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Female Education and Fertility in Bangladesh

by Linda G. Martin

Slowing the growth of the 100-million-plus population of Bangladesh remains a major challenge. Fertility and mortality declined only slightly, if at all, during the 1970s, and the population continues to grow at an annual rate of over 2.5 percent, implying a doubling time of about 25 years (Robinson 1984). The 1983 Contraceptive Prevalence Survey shows some evidence of fertility decline in recent years at least in part attributable to the increased use of modern family planning methods (Mitra and Kamal 1985), and the Matlab project of the International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR) has demonstrated that successful family planning programs are possible in Bangladesh (Phillips, Koenig, and Chakraborty 1986). Nevertheless, given the gravity of the situation, other approaches to lowering fertility and the population growth rate are being explored.

In particular, the United States Agency for International Development (USAID) in recent years has supported among its many activities two pilot

projects to reduce fertility by providing secondary-education scholarships to girls in Bangladesh. The short-term goals of the projects are to encourage young women to continue from primary to secondary school and to reduce dropout rates at the secondary level. It is hoped that, as a result of increased education, these women in the long run will have fewer children by delaying marriage and by increasing their use of contraception.

This article briefly reviews the theoretical link between education and fertility, the educational situation in Bangladesh, and the projects' design and their effects as evaluated by a USAID/International Science and Technology Institute team upon whose report (Martin, Flanagan, and Klenicki 1986) this article is based.

Education and fertility

The negative effect of female education is frequently cited in the analysis of the determinants of fertility, but there are a variety of channels through which education may exert its influence (Cochrane 1979). Among the possibilities are by increasing women's status; by changing women's attitudes about marriage and desired

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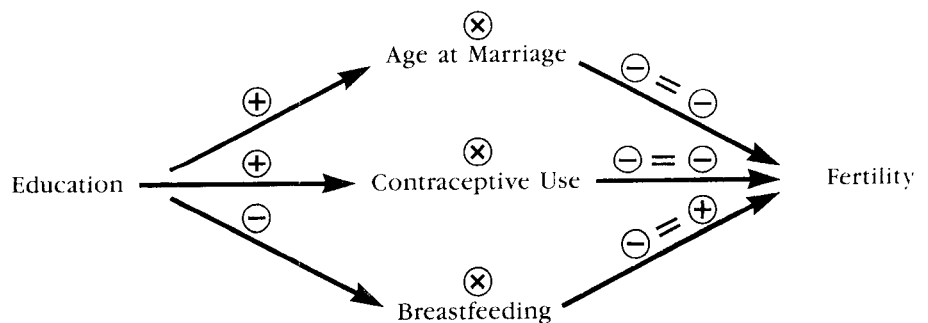
family size; by exposing women to new ideas that may increase willingness and ability to obtain and use contraceptives; by providing an alternative to early marriage; and by making women more valuable in the work force and thereby increasing the so-called opportunity cost of raising children. However, to understand operationally how education affects fertility, it is helpful to think about how education affects the more proximate determinants of fertility, such as age at marriage, contraceptive use, and breastfeeding.

A simple model that can be used to trace the influence of education on fertility through some of the proximate determinants of fertility is shown in Figure 1. Generally, education is thought to increase age at marriage and contraceptive use, thus contributing to fertility decline since each has a negative effect on fertility. On the other hand, increased education is usually associated with decreased breastfeeding, and breastfeeding is negatively associated with

fertility, so through this channel education would have a positive effect on fertility (negative times negative is positive).

In Bangladesh, there is some evidence on these links between education and fertility. Nearly all women are married by age 25 in Bangladesh, but more-educated women do marry later than the less educated. Data from the 1975 Bangladesh Fertility Survey (Ministry of Health and Population Control 1978) indicate that among ever-married women of ages 20 to 49, those with no schooling married on average at age 12.8 years, those with some primary schooling at 13.6 years, and those with more than primary at 14.7 years. Unpublished census data from 1974 show that among females of ages 15 to 19, 81.0 percent of those with no schooling and 70.5 percent of those with some primary education had already married, but only 36.5 percent of those with some secondary education had married (Ahmed and Chaudhury 1981).

Figure 1 Simple Model of Female Education's Effect on Proximate Determinants of Fertility





possible. One of the best multivariate analyses (Chaudhury 1984) tries to explain fertility using mother's age, her age at marriage, her education, her work experience, and a proxy for standard of living. Data from the 1975 Bangladesh Fertility Survey are divided into rural and urban subsamples, and it is found that in the rural subsample education has no effect on fertility. The fertility of urban women with no schooling is the same as that of those with primary schooling, but those with higher education do have lower fertility. In both samples, however, age at marriage has the greatest effect of all the variables on children ever born. Thus, given the association between age at marriage and education, it could be argued that education does indeed affect fertility.

Education in Bangladesh

Illiteracy is a problem in 85-percent-rural Bangladesh for both men and women, but according to the 1981 census 25.8 percent of males are literate, as opposed to only 13.2 percent of females (Rabbani and Associates 1984). In 1984, girls comprised 41 percent of primary-school enrollment and only 32 percent of secondary. Poverty, of course, is a major reason for both sexes to drop out or never attend. At the primary-school level, there is no tuition charge, but families must provide uniforms, supplies, and some books, plus forgo the value of children's labor at home. At the secondary-school level, children's labor may be even more valuable, plus most of the schools are privately operated and fees must be paid.

