertility levels of migrants differ from those of non-migrants at origin and destination at the time of migration and how the move itself may have affected the spacing of children. The available background data on age at marriage, changing marital status, occupational changes, and changes in education allow introduction of appropriate controls for the influence of these key variables on the fertility of migrants and non-migrants. In addition, the usual range of census type information on the characteristics of the respondent and spouse at the time of the survey are available. Together, therefore, the basis is provided for a much more comprehensive assessment of the relation between population movement and fertility than is generally possible. The data are not, however, without their limitations.

Because the life history is obtained only for the respondent, no information on key background variables is collected for respondent's spouse for periods before the survey. The characteristics of the husband at earlier points in time cannot, therefore, be introduced into the analysis when the relation between migration and fertility is being assessed for female respondents. Moreover, even though the life history obtains information on changes in marital status, it does not collect information on separation of spouses for reasons other than the break up of the marriage. Such separations may be quite common in areas where temporary migration is an important component of labor force adjustment. Since previous research (Menken, 1979; Visaria, 1969) has demonstrated that fertility may be affected by marital disruptions associated with the physical separation of the spouses due to migration, omission of

such information is a serious limitation of the data collected in the ESCAP survey's life histories. Consideration of its inclusion should be given in any revision or augmentation of the questionnaire.

As noted, the questionnaire provides for obtaining information on at least two changes in residence and other statuses during each year. Reporting of more changes is allowed, but there is no guarantee that these additional changes will always be obtained, since their inclusion depends on the discretion of the respondent and interviewer. For individuals who have moved unusually frequently, this could constitute a limitation of the data, although it is likely to be serious in only a few cases. More serious, however, is the lack of clarity on the sequence in which changes in different statuses occurred and the exact timing of the changes within the year. Given the present format of the life history matrix and the instructions for the interview it will not be possible to tell which changes occurred first within any given year. More important, it does not allow for identification of the exact month during the year when the change occurred. For births, this means that only the year of birth is known, not the specific date or even month of birth. The absence of this information as well as comparable information for any move that occurred during the same year will make it difficult to ascertain clearly whether the move preceded or followed the birth, and will also make it difficult to ascertain, with any degree of exactitude, the intervals between succeeding births in relation to the interval between succeeding residences.

Additionally, the life history matrix specified in the ESCAP survey does not collect any information on knowledge, attitudes, and practices regarding family planning. This omission was intentional, given the

large number of KAP surveys and especially the WFS that have been conducted in developing countries in recent years. The country representatives who helped to plan the ESCAP survey argued strongly that this migration survey should not overlap and duplicate other efforts. On this basis, the decision was made to omit attention to family planning. However, when the surveys are undertaken in individual countries, the organizers will have the option of incorporating such questions. Whether they do so in terms of current attitudes and practices or attempt to take account of changes through adding to the life history matrix is speculative. If the interest is strong in assessing the relation between fertility and migration, then the arguments are similarly strong for attempting to obtain a full history of contraceptive practice and of methods used; information on attitudes and knowledge are less important since they would not have a direct impact on fertility. Moreover, attitudes and knowledge may be more difficult to recreate over time.

Finally, a strength of the life history matrix is the opportunity it provides to identify the specific location of each residence in terms of province, district, and village/town/city. If the respondents are able to provide accurate identification of such places and to classify them according to their village/town/city status at the time of residence, it will obviate the need for the researcher to properly code these locations in terms of their rural/urban character. If the respondents cannot accurately classify their previous place of residence, then the ability to do so accurately will depend on whether proper information is available in any given country. Some countries may rely on the coding systems of earlier censuses as the basis for

classifying places of residence at earlier times. Most countries, however, do not have such information, and analysts will therefore have to exercise considerable ingenuity to develop a meaningful and useful classification system.

Compared to most other surveys, the ESCAP survey will have a comparatively large sample, 14,000 persons, encompassing ages 15 to 65, although the precise overall sample size will vary by country depending on individual characteristics, resources, and objectives. There will thus be approximately 7,000 women covered in the survey, a very respectable number for analytic purposes. For example, the World Fertility Survey (1975) has recommended sample sizes of between 2000-8000 women. Yet the size of the ESCAP sample may still not be fully adequate for assessment of the relation between migration and fertility. Some of the women, especially in the younger age groups, will not have been married. More important, the proportion of migrants will obviously vary from country to country and ad hoc decisions may have to be taken in some countries, through the particular sampling procedures used, to oversample certain categories of migrants in order to enhance the analysis of migrant/non-migrant differentials.

As the foregoing discussion has pointed out, the data that will be available from the ESCAP survey will allow a wide range of analyses to test the migration/fertility relation. In the sections that follow, attention will be given to specific ways in which such analyses can proceed. Initial discussion will focus on the use of the aggregate measure of fertility--children ever born at the time of the survey;

subsequently, consideration will be given to analyses that make extensive use of the temporal dimensions of the data--children born before and after specific points in time or age of women, cohort analysis, analysis of birth intervals, and changes in status (marital, labor force, migration) and their interrelations with fertility. The appropriateness of using the various approaches to test the selectivity, adaptation, and disruption hypotheses posited earlier will also be indicated.

Underlying all these discussions is the assumption that maximum effort is made in training, field work, and data processing to insure high quality data, and that later quality checks of the life history data justify their exploitation. These discussions assume, too, that the data from the life histories will be retrievable in a form that will allow application of the various methods. The researcher should therefore carefully consider the kinds of analyses that will be undertaken so that the processing of the data can proceed in an appropriate way. The coding and organization of the data file for computer processing must be done in such a way as to insure maximum flexibility in defining migration, intervals between events, and joint consideration of several characteristics and changes in them over time. Unless this is done, the unique value of the life history matrix for analyzing relations between migration, fertility, and background characteristics that change over time will be vitiated. At the same time, the researcher must keep in mind the limitations of retrospective data and the restrictions they place on the testing of these relations, especially as they refer to the selectivity of migrants.

ANALYSES USING CHILDREN EVER BORN

At the most basic level, a wide range of analyses can be undertaken using the most commonly used aggregate measure of fertility--children ever born. Although such an approach does not make maximum use of the potential inherent in the life history data, it does allow the generation of data which can both provide the background for later analyses using a longitudinal approach, and it enables comparisons to be made with the findings of previous research based exclusively on cross-sectional data. Furthermore, initial use of an aggregate measure, by allowing identification of migrant/non-migrant differentials for a number of background characteristics, will point to those variables that are particularly relevant to the analysis for a given country or society. These suggested relations can then be pursued in greater depth using the longitudinal data that are available.

In all of the aggregate analyses discussed below, definitions of migration can vary. Migration can be measured in terms of number of moves, duration of residence, migration type (such as repeat and return migration), migration streams, or a combination of these. If multiple movers constitute a substantial segment of all migrants, it may be desirable to pay particular attention to this sub-segment of the population, taking account not only of the number of moves, but also their sequence in terms of urban/rural origin and destination. If the number of cases proves adequate, attention can also be given to the varied sub-categories of migrants further subdivided by reasons for move, since such motivations may well affect childbearing attitudes and practices. The researchers should also consider whether women who moved

before marriage only should be regarded as migrants; such pre-marital migration may be meaningful only for some of the analyses to be specified. Since a detailed migration history is available only from age 15, migration before marriage will have very limited value even for determining where the respondent lived longest during her period of socialization. Some exploration of the data will be useful before a final decision is made on who to define as a migrant; and maximum flexibility in changing the definition as appropriate is highly desirable. In many countries, an increasing proportion of all migrants is now comprised of women, a considerable proportion of whom are young and single. Evaluation of their migration experience before marriage may therefore be an especially important part of an overall evaluation of the migration/fertility relation. Since migrants generally have an age distribution that is different from that of non-migrants, controls for age should be instituted or the data should be standardized for age.