Beyond poverty, the observance of purdah or female seclusion also plays an important role in female illiteracy. Reasons frequently given by girls and

There is a strong relation between education and contraceptive use in Bangladesh, as documented in the 1983 Contraceptive Prevalence Survey, as well as in the 1975 Bangladesh Fertility Survey. In 1983, 42.1 percent of women with more than primary education used contraception, as opposed to only 21.0 percent of those with some primary education and 16.0 percent of those with none.

Evidence on education and breast-feeding is more limited. Small-area studies have found a negative association (Khuda and Chowdhury 1982

and Khatun 1984), plus an ICDDRDB study found that highly educated women were more likely to give liquid supplements (Huffman, Ford, Allen, and Streble 1985).

Of course, this simple proximate-determinants model does not completely capture the complexity of the relation between female education and fertility. An ideal analysis would also take into consideration the effects of husband's education, income, nutrition, and child mortality. Unfortunately, with the limited data available on Bangladesh such analysis is not

their families for nonattendance include the lack of separate facilities for females, distance between home and school, too few or no female teachers, and the lack of female attendants or ayahs. Also important are early marriage and general questioning of the value of education for girls.

Female secondary scholarship project

In 1982, USAID began funding a pilot project by the Bangladesh Association for Community Education (BACE) to provide secondary-school scholarships for girls in Shahrasti Upazilla, Chandpur District, and in 1984 began funding a similar project by the Southern Gonounnayan Samity (SGS) in Gopalganj Upazilla, Gopalganj District.¹ As stated earlier, the immediate objectives are to encourage girls to enter and continue in secondary school, while the longer-term goals are to

lower fertility by delaying marriage and increasing contraceptive use.

Scholarships are awarded *solely* on the basis of residence in the project areas, and in 1985 were given to over six thousand girls. The stipends cover about one-half of a girl's annual total educational costs, which include tuition, textbooks, supplies, uniforms, and transportation during the rainy season. Each girl is assigned a bank account, and in the BACE project where most of the recipients live relatively close to banks, a significant by-product of the scholarship program has been to give girls the opportunity to learn how to use the banking system.

Schools whose female students receive scholarships are requested to improve facilities, especially, but not only, for girls. Many have responded by building tube wells and employing female attendants. Less progress has

been made in hiring female teachers and providing separate toilets for girls.

Nevertheless, the provision of scholarships seems to have begun to meet the short-term goals of the projects. For example, in the BACE project area in 1981 before the project was implemented, 27.3 percent of secondary students were female. In 1984, the percentage had risen to 43.5 percent (Ather 1984). Female dropout rates also declined from 23.3 percent in 1981 to less than 5 percent in 1984 (Ather 1983 and Ather 1984). The primary reason for scholarship students dropping out is marriage. Money is apparently not an issue (Ather 1985). Given the limited history of the SGS project, such figures are not available, but one indication of the project's effect is the fact that 3,100 female students showed up for secondary school in 1985, when only 2,600 were expected.

An attempt has also been made to assess the progress of the longer-running BACE project in meeting the demographic goals of the projects. A USAID-sponsored survey in 1985 (Ather 1985) solicited data on marriage and fertility attitudes and behavior from four different groups of girls: 383 scholarship recipients who had completed secondary school, 58 recipients who had dropped out, 200 nonrecipients who had completed primary school only, and 200 girls with no schooling. Married and unmarried females ranging in age from 16 to 20 years were included. Each educational group was matched by age; on average the entire sample was 17.2 years old.

As shown in the fourth row of Table 1, only 30 percent of the secondary-school completers had married



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Table 1 Fertility and marriage indicators by education group

	Secondary-school scholarship recipients		Nonrecipients	
	Completers	Dropouts	Primary-school completers	No school
1. N	383	58	200	200
2. Average age (years)	17.2	17.1	17.4	17.2
3. Number married	114	44	154	125
4. Percentage married	30	76	77	62
5. Mean age at marriage (years)	16.5	15.8	14.6	14.7
6. Mean marital duration (years)	1.5	1.6	3.9	3.7
7. Percentage of married females currently using contraception	53	48	12	14
8. Average number of births per married female	0.3	0.4	1.8	1.6
9. Interval between marriage and first birth (months)	16.4	16.2	20.2	18.5
10. Interval between first and second births (months)	20.4	22.0	23.3	21.7
11. Average number of births for all females (row 4 x row 8)/100	0.09	0.30	1.39	.99

Sources: Ather 1985; Martin, Flanagan, and Klenicki 1986.

by the time of the survey, in comparison to 76 percent of the secondary dropouts, 77 percent of the primary-school completers, and 62 percent of those with no school. Of those who had married, their average ages at marriage were 16.5, 15.8, 14.6, and 14.7 years respectively (row 5).

Awareness of the national population problem and knowledge about family planning varied with education among both the married and unmarried girls. The married secondary-school completers and dropouts were also more likely to be currently using family planning than their less-educated counterparts (row 7). Only 12 percent of the primary school completers and 14 percent of those

with no schooling were using family planning versus 53 percent of the secondary-school completers and 48 percent of the secondary dropouts. For the two more-educated groups, husband's resistance and desire for a baby were the most common reasons for not using, whereas the two less-educated groups cited lack of knowledge and religious reasons, as well as desire for a birth in the near future.