Previous research has shown that level of education affects both fertility and migration, with higher education associated with lower fertility and higher levels of mobility often directly related to higher education. The ESCAP data will allow assessment of the interrelation of all three variables to allow determination of whether migration has an impact on fertility once education is controlled. Similarly, both labor force status and occupation can be assessed in terms of fertility and migration jointly. Research findings on these variables have failed to point to a clear and consistent relation among them, in large part because of differences in definitions used and because, even when definitions were similar, they may have assumed that similarly categorized activities are in fact comparable in different contexts.

This is not always so; for example, a salesperson in an MDC is most likely a white collar employee working away from home. In an LDC, such a person is quite often self-employed and based at home; migrants often enter into the labor market through such occupations. Such differences have serious implications for the relation between fertility and occupation for persons so classified; more rigorous definitions are necessary before the impact of occupation can be properly assessed. Here the ESCAP data may be particularly valuable in allowing occupation to be grouped in a way that is meaningful within the national context. Modern, traditional, and service occupations can be identified so that their relation to both migration and fertility can be clarified. Moreover, if labor force status is used, it is important to distinguish between women who are unpaid family workers and those who work for pay; the latter group may be subdivided into women employed in the traditional and modern sector.

Since large proportions of women in many countries are not in the labor force, it is often more realistic to use occupation of husband rather than wife in assessing the impact of status, as indexed by occupation, on migration and fertility; alternatively, a new variable can be created that combines the occupational levels of the spouses. Such a procedure is possible with the ESCAP data, since the survey collects information on occupation of all adult household members. Age and education of spouse may also be considered for these analyses, so long as current characteristics are used since information on characteristics of spouse is restricted largely to those at the time of the survey. If the retrospective data are used, only the respondent's characteristics can be included.

In a number of societies religious or ethnic differences are critical variables in explaining demographic behavior. Initial analyses of migration and fertility variables controlling for these cultural characteristics can indicate if such controls are necessary within a given context. If so, then later multivariate analyses may very likely have to include interaction terms or be performed separately for each major ethnic group, since differing relations between variables may cancel each other out when the total population is used as the basis for the analysis.

Basic to any understanding of migrant/non-migrant differences in fertility is the effect of urban or rural residence, both at the time of the survey and at various times during periods preceding migration, or at fixed points before the survey (e.g., at birth, at age 15, or 5 or 10 years before the survey). Previous research has indicated the powerful effect of urban residence in accounting for lower fertility levels; such residence may have occurred during early stages of a woman's life or at later times, and the length of exposure to urban living may also be a critical consideration. In some countries, where urban places may not serve as a proxy for low fertility areas, it may be desirable to consider identification of low fertility areas per se, and control on this dimension. The information collected in the ESCAP life histories will allow careful control of place of residence after respondents have reached age 15. Not only will data be available on the urban/rural character of current residence, information will also be provided on the character of all previous residences and the amount of time spent in each place. Furthermore, the analysis can be undertaken in terms of

more than a simple urban/rural dichotomy, since the ESCAP questionnaire makes a distinction between city, town, and village. The respondent is asked to characterize each residence in these terms, so that even retrospective data can be classified in this way--within the limits of the respondent's accuracy of recall about the nature of the places in which she has lived. When feasible, answers provided by respondents can be checked against independent coding schemes, such as those used by earlier censuses. Whenever possible, then, if the number of cases available for analysis allows, controls should be initiated for current residence as well as age when assessing the effect of other variables on migrant/non-migrant differentials in children ever born. (See, for example, Table A.)

Availability of information on the rural/urban character of all places of residence of the respondent allows the aggregate analysis of CEB to be carried one step further, in terms of rural/urban origin and destination of migrants. Using the threefold classification, nine separate migration streams can be delineated. Although such refined categories would be very desirable, the number of cases in each stream may preclude this, and a simple, fourfold urban-urban, urban-rural, rural-urban, rural-rural scheme may be more useful. The fertility of migrants in each stream can then be compared to that of non-migrants living in urban and rural places. When analysis is undertaken in terms of migration streams, a number of different approaches can be used in defining origin. Origin may refer to place of birth or place of residence at age 15; or it may refer to residence immediately preceding current residence. For women who have moved only once in their lifetime, place of origin will be the same, regardless of point of

reference, unless the move occurred before the time point being used--in which case the women would be classified as non-migrants. For women who have moved more than once, it may be desirable to distinguish between origin/destination of first move and origin/destination of last move. Alternatively, the place of longest previous residence can be used. Such distinctions will allow comparisons not only of migrants with non-migrants, but also between different migration streams.

The results of tabulations of children ever born by migration streams have often been used as crude indicators of the validity of the selectivity and/or adaptation hypotheses. Comparisons of rural-urban migrant fertility with that of non-migrants in rural areas may provide some indication of migrant selectivity, and comparison with the fertility of non-migrants in urban places may suggest whether some adaptation to urban fertility norms has occurred. Without control for background variables, as well as control for duration of residence at destination, however, CEB by migration streams can be little more than suggestive of the more rigorous analyses that should be made using the life history data, which allows comparisons of fertility before and after migration.

Further comparisons within migrant groups can be undertaken by variously defining the migration category. Migrants may be disaggregated by number of moves, into those women who moved only once, those who moved twice, and those who moved three or more times. Such analysis may particularly provide insights into whether migration is disruptive of fertility. If so, migrants who moved a number of times might be expected to have significantly lower fertility than those who moved only once. Multiple movers can be further subdivided into women

who return to their community of origin and those who move on to still other communities. It is quite possible that if migration does interrupt fertility, or if fertility is postponed to facilitate migration, the relation may be of differing intensity for women who return to communities of origin compared to women moving into new communities. Distinctions between return and onward migrants may also give some indication of whether women returning to rural communities after living in an urban place bring back with them the lower fertility values characteristic of urban women.

Additional insights into the relation between migration and fertility may be gained by defining migrants in terms of their duration at current residence. If adaptation is an explanatory factor in fertility differentials, then the fertility of migrants who have lived longer at a given destination should resemble that of non-migrants more than would the fertility of newcomers. It is possible, for example, that recent arrivals to urban places have more children than urban residents of similar characteristics. With longer residence in the urban places, these migrants may experience a slowdown in their pace of childbearing, so that in time their fertility levels, or at least their current childbearing behavior, will resemble those of the non-migrants. On the other hand, among rural-rural migrants, a different pattern may obtain, especially if migration is disruptive of fertility. Such women may arrive at destination with fewer children than their non-migrant counterparts, and may subsequently accelerate their childbearing to "catch up" to rural fertility levels.

Duration can be measured in a variety of ways. Studies relying on census data have often incorporated a duration variable by dividing

migrants into those who have lived at current residence less than five years--recent migrants (based on the commonly asked 5-year question), and those who have lived at current residence five or more years--longterm migrants (based on place of birth question); similar distinctions can be made using data generated by the ESCAP questionnaire to allow comparisons with other studies. But the ESCAP material will allow other distinctions as well. Duration of residence can be defined in terms of specific years, i.e., 1, 2, 3, . . . n years or in terms of period of residence, i.e., less than 1 year, 1 to 4 years, 5-9 years, etc. Each definition will generate its own set of comparable non-migrant and/or longterm migrant groups. For example, if a 1-year duration is used, then recent migrants are those who moved within one year of the survey, longterm migrants moved more than a year preceding the survey, and non-migrants never moved; or, alternatively, the comparison group for the 1-year migrants is all other women combined. Similar comparative groupings can be made for 2- to n-year migrants. If migration is defined in terms of mutually exclusive durations of residence, then the fertility of women who have lived at current residence less than one year may be compared to that of women with 1-4 years in current residence, with 5-9 years, and so on; non-migrant women would be those who have never moved and, if one wishes, also those who moved longer ago than the longest period used for designating persons as migrants; for example, those living in an area longer than 25 years might be considered non-migrants. The flexibility of such variable definitions of residence allows much fuller exploration of the relation between migration and fertility, even using an aggregate measure like CEB, than is possible with most cross-sectional data sets.

Although the number of cases in each national survey is expected to be large enough to allow for quite refined analysis using cross-tabulations procedures--i.e., a number of variables can be controlled at any one time--it still will likely be desirable to test the interrelations using ordinary least squares (OLS) regression analyses. In addition to providing a measure of the relative influence of migration on CEB when other variables are controlled, a series of regression analyses will also allow assessment of the comparative importance of migration when migration is variously defined in terms of number of moves, migration streams, or intervals. The basic regression formula which would incorporate the variables discussed above, is as follows:

$$CEB = A + X_1AGE + X_2EDUC + X_3LABFO + X_4RESID + X_5MIG + e$$

where: CEB = Number of children ever born

A = Constant

AGE = Age of woman in single years or in number of months

EDUC = Education of woman in single years; if desirable education of spouse, or a combined value for wife's and husband's education may be used

LABFO = Labor force status of woman, treated as a dummy variable. Labor force status may also be defined in terms of cumulative number of years in the labor force or as percent of adult or married life in the labor force (either since age 15 or since marriage), in which case it can be treated as an interval-level variable. Alternatively, occupation may be used, but then provision should be made for including women listed as unpaid family workers and women not in the labor force, or for evaluating this group separately since they will constitute a large proportion of the sample. As indicated earlier, husband's occupation or a composite index may also be considered.

RESID = Current residence in terms of city, town, and village, treated as a dummy variable. Those countries that opt for a

more detailed classification of residence can, of course, incorporate it into the regression analysis.

MIG = Migration status, treated as a dummy variable. This variable will change, depending on the definition of migration that is used. If non-migrants are used as the reference group, care must be taken to define the non-migrants in terms of the migration definition; for example, they may be women who have never moved in their lifetime, or women who have not moved in the last 1, 5, or 10 years. If number of moves are used, there would be no need to treat this as a dummy variable.

e = error term

(In this and later formulas, the notation used conforms to the types of variable names that are commonly employed for computer processing rather than a more abstract, generalized notation.)

For simplicity, no interaction terms have been specified in this or later formulas. It is wise, however, to test for interactions and incorporate them if they prove to be significant.

In addition to the variables specified above, others may be added to the equation as warranted by the particular national context. Ethnicity, religion, or citizenship may be important factors influencing fertility; if so, they should be incorporated into the analysis. If ethnic differences are very strong, as for example, in Malaysia, it may be advisable to perform the regressions separately for each ethnic group.

As in all regression analyses, it is necessary to test for the linearity of the relation between the dependent variable (CEB) and the independent variables, and for collinearity between variables. If necessary, some variable transformations may have to be performed.

Results of the regression analyses, using all the same variables, but changing the definition of migration status, will permit some

insights on the impact of migration on fertility. For example, when migration is defined in terms of number of moves, the regression coefficient may be quite small and not statistically significant for migrants making one move compared to non-migrants; on the other hand, multiple-move migrants may have a significantly high and negative coefficient, suggesting that repeated migration disrupts fertility. A second regression, using duration of residence since migration, may result in significant differences between non-migrants and migrants who have short durations of residence, but little difference between longterm residents and non-migrants, suggesting adaptation to the fertility norms at destination. The findings from these two regression analyses thus complement each other to indicate the complexity of the relation and to suggest some of the factors accounting for the differentials.

The analyses specified above have used age of respondent as a key variable. Yet some research has indicated that more powerful than current age in explaining fertility differentials is age at marriage or duration of marriage. Since migration may be an important factor in delaying marriage, this variable is especially pertinent in an analysis of migrant/non-migrant differentials. If migrants marry at later ages than non-migrants, then any patterns of lower migrant fertility may very well simply be a reflection of the shorter time that migrants have been at risk of childbearing, compared to non-migrants of similar age at the time of the survey. Assessment of migrant/non-migrant differentials in age at marriage is therefore a necessary component of an analysis of fertility differentials. If such differences are found, then duration of marriage may be substituted for age in the regression analyses.

Unlike age, however, duration of marriage is not available in terms of months, since exact date of marriage is not ascertained in the ESCAP questionnaire; duration must be expressed in terms of single years of marriage.

USE OF SEQUENTIAL DATA

The foregoing discussion of fertility differentials, because of its reliance on CEB at the time of the survey as the measure of fertility, has exploited the data available from the ESCAP surveys in only limited fashion. Only the variable definitions and measures of migration used in the analyses have taken advantage of the flexibility allowed by the life history matrix. Yet the matrix provides information on the sequence of events, so that determination becomes possible of the temporal relation between births and moves, as well as between these two variables and changes in marital status and occupation. The following discussion will point to a number of ways in which this wealth of information can be used to test the relation between migration and fertility.

Pre- and Post-migration Fertility: If migration is selective of low fertility women, then it follows that before migration, migrants will have had fewer children than non-migrants of similar age (duration of marriage) in similar places of residence, and with similar background characteristics. No differentiation in fertility levels between migrants and residents at origin would suggest a lack of migration selectivity on this characteristic (within the limitations on the researcher's ability to reconstruct the population at origin from a cross-sectional survey).

On the other hand, post-migration fertility may reflect adaptation at destination if the migrants who move to lower fertility areas change their pre-migration childbearing patterns to resemble those of women at place of destination. Some studies (Goldstein and Goldstein, 1981; Magnani, 1980) have suggested that, in fact, childbearing after migration may be somewhat accelerated compared to that of the population at destination. It has been hypothesized that the increased pace of childbearing may be a reaction to earlier disruption caused by migration. If such a "catch-up" effect continues and results in higher fertility for migrants than non-migrants, no adaptation to lower fertility would occur. Yet, such accelerated childbearing may be only a temporary phenomenon to compensate for earlier reduction in childbearing associated with migration; the catch-up effect may still not lead to higher fertility than that of the non-migrant women at destination. Given these different possibilities, and because one course does not preclude the others, the researcher must be sensitive to these possible variations in childbearing behavior and test the various hypotheses by using intervals of differing lengths, both before and after migration, over which to measure fertility. Assessment of these patterns is possible using the life history data.