Variation of actual fertility by education group is less clear, because only a few years of experience have been documented. Table 1 shows for each education group the average number of births per married woman (row 8) and the interval lengths between marriage and subsequent births

(rows 9 and 10). The two more-educated groups have fewer births on average, but they have been married for shorter periods. In fact, the married women in the two more-educated groups have shorter intervals between marriage and first and second births than do women in the two less-educated groups. Of course, these figures are based on the experience of only those women who have already married and have had a child, so they do not necessarily reflect the ultimate experience of the different educational groups. Those in the two upper groups who have already given birth are probably among the most fecund of these groups, because overall the groups have had a shorter period of exposure to the risk of pregnancy than the other two educational groups (row 6).

If the average number of births per married female (row 8) is multiplied by the proportion who are married (row 4), the result is the average number of children for each education group, including both married and unmarried respondents (row 11).

Given that each group is of approximately the same average age, one can conclude that keeping a girl in school from primary graduation to secondary graduation would avert on average 1.3 births (1.39 minus .09). Of course, this result represents experience only up to age 17.2, the average age at the time of the survey, and there is some hope that additional births would be averted later in each woman's child-bearing experience as a result of her higher education. On the other hand, it should also be emphasized that some girls would have continued with their schooling without the scholarship program, so not all of the births averted can be directly attributed to the project.²

Using the above very rough estimate and information on project and governmental education expenditures, one can attempt to calculate the cost per birth averted. Annual project costs per girl are \$41.71 and annual government expenditures per girl are \$2.72, giving a total of \$44.43 per year or \$222.15 for the five years of secondary schooling. Thus, the estimated cost per birth averted to age 17.2 years is \$170.88. This figure is significantly higher than the cost per birth averted as a result of the family planning service delivery program, which is roughly between \$50 and \$60 (Martin, Flanagan, and Klenicki 1986).

There has been no attempt here to quantify the nondemographic benefits of education, which are no doubt substantial. Furthermore, there might be additional indirect demographic benefits, such as a second-generation effect in which educated mothers

would be expected to have higher educational aspirations for their daughters.

It should be emphasized that the secondary-scholarship project is not the only type of educational project (let alone population project) that might be supported in order to reduce fertility. Even though women with primary schooling have as many or more children as women with no schooling, increased primary-school attendance would eventually increase the demand for secondary education. The Government of Bangladesh has given high priority in its Second and Third Five-Year Plans (1980-85 and 1985-90) to the development of primary education with the goal of achieving universal primary education by the year 2000—what is most likely an overly optimistic, but certainly laudable, goal.

Other possibilities include adult literacy campaigns and programs

designed to change male attitudes about family planning and desired family size. In discussions with some of the scholarship students in the SGS project, the girls were adamant about limiting the number of children to two and did not show a strong preference for male children. The boys in the school were not so convinced. One boy indicated that he would continue trying to have a male child, even if his wife had already given birth to ten girls, and his male friends appeared to think this position eminently reasonable.

Clearly, there is much to be done in reducing population pressure and raising the standard of living in Bangladesh, and raising the status of women through education could be a valuable component in such efforts. Given limited resources, the challenge is to find the most cost-effective methods of accomplishing these tasks.



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NOTES

1. Funding for and monitoring of both projects has been implemented by USAID through the Asia Foundation since 1984.
2. The point that some girls would have continued school without scholarships is similar to the caveat that some family planning program acceptors would use contraception even without the family planning program. The magnitudes of these two phenomena may be quite different, though, and additional data would have to be collected to make an accurate comparison.

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Estimating Census and Death Registration Completeness

by Kenneth Hill

$$\frac{N(a)}{N(a+)} = r + \frac{D(a+)}{N(a+)} \quad (1)$$

Population censuses and vital registration systems are subject to omissions. A well-conducted census taken under not too unfavorable conditions will enumerate all but a few percent of the population, and it is rare for a census to enumerate less than 90 percent of the target population. The completeness of death registration, in contrast, varies widely, with many systems in developing countries registering less than half of all the deaths that occur in the population.

Where substantial omissions are known or suspected, it is essential to assess the completeness of coverage of the census and death registration data and to make some adjustment for omission. Various methods are available for this purpose. This article presents a new method for estimating the relative completeness of two census enumerations and of intercensal registered deaths. The method applies to any two censuses, no matter what the intercensal interval, and is simple to apply.

Background

The Growth Balance Equation was developed by Brass (1975) to estimate the completeness of death registration (or any distribution of deaths by age) relative to the completeness of enumeration of a census (or any other population age distribution). The method assumed (i) that the population was closed to migration; (ii) that the population was demographically stable, that is, that the population growth rate r was constant at, or above, any age a ; (iii) that the completeness of death recording, which for consistency with what follows we will denote by k_3 , was constant at all ages a after early childhood; and (iv) that the completeness of census coverage, k_1 , was constant at all ages a . The basic relationship proposed was that

where $N(a)$ is the true density of population at exact age a , $N(a+)$ is the true total population above age a , r is the stable population growth rate, and $D(a+)$ is the true total deaths at ages a and over. Since in a closed population $N(a)/N(a+)$ is the rate of entry into the population aged $a+$, and $D(a+)$ is the loss rate of the population aged $a+$, equation (1) can be seen as a special case of the demographic tautology that, for any population, the entry rate equals the sum of the loss rate and the growth rate.