Involved in such assessment is the identification of a group of women of similar age (or marital duration) who moved within a given period of time. Their fertility (in terms of number of children ever born) one, two, three, four, and five years before and after the move is then determined. Because of a possibly uneven distribution of women under age 30 by marital duration, it is desirable to carry out this

analysis for groups of women within as narrow an age range as the sample size will permit. The number of cases available may, however, necessitate as much as a five-year age group. For example, the group may be defined as those women who were age 25-29 at the time of the move and moved during 1973-75. Their fertility is determined for each of five years before the move and for each of five years after the move, during which time, by definition, they did not move. The comparative group of non-migrants is women of the same age (marital duration) in the mid-point year, who had not moved during the entire period under consideration. In our example, these would be women aged 25-29 in 1974 who had not moved in the five years before, (1969-73) or after (1975-79) the reference year. As was done for migrants, the number of children ever born is calculated for each year before and after the reference year. Place of origin and destination of migrants and place of residence of non-migrants can also be controlled (Table B). In order to eliminate the compounding effects that may be caused by marital disruption, it is important that the women included in the analysis be married during the entire period under consideration. In pursuing such analyses, it is important to remember that these relations can only be partially addressed because of the limitations inherent in a cross-sectional survey, even one that includes the wealth of retrospective data as the ESCAP survey does. As earlier discussion indicated, any attempt to assess migrant selectivity from cross-sectional data collected anywhere from one to 45 years after the event is hampered by the researcher's inability to reconstruct the population as it existed in the past, especially at migrant origins.

With the information generated by such an approach, fertility differentials can then be assessed either by direct comparisons of the levels of children ever born to migrants at specific times before and after migration with those of non-migrants at similar times; or the comparisons can be effected through calculation of migrant: non-migrant ratios of fertility one, two, etc. years before and after migration (reference year for non-migrants). If migration is selective of women with fewer children then the ratios for pre-migration fertility should fall below unity if comparisons are made with non-migrants at origin; if migrants are characterized by a more rapid pace of childbearing, post-migration ratios will be above unity. And if adaptation comes to characterize migrant fertility, then the migrant/non-migrant ratios at destination will approach unity in the post-migration period, especially several years after the migration occurred.

This approach toward assessing the impact of migration on fertility can, of course, encompass a variety of time periods during which migration occurred to test whether the relation has changed over time. The ages of women included in each group can also be varied, allowing assessment of whether the migration/fertility relation affects different age groups differently. Ideally, controls for background variables should be introduced into the analysis. Such characteristics can relate to a number of different points in time--time of migration (reference year for non-migrants), beginning of period under consideration, or end of period--or change in any given characteristic may be taken into account if the number of cases warrants such an approach. To introduce such controls into the kind of analysis outlined above would, however, prove very cumbersome; a multivariate approach would prove helpful.

Multivariate analyses to test whether migration 1) is selective of low fertility women and 2) affects fertility after the move might best be performed in two stages to test each relation separately. It is possible to gain some insight into migrant selectivity by undertaking multivariate analysis using the probability of migrating during a specific period as the dependent variable. 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, 1967:493-495); 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.

Such regression analysis has as its key independent variable the number of children born up to the beginning of the potential migration interval and can incorporate a variety of background characteristics as independent variables. For example, if the dependent variable is defined as the probability of migrating between 1970-1975, the number of children born by 1970 and characteristics such as education, residence, and labor force participation in 1970 may be included as independent variables. On the basis of previous findings that previous migration is a strong predictor of future migration, migration status before 1970 might also be used. The regression can be performed separately for women in specific age (marital duration) groups, or age (marital

duration) can be included as an independent, control variable in the equation. An example of a regression equation, where only a specified age group is considered, is as follows:

$$MIG075 = A + X_1CB70 + X_2ED70 + X_3RES70 + X_4LABFO70 + X_5MIGSTAT + e$$

where: MIG7075 = probability of migrating between 1970 and 1975

CB70 = number of children born by 1970

ED70 = number of years of schooling by 1970

RES70 = place of residence in 1970; for migrants this is place of origin; treated as a dummy variable.

LABFO70 = labor force participation in 1970; treated as a dummy variable.

MIGSTAT = migration experience up to 1970; treated as a dummy variable. This variable can be variously defined (e.g., never moved/ever moved; never moved/moved before 1964/moved between 1965-1970; never moved/ moved once by 1970/moved more than once by 1970).

To avoid overestimating the probability of migrating due to marital dissolution through divorce or widowhood, only women who are continuously married during the migration interval under consideration (in this example 1970-1975) should be included. The key variable in this equation for an understanding of whether migration is selective of low fertility women is CB70. If the regression coefficient for this variable is significant and negative, it will suggest that a woman's propensity to migrate is inversely related to the number of children she has borne.

A series of migration intervals may be investigated in this manner to determine whether the relation has changed over time. During periods of very rapid urbanization within a short time span, for example, the migration may be selective of persons with quite different characteristics, including different patterns of fertility, than it

would in situations where considerable urban-to-rural migration takes places as a result of government policies. Or, as suggested earlier, earlier migrants may be more or less innovative than later migrants. A series of time periods referring to the various stages of development should therefore be included in the analysis insofar as the data cover the relevant periods.

An OLS regression approach can also be used to test whether fertility patterns for migrants in the post-migration period differ from those of non-migrants with similar characteristics. In such analysis, the dependent variable can be defined as the number of children born during a given 5-year period (e.g., 1975-80) and a migrant can be defined as any woman moving in the preceding five years (i.e., 1970-75). Again, if sample size permits, these time intervals can be reduced to three years; or the childbearing period can be defined as the five years following migration for women who migrated during a specified period. Two restrictions should be imposed: 1) only women who were continuously married during the entire period (1970-80) should be included, and 2) all women who are included should be non-migrants during the second five years, during which childbearing is measured. When considering the background variables that may be entered into the regression, justification can be found for using the characteristics that pertain at the beginning of the childbearing period being analyzed (1975 in this example). Age, education, labor force participation, and place of residence during the period have all been shown to have an effect on childbearing patterns; taking advantage of the life history data to define them as close to the time of childbearing as possible should therefore strengthen their explanatory power. Additionally, the number

of children already born at the beginning of the period (i.e., 1975) is another important variable for explaining subsequent fertility. Other variables, such as ethnicity, may be added as well, as the local situation dictates. Basically, the regression will take the following form:

$$CB7580 = A + X_1AGE75 + X_2ED75 + X_3RES75 + X_4CB75 + X_5MIG7075 + e$$

where: CB7580 = number of children born between 1975 and 1980

AGE75 = age of women in 1975

ED75 = years of schooling by 1975

RES75 = place of residence in 1975; for migrants this will be defined as the place of destination; treated as a dummy variable

CB75 = number of children born by 1975

MIG7075 = whether or not the woman moved between 1970 and 1975; treated as a dummy variable

The key variable here is the migration variable. A positive value of the regression coefficient for MIG7075 would support the hypothesis that migrants accelerate their childbearing in the period following migration. A negative regression coefficient indicates lower fertility among migrants and suggests adaptation if the migrant destination was an urban area.

Some models of fertility and family planning adoption have suggested that there is a "threshold" after which it becomes easier to adopt contraception, and that such a threshold occurs after the birth of the second child. A similar mechanism may operate to influence the decision to move and/or the timing of births after the move. The preceding two regression analyses may be used to obtain some insights into this possibility. In order to do so women should be disaggregated by parity, that is, those with fewer than two children, those with 2-3 children, and those with more than 3 children at the beginning of the

period being considered. Regressions can then be performed for each parity group separately to determine if different patterns prevail depending on the number of children already born. Similarly, women can be disaggregated by both parity and whether or not one of the children is a male to assess the joint effects of numbers and sex composition.

Migration and Fertility at Specific Ages: Quite a different approach can be taken to also test these hypotheses, one that is particularly sensitive to duration of marriage as well as timing of migration within marriage. Using the information available from the life histories, and restricting the universe of migrants only to women who migrated after marriage, calculations can determine for migrants, how many years each woman was married before migration, the number of years between migration and the time of the survey, and age at migration; similarly, the number of children born before and after migration can be determined.

The number of children born per person years married before and after migration can then be calculated:

$$MR_{CB} = \frac{\Sigma \text{Children born to age X}}{\Sigma \text{Years married to age X}}$$

and

$$MR_{CA} = \frac{\Sigma \text{Children born after age X}}{\Sigma \text{Years married after age X}}$$

where Age X is the age at time of first migration after marriage. The number of women included in each age will vary, depending on the number of women who moved at any particular age.

MR_{CB} = rate of children born per person year married to migrants before migration

MR_{CA} = rate of children born per person year married to migrants after migration

For non-migrants, a slightly different procedure is used. For each single year of age, it is possible to calculate the number of years married up to that age, the number of years married from that age to the time of the survey, and the number of children born before and after the specific age.

$$N\text{-}MR_{CB} = \frac{\Sigma \text{Children born to age X}}{\Sigma \text{Years married to age X}}$$

and

$$N\text{-}MR_{CA} = \frac{\Sigma \text{Children born after age X}}{\Sigma \text{Years married after age X}}$$

where Age X includes all women married by that specific age, so that the number of women in succeeding ages will also include the women married earlier. For example, if 10 women were married at age 15, 25 women were married at age 16, and 20 women were married at age 17, the calculations for age 15 would include the 10 women: for age 16, 35 women enter into the calculations; and at age 17, 55 women are included (Table C).

Since migrant women may have been married for various number of years before migration, and since age at marriage may differ from migrants and non-migrants, great caution must be used in making migrant/non-migrant comparisons with these data. If the number of cases permits, control for age at marriage of migrants would enhance the comparability of the data considerably. Alternatively, the researcher may wish to introduce standardization for duration of marriage among the migrants. Further caution must also be exercised if a substantial proportion of first births occur before marriage.

These rates of childbearing per person years of marriage can be calculated separately for urban and rural origins and destinations of migrants and/or for migration streams, and for urban and rural residence

of non-migrants. The migrant rates can be compared directly or ratios can be computed to allow easier identification of differential patterns. If migration is selective of low fertility women, then the ratios of migrant to non-migrant fertility before given ages should be below unity. Conversely, if migrants accelerate their childbearing after migration, then the migrant to non-migrant ratios after specific ages should be above unity. Ratios at or near unity suggest adaptation to the fertility norms at destination. Such adaptation would also be indicated if the ratios before given ages were above one and below one after these ages if rural-urban migrants are being considered. If the timing of migration within marriage has an effect on childbearing patterns as well, this effect should also become apparent. These data permit evaluation of childbearing patterns while carefully controlling for the population that is at risk. They have the further advantage of not being restricted to continuously married women, since the life history provides information that allows summation of the total number of years a woman has spent within marriage.

On the other hand, since the younger women in the survey have not had as long a period at risk as older women, their inclusion into this analysis, particularly in the rates for childbearing after specific ages, would distort the findings. In order to reduce this bias, the analysis should be restricted at least to women age 30 and over at the time of the survey. Alternatively, since the ESCAP survey includes women up to age 65, only women age 45 and over might be included; doing so would restrict the analysis to women who have largely completed their childbearing and would result in less distortions than if women were included who might still give birth. Exactly what the age restriction

should be will have to be determined in part by the number of cases available for analysis. Initial exploration of the data must also determine the range of ages for which the calculations will be made. Using ages 15 through 29 will in most countries encompass the large majority of the women interviewed, since most first marriages occur within that age range.

Cohort Analysis: In assessing the relation between migration and fertility, the researcher must recognize that the relation may change over time as the conditions that stimulate or retard migration change and as fertility-related attitudes and behavior changes. In the methods of analysis suggested so far, a number of approaches focused on varying time periods for identifying migrants and their fertility. A more direct way of assessing change in the fertility-migration relation over time is to use a cohort approach. Cohorts of women in specified age groups at particular years form the basis for the analysis. Their migration and fertility experiences can then be jointly identified for a sequence of time to determine if migration affects fertility during the period in which the move takes place, if the migrants continue to be characterized by fertility that differs from that of non-migrants in the succeeding periods and if total migrant fertility differs.

For example, one cohort may be defined as those women who were age 20-29 in 1950 and married by age 20. Their migration experiences and the number of children born during ages 20-29, 30-39, and 40-49 can be determined from the data collected in the life histories. The migration history can be categorized as 1) non-migrant throughout the 30 years; 2) non-migrant, ages 20-29 and 30-39, migrant, ages 40-49; 3) non-migrant, ages 20-29 and 40-49, migrant, ages 30-39; 4) non-migrant, ages 20-29,

migrant, ages 30-39 and 40-49; 5) migrant, ages 20-29, non-migrant, ages 30-39 and 40-49; 6) migrant, ages 20-29 and 30-39, non-migrant, ages 40-49; 7) migrant, ages 20-29 and 40-49, non-migrant, ages 30-39; 8) migrant in each age period. The number of children born during each age segment can then be compared for women with differing migration histories. The resulting data can thus provide insights into both the levels and rates of childbearing in relation to migration and enable comparison of completed fertility as well. Such an analysis is particularly well suited to an assessment of the effects of repeat migration on fertility (Table D).

In order to restrict these tabulations to the appropriate population at risk, only women who have been continuously married during the entire 30 years should be included. Researchers in each country need also to determine whether enough women are married by age 20 to define the sample for the cohort analysis using marriage by age 20 as one of the criteria; marriage by age 25 might be more appropriate in some contexts. If so, then the age categories may also need to be adjusted to 25-34, 35-44, 45-54. The analysis can use 1950, 1960, and 1970 as reference years. When 1970 is defined as the reference year, only the younger age categories can be used, since women would not have had time to reach ages 40-49 by the date of the survey.

Because of the relatively complex nature of the migration categories used in this analysis, tabulation by separate migration streams would probably prove too cumbersome and difficult to analyze. If analysis in terms of rural/urban residence is desirable, however, two approaches are possible. The data can be tabulated separately for women who reside in urban and rural places at the time of the survey (current

residence), or, because of the detailed information available in the life histories, they can be tabulated in terms of the type of place of longest residence. This latter approach may be especially valuable in assessing the joint effect of residence and migration on fertility behavior. The cohort analysis can thus be particularly useful for gaining insights into the validity of both the selectivity and adaptation models; moreover, since women who have moved several times are identified separately, the effect of multiple migration on fertility can also be evaluated. If migration is disruptive of fertility, this effect should be especially clear among the repeat migrants. Together with the possibility offered by the data from the ESCAP surveys of analyzing several 10-year cohorts of women (at least those aged 20-29 in 1950, 1960, and 1970) and thereby adding a temporal dimension, the cohort analysis can prove to be a most important analytical approach for gaining insights into migrant/non-migrant fertility differentials.

Birth-Migration Intervals: The analytic approaches discussed above are useful for gaining insights into whether migration tends to be selective of low fertility women and whether post-migration fertility differs from that of non-migrants at destination with similar background characteristics. Migration may also have a more direct impact on fertility: for a variety of reasons--as outlined earlier--migration may be associated with disruptions in fertility. In the absence of detailed information on motivations with regard to both timing of births and migration, it is impossible to know definitely whether births are delayed to allow for migration or whether, instead, movement per se has a disruptive effect on fertility. Nonetheless, an analysis that focuses on the timing of births in relation to the timing of moves can give

considerable indication about these relations. Such an analysis must focus on the intervals between childbearing.