The estimation procedure was as follows. Given the error patterns specified by assumptions (iii) and (iv) above, and denoting observed quantities by the superscript o , equation (1) can be re-written as

$$\frac{N^o(a)}{N^o(a+)} = r + \frac{k_1}{k_3} \frac{D^o(a+)}{N^o(a+)} \quad (2)$$

Equation (2) indicates that there should exist a straight line relationship of intercept r and slope k_1/k_3 between $N^o(a)/N^o(a+)$ and $D^o(a+)/N^o(a+)$. Fitting a straight line to points for a series of ages a should thus estimate the stable growth rate r and the correction factor k_1/k_3 necessary to adjust for the coverage difference between deaths and the population, making possible the calculation of adjusted age-specific mortality rates and thence of any other mortality measures.

Around 1980, three methods were proposed for using similar information for any closed population, relaxing the assumption of stability. Martin (1980) noted that equation (1) could be thus generalized by allowing r to be age specific, that is, represented as $r(a+)$, if such age segment

growth rates could be estimated from two successive censuses. No explicit allowance was made, however, for the possibility that the two censuses might be of different completeness of enumeration. Preston and Hill (1980) and Brass (1979) proposed methods that sought specifically to estimate the relative coverage of two census enumerations and the completeness of recording of deaths relative to one census or the other. Though the methods of comparison differed, both methods essentially compared deaths for cohorts defined by age at the first census as recorded by vital registration with deaths for the same cohorts as indicated by change in cohort size from the first census to the second. This comparison, age by age, provided estimates of relative census coverage and completeness of death registration relative to one census or the other. The Preston-Hill method was found in practice to be most unstable because the cohort deaths obtained from the two age distributions were seriously distorted by age misreporting errors, particularly the increasing exaggeration of age as age increases. Luther (1983) uses a modification of the procedure to estimate relative census coverage, noting that such estimates are robust to typical age errors even though the estimates of death registration completeness are not. This problem of age exaggeration also affects the Brass method, though to a lesser extent because of the way the comparison is made with registered cohort deaths. The generalized Growth Balance Equation formulation of Martin is explicit in the Brass method. It may also be noted that both the Preston-Hill and the Brass methods are inconvenient to apply if the intercensal interval is not an exact multiple of the width, usually five years, of the age groups by which the basic data are tabulated.

Derivation of the Method

The method presented here can be seen either as an extension of Martin's formulation to allow explicitly for changes in census coverage or as a modification of Brass's method to use deaths by age group rather than deaths by cohort, preferable on the grounds that age group comparisons will be less distorted by age misreporting than cohort comparisons if the patterns of age misreporting are similar for two successive censuses. The starting point for the derivation of the new method is Martin's general equation for any closed population, that

$$\frac{N(a)}{N(a+)} = r(a+) + \frac{D(a+)}{N(a+)} \quad (3)$$

Rewriting this as

$$\frac{N(a)}{N(a+)} - r(a+) = \frac{D(a+)}{N(a+)}$$

we see that it may be regarded as giving two ways of calculating the death rate of the population over age a . The obvious and direct method is to divide deaths over age a by person years lived over age a , represented by the right side of the above equation. An alternative, indirect method is to calculate the difference between the "birth rate" and the growth rate of the population over age a , represented by the left side of the equation. If all the data involved are precisely accurate, the results of these two calculations will be identical. If numbers of registered deaths are too small due to underregistration, the death rate calculated directly from the right side of the equation will be too low. The death rate calculated indirectly from the left side will be accurate, however, so long as the population numbers are accurate. By comparing the two sets of rates we can estimate the completeness of the death registration data. This is the general idea of the method, but it turns out that with some further development we can estimate not only the completeness of death registration, but also the relative completeness of enumeration of the two censuses.

Let us assume that we have two census age distributions separated by t years and intercensal deaths by age group, that the first census was k_1 complete, the second census k_2 complete, and the deaths k_3 complete, and that k_1 , k_2 and k_3 are all constant with age. We can then express the true populations and deaths in terms of the observed populations and deaths and the completeness factors k . If $N1^0$ and $N2^0$ denote populations (of unspecific age or age range) from the first and second censuses respectively, and D^0 denotes intercensal deaths,

$$N1 = N1^0/k_1 \quad (4a)$$

$$N2 = N2^0/k_2 \quad (4b)$$

$$D = D^0/k_3 \quad (4c)$$

Turning to the specific elements of equation (3), let us define $r(a+)$ as the exponential growth rate of the population aged $a+$, that is,

$$r(a+) = \frac{1}{t} \log \frac{N2(a+)}{N1(a+)} \quad (5)$$

Substituting (4a) and (4b) into (5) and rearranging gives

$$r(a+) = r^O(a+) + \frac{1}{t} \log \frac{k_1}{k_2} \quad (5a)$$

where $r^O(a+)$ is the growth rate calculated from the observed population numbers,

$$r^O(a+) = \frac{1}{t} \log \frac{N2^O(a+)}{N1^O(a+)} \quad (5b)$$

The person years lived by the population age a and over can be calculated as the geometric mean of the initial and final populations age a and over multiplied by the intercensal interval t :

$$N(a+) = t[N1(a+)N2(a+)]^{1/2} \quad (6)$$

Substituting (4a) and (4b) in this expression gives

$$N(a+) = \frac{1}{[k_1 k_2]^{1/2}} N^O(a+) \quad (6a)$$

where $N^O(a+)$ is calculated from the observed values as

$$N^O(a+) = t[N1^O(a+)N2^O(a+)]^{1/2} \quad (6b)$$

Strictly speaking, there is an inconsistency between the geometric calculation of $N(a+)$ and the exponential calculation of $r(a+)$. The geometric calculation is necessary to the derivation, however, and as discussed in the Appendix, the discrepancy is inconsequential for small $r(a+)$ values.

$N(a)$ represents the entries to the population aged a and over during the intercensal period, that is, the number of people having a -th birthdays during the interval. The arithmetically simple way to estimate this number is by first estimating the person years lived in the five year intervals up to and from age a , as the geometric means of the corresponding initial and final populations, each mean being multiplied by t , and then taking the geometric mean of the two person years lived, divided by 5 as the age group width, as the number of intercensal birthdays. Thus

if $PYL[a, a+5]$ denotes the intercensal person years lived by the age group $[a, a+5]$, and $N1[a, b]$ and $N2[a, b]$ the numbers aged a to b at the first and second censuses, respectively,

$$PYL[a-5, a] = t\{N1[a-5, a]N2[a-5, a]\}^{1/2}$$

and

$$PYL[a, a+5] = t\{N1[a, a+5]N2[a, a+5]\}^{1/2}$$

and

$$N(a) = \frac{t}{5} \{N1[a-5, a]N2[a-5, a]N1[a, a+5]N2[a, a+5]\}^{1/4} \quad (7)$$

Substituting (4a) and (4b) in this expression gives

$$N(a) = \frac{1}{(k_1 k_2)^{1/2}} N^O(a) \quad (7a)$$

where $N^O(a)$ is calculated from the observed values by

$$N^O(a) = \frac{t}{5} \{N1^O[a-5, a]N2^O[a-5, a]N1^O[a, a+5]N2^O[a, a+5]\}^{1/4} \quad (7b)$$

This expression for $N(a)$ imposes substantial smoothing on the age distributions by taking geometric means around age a . Such smoothing is likely to be beneficial if irregularities in the age distribution arise mainly from age misreporting such as digit preference. However, if such irregularities mainly reflect true differences in cohort size, with little impact from age misreporting, they will still be smoothed away, with a consequent loss of accuracy. Under such circumstances, it is preferable to estimate the initial and final sizes of the cohort that passes through age a during the intercensal interval (for an interval t , this cohort is aged $(a-t, a)$ at the first census and $(a, a+t)$ at the second census). This estimation might be made by fitting polynomials of the necessary order to the two cumulated populations around age a , integrating the polynomials and evaluating them over the necessary age ranges. $N(a)$ can then be estimated as the geometric mean of the initial and final cohort sizes multiplied by t . The resulting expression

for $N(a)$ in terms of observed values k_1 and k_2 would be the same as that in (7) except that the right hand side of (7b) would be the square root of the product of the initial and final cohort populations.

The intercensal deaths $D(a+)$ are obtained by cumulating recorded deaths by age group across the entire interval to obtain $D^O(a+)$ values. However, the important feature of the $D^O(a+)$ series is its age pattern, since level should be adjusted by the factor k_3 , so $D^O(a+)$ could be obtained by estimating average annual intercensal deaths and multiplying by the interval between the two censuses. Average annual intercensal deaths might be estimated by averaging recorded deaths for, say, the first, central, and last years of the intercensal period, or by using annual deaths for a year near the middle of the interval, depending on data availability. However $D^O(a+)$ is obtained, the corresponding true deaths are given by

$$D(a+) = D^O(a+)/k_3 \quad (8)$$

Formulas (5-8) express the various elements of the basic equation (3) in terms of observed values and the coverage factors k . Re-arranging and canceling where possible gives our final estimation equation:

$$\frac{N^O(a)}{N^O(a+)} - r^O(a+) = \frac{1}{t} \log \frac{k_1}{k_2} + \frac{(k_1 k_2)^{1/2}}{k_3} \frac{D^O(a+)}{N^O(a+)} \quad (9)$$

This equation is of the form $Y = A + BX$, where Y is the left hand side, X is the $D+/N+$ term, the intercept A estimates $[\log(k_1/k_2)]/t$, and the slope B estimates $(k_1 k_2)^{1/2}/k_3$. Using some fitting procedure to fit a straight line to the points (X,Y) for different ages thus provides estimates of relative enumeration completeness and of the completeness of death registration relative to the average enumeration completeness. Given any one factor k , we can estimate the other two. For instance in developed countries with complete death registration, k_3 could be set equal to unity and k_1 and k_2 could be estimated. More typically, our interest is in estimating mortality by obtaining consistent denominators and numerators for central age-specific mortality rates. For this purpose, we can arbitrarily set k_1 or k_2 equal to unity, and estimate the remaining two factors relative to k_1 or k_2 .

Illustrative Application

Table 1 and Figure 1 show the results of an application of the new method to the female population of South Korea between 1970 and 1975. In this case the intercensal interval is exactly five years, but the calculations would have been similarly simple regardless of the length of the interval. This application was chosen because the same data were used by Bennett and Horiuchi (1981) to illustrate their pioneering procedure for using age-specific growth rates to assess the completeness of death registration. For the sake of clarity Table 1 has many columns, but the simplicity with which the method can be applied and its freedom from inconvenient assumptions about the open interval or the distribution of deaths within age groups are evident.