Comparisons of the length of interval for women of specific parity who moved before the next birth with the length of interval between births for women of similar parity who did not move will provide an indication of the disruptive effect of migration. They will also allow determination of the extent to which the disruptive effects, if they exist, are compensated by shortening of birth intervals in the post-migration period. At the same time, such analysis, by focusing on the lengths of intervals before migration and on those after migration, will allow some assessment of whether spacing patterns of migrants differ from those of non-migrants at origin and/or destination. Such differentials can then provide clues on both selectivity (migrants have longer birth intervals before migration than non-migrants at origin) and adaptation (migrants have longer birth intervals after migration than before, and the post-migration intervals are at least as long as those of non-migrants at destination).

Unfortunately, the data as they are to be collected according to the ESCAP survey are not adequate for such an analysis. Data are needed in terms of both month and year of marriage, births, and migration to allow calculation of exact length of interval. Use of information in terms of only years of marriage, births, and migration would provide very crude estimates of length of interval and may, in fact, completely distort or obscure the migrant/non-migrant differences. It would be highly desirable, therefore, to modify the instructions for collecting the life history data to include month as well as year of occurrence for these events. Availability of this information would greatly enhance

the quality of the data and broaden the scope of the analyses that might be undertaken. But, obtaining such exact data on timing of moves and births obviously also presents considerable challenge to the data collectors.

If such data become available, then a series of calculations can be made to determine the average length of intervals between events, controlling for migration status at specific parities and rural/urban character of origin and/or destination for migrants and rural/urban character of residence for non-migrants. Thus for women of parity 0 at time of move who had at least one child, the average intervals are calculated for marriage to migration and from migration to first birth. Women who had not moved by first birth constitute the comparable non-migrant group; for them the average interval between marriage and first birth is determined. Similarly, for women who moved at parity 1 and had a second child, average intervals are calculated from marriage to birth 1, birth 1 to migration, and migration to birth 2. Average intervals between marriage and birth 1, and birth 1 and birth 2 of women who did not move between marriage and their second birth complement the data for these migrants (Table E).

Calculations can be made in like manner for intervals between higher order births. In each instance, the migrant women moved for the first time between the births of specified parities and non-migrants had not moved up to the highest birth being considered. In order to eliminate any additional disruptive effects caused by marital dissolution followed by remarriage (such situations may occur relatively often in Moslem societies where divorce is common), only those women should be included in the analysis who were <u>continuously</u> married during

the entire period under consideration. If the number of cases permits, additional controls may be introduced, including marriage cohort and joint controls for origin and destination (migration streams).

The analysis can be further refined by incorporating "open intervals" into the data. Women of specified parities who have not had an additional child by the time of the survey are thus included. That is, women of parity 1 at the time of the survey would be included into an assessment of migrant/non-migrant differentials in the length of interval between births 1 and 2; higher parities would be treated in the same way. This procedure will have the effect of lengthening the birth intervals (since it will include women who have completed their childbearing at the given parity), but it will also guard against distortions that might be introduced by migrant/non-migrant differentials in the spacing of childbearing. If open intervals are used, then particular care must be taken to include only those women who could in fact have had another child by the time of the survey. Women whose last child was born within one year of the survey, who have reached menopause (age 45 may be used as a proxy), or who were no longer married at the time of the survey should be excluded from the analysis.

The effect of migration on birth intervals may also be assessed through a series of regression analyses, each of which focuses on the interval between specific parities. Such an approach has the advantage of allowing introduction of a number of characteristics and enabling assessment of the comparative strength of the impact of migration in affecting the interval compared to other characteristics. The independent variables would remain similar for each regression, but the time of reference for each would vary. Age refers to age of mothers at

the beginning of the interval; residence may refer to the beginning and/or end of interval. For example, the regression for the interval between birth 1 and birth 2 might be as follows:

$$INTB1B2 = A + X_1AGEB1 + X_2MIG + X_3ETHNIC + X_4RESB1 + X_5RESB2 + e$$

where: INTB1B2 = months between birth 1 and birth 2

AGEB1 = age of mother at birth 1

MIG = migration status treated as a dummy variable. This variable may be defined dichotomously as migrant/non-migrant, or it may be defined in terms of migration streams (non-migrant/rural-rural/ rural-urban/urban-rural/urban-urban); other types of migration may be defined instead

ETHNIC = ethnic identification, treated as a dummy variable, if the national context makes inclusion of such a variable desirable

RESB1 = residence at time of birth 1; treated as a dummy variable

RESB2 = residence at time of birth 2; treated as a dummy variable RESB1 and RESB2 would not be included in the equation if migration is defined in terms of streams.

Other variables that should ideally be included in the assessment of birth intervals because of their direct effect on birth spacing are breastfeeding during the interval and contraceptive use. Since the ESCAP survey does not include such information in its questionnaire, however, these variables are not included in the examples given here. As for the cross-tabulations, the regression analyses should be restricted to women who were continuously married during the period under consideration. In societies where a considerable proportion of women are likely to be married several times, it may also be wise to restrict the sample to women married only once or to include only the first marriage, or the marriage of longest duration for women married more than once.

The result of these various analyses of birth intervals can provide strong evidence of whether migration has a disruptive effect. They cannot, however, indicate what the mechanisms are that effect such disruption. One possible explanation may be the greater temporary separation of spouses around the time of migration; other explanations may involve deliberate decisions by the parents to postpone childbearing if migration is planned, or physiological or psychological impairments to fertility resulting from migration. Data to test these assumptions are not, however, available from the ESCAP surveys. Nonetheless, these data on birth spacing complement the earlier analyses of number of children ever born and may help to explain observed differentials in total fertility. If longer birth intervals associated with migration disrupt fertility sufficiently, migrants may not, subsequently, bear enough children to reach the fertility levels of the non-migrant population.

VARYING THE DEFINITION OF MIGRATION

Implicit in the discussions on various approaches to assessing the migration/fertility relation is the importance of taking into account the rural or urban character of places of origin and destination and places of longest residence. It has been suggested, therefore, that information on migration streams be incorporated into the analyses wherever feasible. It is possible, however, to take yet another approach to categorizing migrants in terms of their type of move, one that again takes advantage of the wealth of information available from the ESCAP surveys. Migrants may be defined as women who 1) moved only once; 2) moved more than once, always to a new place of residence

(repeat migrant); 3) moved more than once, but returned to place of birth at last move (return migrant); 4) moved more than once between the same places of residence (circular migrant).

Each of these migration experiences can be expected to have quite a different relation both to a whole range of migrant characteristics and to fertility. If the selectivity hypothesis is a valid explanation of migration differentials, multiple-move migrants, especially repeat migrants, may be selected along quite different lines than women who moved only once. If lower fertility is one of the characteristics of migrants, then repeat migrants may have the lowest fertility of any group. Aggregation of all types of migration may therefore obscure a range of fertility levels and make any definitive conclusion about selectivity difficult.

Similarly, adaptation by migrants of the fertility norms of the population at destination may be strongly affected by the type of move. Women who move only once are likely to have a different attitude toward their place of residence than do women who have lived in several places; and once only migrants may have had a longer time in which to adapt to local attitudes and behavior. By contrast, return migrants, especially women who return to rural areas, may have adopted the values and behavior of the women in the urban places to which they first moved and not wish to revert to local patterns at origin; in fact, they may serve as models of modern attitudes and act as agents of change in their own right. Such differentials in the potential adaptation to fertility norms have important implications for policy formation and therefore may be considered central to the assessment of the various hypotheses about the relation of fertility and migration.