The plot of the two death rate measures, that based on the age distributions, $N^O(a)/N^O(a+) - r^O(a+)$, and that based on recorded deaths, $D^O(a+)/N^O(a+)$, is shown in Figure 1. There is clearly a close linear association, especially for younger women. However, the points for older women, especially for ages 75+ and 70+, tail off quite sharply to the right; this effect probably arises from exaggeration of the age at death of the elderly. Close inspection suggests that this pattern starts above age 60, so estimates have been obtained by fitting a line to the points up to and including 60+; it may be noted in passing that Bennett and Horiuchi in their analysis also used an open age group of 60+. A least squares line fitted to the points from 5+ to 60+ has an intercept of -0.0009 and a slope of 1.600, with an R^2 of 0.994. A simple robust fitting procedure, of dividing the points into two equal groups according to their ordinate values and finding the line that passes through the average point of each group, gives a slightly larger slope and slightly smaller intercept. The closeness of fit of the lines to the points suggests that the assumptions of the method are approximately met at least up to age 60.

Accepting the parameters of the least squares line, we have from the estimation equation (9),

$$[\log(k_1/k_2)]/t = A = -0.0009$$

and

$$[(k_1 k_2)^{1/2}]/k_3 = B = 1.600$$

Solving the first of these equations for the ratio k_1/k_2 , we obtain

$$k_1/k_2 = \exp\{tA\} = \exp\{5 \cdot -0.0009\} = 0.9955$$

Arbitrarily setting k_1 equal to unity, thus expressing other factors relative to the coverage of the first census, gives

$$k_2 = 1/0.9955 = 1.0045$$

The 1975 census was thus some 0.45 percent more completely enumerated than the 1970 census.

The second equation is solved for k_3 as $k_3 = [(k_1 k_2)^{1/2}] / B$. Putting $k_1 = 1$, we obtain $k_3 = 0.626$ and so estimate the registration of deaths to have been 62.6 percent

Table 1 Illustrative application of generalized growth balance method: Female population of South Korea, 1970-75

Age group	Population		Deaths								
	10/1/70 (1)	10/1/75 (2)	1971-75 (3)	$N1^0(a+)$ (4)	$N2^0(a+)$ (5)	$D^0(a+)$ (6)	$N^0(a)$ (7)	$N^0(a+)$ (8)	$r^0(a+)$ (9)	Y (10)	X (11)
0-4	2087	2038	28533	15653	17236	373.9	*	82127	.0193	*	*
5-9	2183	2151	16381	13566	15198	345.4	2114	71794	.0227	.0067	.0048
10-14	2119	2179	12141	11383	13047	329.0	2158	60933	.0273	.0081	.0054
15-19	1515	2023	14223	9264	10868	316.9	1940	50170	.0319	.0067	.0063
20-24	1224	1511	14284	7749	8845	302.7	1543	41394	.0265	.0108	.0073
25-29	1107	1236	13003	6525	7334	288.4	1261	34588	.0234	.0131	.0083
30-34	1084	1093	12958	5418	6098	275.4	1128	28740	.0236	.0156	.0096
35-39	939	1078	13095	4334	5005	262.4	1046	23287	.0288	.0161	.0113
40-44	771	915	14435	3395	3927	249.3	919.3	18257	.0291	.0212	.0137
45-49	656	749	16006	2624	3012	234.9	767.3	14057	.0276	.0270	.0167
50-54	518	621	18915	1968	2263	218.9	630.5	10552	.0279	.0318	.0207
55-59	447	490	21247	1450	1642	200.0	515.2	7915	.0249	.0419	.0259
60-64	363	403	26530	1003	1152	178.7	423.1	5375	.0277	.0510	.0333
65-69	253	313	29325	640	749	152.2	328.1	3462	.0315	.0633	.0440
70-74	195	202	31823	387	436	122.9	236.3	2054	.0238	.0912	.0598
75-79	114	136	31403	192	234	91.0	157.2	1060	.0396	.1088	.0859
80-84	57	65	29555	78	98	59.6	87.06	437	.0457	.1535	.1364
85+	21	33	30072	21	33	30.1	*	132	.0904	*	*

Notes

1. The population figures in columns (1) and (2) are from the United Nations *Demographic Yearbook*, 1978, *Historical Supplement*, table 3. Numbers in thousands. The female deaths in column (3) are from Coale, Cho, and Goldman (1980), table 6. Columns (4), (5), and (6) cumulated from columns (1), (2), and (3) respectively (all in thousands).

2. The $N^0(a)$ values in column (7) are calculated from formula (7b), $N^0(a) = \frac{t}{5} \{N1^0[a-5, a]N2^0[a-5, a]N1^0[a, a+5]N2^0[a, a+5]\}^{1/4}$.

3. The $N^0(a+)$ values in column 8 are calculated from formula 6(b), $N^0(a+)t = [N1^0(a+)N2^0(a+)]^{1/2}$.

4. The $r^0(a+)$ values in column (9) are calculated from formula (5b), $r^0(a+) = [\log(N2^0(a+)/N1^0(a+))]/t$.

5. The estimation equation is
$$\frac{N^0(a+)}{N^0(a)} - r^0(a+) = \frac{1}{t} \log \frac{k_1}{k_2} + \frac{(k_1 k_2)^{1/2}}{k_3} \frac{D^0(a+)}{N^0(a+)}$$

This has the form $Y = A + BX$, where $Y = [N^0(a+)/N^0(a)] - r^0(a+)$, $X = D^0(a+)/N^0(a+)$, $A = [\log(k_1/k_2)]/t$, and $B = [(k_1 k_2)^{1/2}]/k_3$. The values of Y and X are given in columns (10) and (11) respectively. The least squares line fitted to these (X, Y) values has intercept $A = -0.0009$ and slope $B = 1.600$. From this we deduce (a) that $k_1/k_2 = 0.9955$, indicating that females were 0.45 percent more completely enumerated in the 1975 census than they were in the 1970 census; and that (b) putting $k_1 = 1$, gives $k_3 = 0.626$, indicating a completeness of death registration, relative to the 1970 census, of 62.6 percent.

complete relative to the first census. Bennett and Horiuchi arrive at an estimate of death registration completeness of approximately 65 percent using the same data. The difference between the two estimates is in the expected direction. Higher enumeration completeness at the second census will inflate age-specific growth rates $r^O(a+)$. In the Bennett-Horiuchi formulation, this exaggeration of growth rates will increase the population of each age a calculated from deaths and growth rates over age a , and so make registered deaths appear to be less incomplete than they actually are.

Given the positive growth rates over each age a , any bias in the current method's estimate of k_1/k_2 is likely to

be in the direction of overestimating this ratio (see Appendix), so in this application the estimate of coverage differential should be regarded as a minimum. If the parameters of the least squares line are accepted, adjusted age-specific mortality rates for the age range 5 to 60 can be obtained by adjusting one of the populations and the intercensal deaths so that both are consistent with the other population. For example, to be consistent with the first census, the population of each age group from the second census should be multiplied by 0.9955, and intercensal deaths for each age group should be divided by 0.626. A life table above age 60 could then be obtained by fitting a suitable model to the age-specific mortality rates for ages 5 to 60. Estimates of infant and child mortality will generally have to be obtained independently, since the registration of deaths under age 5 is generally less complete than that of deaths above age 5.

Conclusion

Even quite small changes in coverage from one census to the next can have large effects on demographic estimates derived from comparisons of two censuses. This paper proposes a simple method for estimating simultaneously the relative coverage of the two censuses and the completeness of registration of intercensal deaths. The key assumptions of the method are that the population is closed to migration and that all the coverage factors involved are invariant with age, at least for the age range studied. Initial applications of the new method are reasonably encouraging, though further applications are required to assess the general applicability of the method. Analysis of the sensitivity of the estimates to the assumptions and further work on extending the method to open populations would also be useful.

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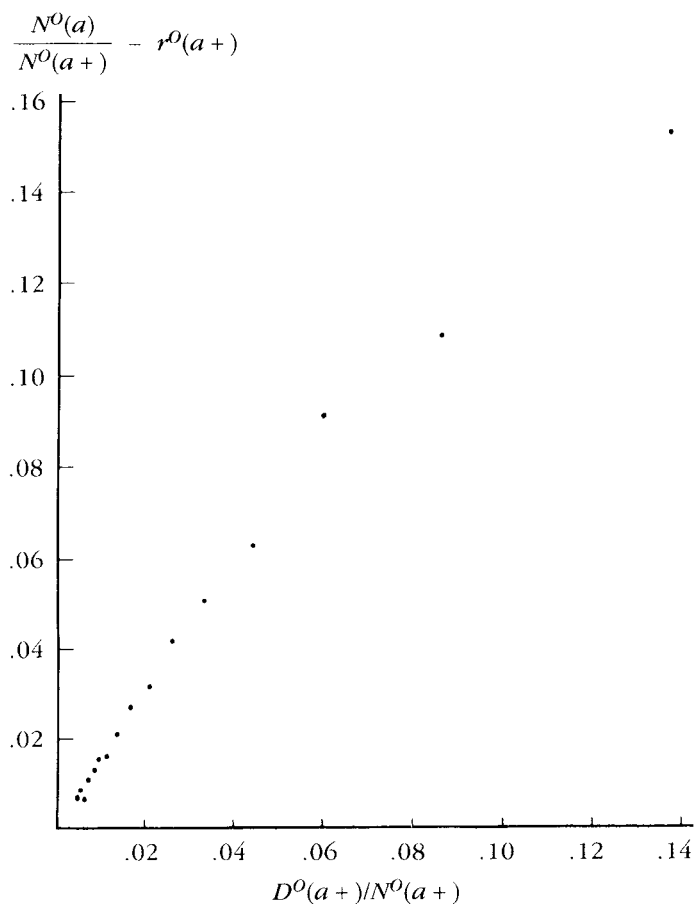


Figure 1 Illustrative application of generalized growth balance method: Female population of South Korea, 1970-75

Escape Route to Dependency? Female Migration from Sri Lanka to the Middle East

by Grete Brochmann

A significant feature of the world economy during the 1970s was the expanding international trade in labor. For many developing countries, remittances from citizens temporarily working abroad became a major source of foreign exchange and contributed to the reduction of trade deficits.

Labor migration has also become a major *social* issue, as large numbers of people leave home and family for lengthy stays in strange lands. A dramatic event for the individual migrant, it affects also the culture, organization of production, and pattern of consumption in the migrants' local communities.