One strategy that might be adopted to test whether incorporation of migration categories like those discussed here is necessary begins with determination of the prevalence of each type of migrant in the study population. If once-only movers constitute the vast majority of all migrants, then it may not be statistically reasonable to disaggregate the migrants into all four categories. Some recombination may be more useful. Controls can then be introduced in the tabulations and analyses for the appropriate migration categories. In the various regressions that have been suggested, migration category may be entered (treated as a dummy variable) in place of migration status or migration stream. Alternatively, the regressions can be performed separately for each migration category. Either approach will allow some evaluation of the differential impact of the migration categories, but if differences vary in direction on a number of background variables, then separate regressions would be desirable. Again, such a method is possible only if enough cases are available in the respective categories. Such an evaluation and subsequent incorporation of the appropriate migration categories into the analyses will greatly add to the value of the research, especially for policy purposes.

OTHER APPROACHES TO STUDYING THE MIGRATION/FERTILITY RELATION

As more surveys collect detailed data on fertility and migration histories, researchers are beginning to develop more sophisticated techniques for studying the relations between these two aspects of demographic behavior. In particular, attention has been given to the applicability of econometric models. One such attempt by Bun Song Lee (1981) uses an autoregressive model first developed to test the effect

on earnings of participation in manpower training programs. The method uses OLS regression procedures 1) to estimate the effect of rural-urban migration on fertility, based on comparisons with rural-rural migrants and rural non-migrants, and 2) to test whether increasing length of residence in an urban place leads to an increasingly larger differential between the migrants and non-migrants.

The autoregressive model of fertility assumes fertility at one point in time is a function of fertility at a previous point in time as well as of the other relevant variables. By estimating coefficients for the model for each rural-urban migration cohort and for various periods before and after migration, the extent to which the fertility of rural-to-urban migrants reflects adaptation to urban life can be ascertained by comparing the incremental fertility of migrants during a specified post-migration period with that of non-migrants in rural places while controlling for fertility level at the beginning the period. The method is therefore particularly well-suited to a test of the adaptation hypothesis.

The model, as elaborated by Lee, thus takes into account both the respondent's age and duration of marriage, migration during a specified period, and the incremental effect of migration on fertility during specified lengths of time both before and after migration. In addition, a number of socioeconomic variables can be included, such as woman's education, family income, child mortality experience, and share of sons. Other SES variables can also be included or substituted for the ones listed, depending both on the data available and on the contextual situation.

Several assumptions underlie use of the autoregressive model. Most basic is the assumption that the autoregressive structures for migrants and non-migrants are identical. The model also assumes that, when testing the adaptation model, the effects of pre-migration selectivity can be obviated through controlling for individuals with similar budget constraints, stage in life cycle, and number of children already born. Preferences for number of children are assumed to be identical if the observed situations prior to migration are identical. The validity of these assumptions needs careful checking within any given cultural context.

If these assumptions can be adequately tested, the autoregressive model can be a very useful approach to evaluating post-migration fertility. Its application need not be restricted to rural-to-urban migrants. If other migration streams are of importance in a specific country, the relation of such migration to fertility can also be tested. It may be possible, for example, to assess whether and to what extent urban-rural migrants are affected by the higher fertility norms in rural places or whether rural-rural migrants exhibit any change in fertility behavior compared to non-migrants.

Another approach that holds promise for allowing assessment of changes in status for a whole range of characteristics is multidimensional analysis, as pioneered by Andrei Rogers (1975), Rogers and Ledent (1976), Frans Willekens (1978), and summarized by Keyfitz (1980). Multidimensionality builds upon the methodology of the increment-decrement life tables, and uses matrix algebra to allow simultaneous incorporation of many variables. Thus, account can

simultaneously be taken, for example, of migration, labor force participation, fertility, and mortality. The methodology has been applied to analyses of regional variations in life expectancies and in fertility expectancies, to labor force participation patterns, and to probabilities of moving; it is, however, still in an experimental stage. Its application to the kinds of rich data available from the life history matrix would enhance both the methodological aspects of multidimensional analysis as well as the analysis of the relation between migration and fertility.

RECOMMENDATIONS

Quite clearly, the ESCAP surveys promise to provide an unusually rich body of data for analysis of the relations between migration and fertility. The life history matrix, because it obtains information sequentially on births, moves, and changes in marital status and other SES characteristics, is especially useful for analyses designed to test the selectivity, disruption, and adaptation hypotheses. For this reason, the focus of the approaches proposed in this paper has been on the life history segment of the ESCAP survey. The analyses can be augmented, however, by the detailed data gathered in the section of the questionnaire dealing with mobility during the last 12 months--particularly as it identifies short-term mobility, and by the section on future mobility. This latter part of the questionnaire may provide especially useful insights into whether women who plan to move in the future have fewer children than those who plan to remain stable. Although intentions to move are not always translated into reality, analysis incorporating such information can serve as an additional test of the selectivity hypothesis, when desired destination is also taken

into account.

As has been pointed out at various places in the discussion, despite the wealth of data that the survey will generate, some information is still lacking, information that is particularly relevant to a full understanding of migrant/non-migrant fertility differentials. 1) Some of this information can be obtained through simple modification of the instructions to interviewers. If they are instructed to ask month, as well as year, of the occurrence of any change in status (e.g., birth, move, employment), then several changes occurring within a single year can be properly ordered. Moreover, such information would also allow much more exact calculation than is now possible of intervals between events.

Obtaining other pertinent data would require modification of the interview schedule, or the addition of further question modules. 2) If, as a number of studies suggest, place of socialization during childhood is relevant for an understanding of later fertility behavior, then additional questions are required to ascertain longest duration of urban/rural residence before age 15. This information may be especially important for women who have changed their places of residence, since neither place of birth nor residence at age 15 would necessarily indicate place of socialization for these migrants.

3) Throughout the assessment of the relation between migration and fertility, attention needs to be given to the broader impacts of migration on the roles and status of women. More particularly, the increasing female composition of many migration streams in Asia, and the increasing proportion of young, single women in these streams warrants

attention. Their future fertility may well be affected by their urban experience, their changing patterns of labor force participation, and their educational achievement. Indeed, the rate of premarital fertility itself may change as traditional controls weaken.

4) Migrant/non-migrant differentials in fertility may reflect differing levels of modernization or willingness by women to adopt new forms of behavior. Such attitudes may best be reflected in the levels of use of different methods of birth control, rather than in the actual childbearing experience. Therefore, although a conscious decision was made not to include KAP variables in the ESCAP core questionnaire, it may be desirable to add several questions that will ascertain when the respondent adopted various types of contraception. In any such question, it would be important to distinguish between traditional and modern methods, and to determine as well if either spouse had been sterilized. Additionally, information on prevalence and length of breastfeeding should be obtained.

5) The available information on the urban-rural classification of present and earlier places of residence should be supplemented, as far as feasible, by use of data from both the ESCAP survey and from non-survey sources on community-level characteristics that affect the demand for children, including their economic value and costs, as well as the ability to control fertility. Attention to such community level characteristics at both origin and destination should help to explain the effects of migration on fertility as well as ways in which fertility affects movement. Among the many community level variables (see Findley, 1981) which warrant assessment are the nature and extent of female labor force participation, household and kinship structure, the

land tenure system, the extent to which children are in the labor force, the availability of schooling for children, the prevalence/availability of contraception, and access to maternal and child health facilities. Evaluation of these community level variables should help to explain both fertility differentials among women in different places of residence and why fertility changes to lesser or greater degrees as women move from one type of location to another.

6) Migration is often associated with temporary separation of spouses. Some recognition of this possibility is evidenced in the sections of the ESCAP questionnaire immediately preceding and following the life history matrix which focus on the first and last move, respectively. Given the present phrasing of the questions, however, it is not possible to determine whether a woman moved only with her children, leaving her husband behind (this may be quite likely among return migrants), nor is it possible to ascertain the length of the period of separation. Furthermore, for respondents who moved more than twice, no information on separation from relatives or friends is obtained for the moves intermediate between the first and last migration. Some modification of the questions as they are presently phrased will provide some of the desired information (for example, treating spouse and children separately), but ideally, a question on separation of spouses should be incorporated into the life history matrix; this revision would be likely to generate more accurate information and would later simplify data processing for analysis.

7) Finally, in order to assess change in background variables associated with both migration and fertility, it would be valuable to ask about the characteristics of spouse before and at the time of

migration. This should ideally take the form of a life history matrix to complement the one obtained for the respondent; but even questions directed simply at changes in labor force status or occupation of spouse during the period in which migration occurred would prove helpful.

Serious consideration should be given to augmenting the ESCAP questionnaire by one or several of these areas of inquiry to allow the fullest possible analysis of the relation between migration and fertility. Yet, even without such additional questions, full exploitation of the ESCAP survey data will provide better insights and guidance for policy makers than has been possible from most data sources to date. Evaluation of the various explanations for observed differentials, especially as the selectivity, disruption, and adaptation mechanisms are related to each other, should prove of particular value in the design of development programs.

Determination of migrant fertility levels before and after movement should allow clearer assessment of the direct and indirect effects of migration on population growth at both origin and destination. In doing so, it should point to the extent to which programs directed specifically at migrant fertility are desirable as a means of controlling natural growth rates at destination, especially in urban places. Moreover, if the research findings point to lower migrant than non-migrant fertility and if it can be shown that this results from migrant adoption of the lower fertility norms and behavior of the non-migrant population among whom they have settled, the extent to which population redistribution should be encouraged as a means of reductions in national fertility levels will have to be more fully assessed. Concurrently, if research shows that return migrants to high fertility

areas have lower fertility, it may be desirable to identify ways in which these return migrants can be used to stimulate adoption of low fertility norms by the non-migrants at origin.

For policy purposes, however, any reduction in fertility associated with migration needs to be evaluated against the potentially negative impact that migration may have, both direct and indirect, on urban facilities, services, and employment opportunities as well as on manpower needs, household structure, and skill levels in places of origin, especially rural areas. In sum, the policy relevance of migrant/non-migrant differentials in fertility, important as they may intrinsically be, cannot be fully evaluated in a vacuum. Their significance must be assessed within the context of the broader relevance of migration to development efforts at both origins and destinations. The possibilities for such evaluations are enhanced in the proposed ESCAP Surveys by the attention to be given concurrently to a host of key variables affected by and affecting the success of migration as an adjustment process and its contribution to overall development.

APPENDIX

ILLUSTRATIVE DUMMY TABLES

The tables that follow present examples of the format and categories that may emanate from the suggested analyses. Depending on the definitions of migration or background characteristics, these categories may, of course, vary. No actual data have been inserted in the tables. The researcher who is interested in seeing the results of such analyses is referred to a report using the Malaysian Family Life Survey (Goldstein and Goldstein, 1981b).

Table A

AVERAGE NUMBER OF CHILDREN EVER BORN PER EVER MARRIED WOMAN BY LABOR FORCE STATUS AND EDUCATIONAL ACHIEVEMENT, BY MIGRATION STATUS, RURAL-URBAN ORIGIN, AND PLACE OF CURRENT RESIDENCE

(Standardized for Age)

Place of Residence and Migration Status	Labor Force Status			Educational Achievement			
	In Modern Sector	In Traditional Sector	Not in Labor Force	None	Primary	Secondary	University
CITY							
Non-migrants							
Migrants							
Rural origin							
Urban origin							
Total							
TOWN							
Non-migrants							
Migrants							
Rural origin							
Urban origin							
Total							
RURAL							
Non-migrants							
Migrants							
Rural origin							
Urban origin							
Total							
TOTAL COUNTRY							
Non-migrants							
Migrants							
Total							

NOTE: As indicated in the text, other definitions of migration may be used, including ones based on number of moves and duration of residence.

Table B

CHILDREN EVER BORN IN RELATION TO TIME OF MIGRATION,
FOR WOMEN CONTINUOUSLY MARRIED 1968-1980, AND AGED 25-29
AT TIME OF MOVE (1973-75) OR REFERENCE YEAR FOR NON-MIGRANTS (1974)
BY ORIGIN/DESTINATION OF MIGRANTS AND RESIDENCE OF NON-MIGRANTS

	Migrants				Non-migrants	
	Rural-Rural	Rural-Urban	Urban-Rural	Urban-Urban	Rural	Urban
Average number of children born before the move:						
Five years						
Four years						
Three years						
Two years						
One year						
Average number of children born after the move:						
One year						
Two years						
Three years						
Four years						
Five years						

Table C

RATES OF CHILDBEARING BEFORE AND AFTER MIGRATION BY AGE AT MIGRATION, AND BEFORE AND AFTER SPECIFIC AGES FOR NON-MIGRANTS MARRIED BY THAT AGE

	Migrants		Non-migrants		Migrant/Non-migrant Ratios	
Age	Before Migration	After Migration	Before Specific Age	After Specific Age	Before	After
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						

Notes: Migration refers to moves after marriage only. Restricted to women aged 30 and over at the time of the survey.

Table D

COHORT ANALYSIS OF FERTILITY BY MIGRATION STATUS

(For Women Aged 20-29 in 1950 and Continuously Married)

	Average Children Born			
	Ages 20-29	Ages 30-39	Ages 40-49	Ages 20-49
1) Non-migrant, ages 20-29, 30-39 40-49				
2) Non-migrant, ages 20-29, 30-39; migrant, ages 40-49				
3) Non-migrant, ages 20-29, 40-49; migrant, ages 30-39				
4) Non-migrant, ages 20-29; migrant, ages 30-39, 40-49				
5) Migrant, ages 20-29; non-migrant, ages 30-39, 40-49				
6) Migrant, ages 20-29, 30-39; non-migrant, ages 40-49				
7) Migrant, ages 20-29, 40-49; non-migrant, ages 30-39				
8) Migrant, ages 20-29, 30-39, 40-49				

Table E

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

	Migrants				Nonmigrants	
	Residence at Origin		Residence at Destination		Residence	
	Rural	Urban	Rural	Urban	Rural	Urban
0 Parity at migr					Nonmigr at b1	
Marr → migr						
Migr → b1						
Marr → b1					Marr → b1	
Parity 1 at migr					Nonmigr at b2	
Marr → b1					Marr → b1	
B1 → migr						
Migr → b2						
B1 → b2					B1 → b2	
Marr → b2					Marr → b2	
Parity 2 at migr					Nonmigr at b3	
Marr → b1					Marr → b1	
B1 → b2					B1 → b2	
B2 → migr						
Migr → b3						
B2 → b3					B2 → b3	
Marr → b3					Marr → b3	
Parity 3 at migr					Nonmigr at b4	
Marr → b2					Marr → b2	
B2 → b3					B2 → b3	
B3 → migr						
Migr → b4						
B3 → b4					B3 → b4	
Marr → b4					Marr → b4	

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

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