It is a worldwide and an old phenomenon, and it offers a wide range of aspects for study. Studies of today's more common kind of migration, temporary contract circulation, have mostly been confined to male migration. The man gets a short-term work contract in another country, leaving the rest of his family behind. The role of the woman in this context is to maintain the household and possibly undertake agricultural production or other economic activities while the man is away. Although women are therefore a part of the

whole system of migration, they are seldom regarded as active participants in it.

This article looks at labor migration with the sex component turned upside down, where the *woman* leaves hearth and home in search of work in distant lands. The sending country is Sri Lanka, and the women migrate as maids to Arab households in the Gulf area.

International division of labor

Labor migration is a dynamic social process and can be analyzed on different levels. At the lowest level is the individual migrant, and at the highest is international society, with numerous gradations of family and society in between.

The aggregated movements of the individuals affect the other levels, and at the same time societal structures create and maintain forces that act upon the individual migrants but lie outside their spheres of influence. The interplay between these elements determines the nature and extent of migration.

Labor is a resource for the developing country in more or less the same way as raw materials and a favorable infrastructure can be. Sri Lanka has advertised itself internationally as

having the "cheapest labor in Asia." Cheapest of all is female labor, increasingly utilized as wage labor within Sri Lanka's tourist sector, free-trade zones and, not least, labor-export sector.

Labor migration must be understood in the context of the economic and social development that has made migration possible, or rather *pushed it forward*. The internationally founded relations are central. On the one hand there is the Lankan adoption of an *export-oriented strategy of industrialization*, with the change of government in 1977. This strategy included a liberal import policy that contributed to raising the population's expectations about its living standard and consumption. On the other hand we find the oil boom in the Middle East in the beginning of the seventies, which led to an increased need for labor power.

The export of labor from Sri Lanka started on a large scale after 1977. The liberal economic policy of the new leadership allowed huge amounts of imported goods to flow into the country (radios, television sets, refrigerators, furniture, canned food, etc.). This policy created deficiency of foreign revenue, a heavy rate of inflation, and a gap between real incomes and new expectations of a higher level of consumption.

For the Lankan state the new policy meant an increased need for foreign currency; for the families the situation made it hardly possible to maintain a household on the traditional source of income.

Because labor needs in the Middle East region could not be satisfied nationally, males were imported from abroad in large numbers to work in the comprehensive development projects. After some time, demand for female labor for housework was created by the increasing prosperity of Arab families. Since this sort of work was not considered appropriate for Arab women, foreign female labor also had to be imported.

Sri Lankan women have been widely used in this sector because they are the cheapest and because other labor-exporting countries in the region (India, Bangladesh, Pakistan, and Indonesia) have placed restrictions on the export of female labor.

Escape route for the government

The increased demand for labor in the Gulf also gave the Sri Lankan government a means to remedy its economic problems, at least in the short run, by supplying the country with hard currency, alleviating domestic unemployment, and partially fulfilling the people's increased expectations.

Today, the export of labor is the second biggest source of foreign earnings of the state (Ministry of Plan Implementation, 1985) and females constitute the largest single group of labor migrants. The number of women who travel every year is difficult to ascertain, but there is little doubt that it has been increasing sharply since the commuting started.

The migration to the Middle East is usually based on a labor contract arranged through recruiting agencies located more or less throughout Sri Lanka. Fewer than half of the agencies are registered with the authorities (Ministry of Plan Implementation 1985), and illegal recruiting activities flourish. A significant number of women arrange Gulf jobs through friends and relatives who are already there.

In spite of the burdensome labor situation the women expect to face overseas, the fact that they keep lining up in steady streams at the recruiting agencies perhaps reflects the seriousness of the social and economic problems they face at home.

Female migration and gender relations in the communities

Having (in very broad terms) set the international and domestic scene, I now turn to the social and economic processes acting at the household and community levels when the women leave. Specifically:

- What are the impacts of female migration on social mobility? If upward mobility is taking place, how lasting is this phenomenon when the woman stops migrating? How are migration and social strata correlated in the first place, and what is the impact of migration on patterns of differentiation? Does it reemphasize an already existing mode of differentiation, or does it contribute to leveling out differences?

- How do the remittances from abroad affect the local economy? Are there other groups beside the migrants' households that benefit from the petro-dollars?

- On the social and cultural side, how does the Middle East migration affect the lives of the women themselves? How are they looked upon by the community and by society in general? What impact does their experience of a different world have on their environment? How does the exodus of the women affect family life, division of labor, and relations within the household?

Many of these questions are difficult if not impossible to answer, at least in the near term. Nevertheless, they form part of a problem complex that might be investigated further in the future.

The findings presented here—tentatively and in brief—are based on qualitative and quantitative data obtained from observation, from semi-structured and structured interviews with female migrants and their families, from other key informants, and from documentary studies. Samples were selected from areas of Colombo that have substantial numbers of migrants, and also from the district of Hambantota in the south of the country. Most of the women from Colombo who migrate are married Sinhalese, and Buddhist. They live in shanty areas of the city. Hambantota was selected to provide a sample of migrants from a very different context. Most of the women who migrate from that area are married, Muslim, and live in rural villages or fishing communities.

A village of "mobile maids"

Whether one walks around the slums of Colombo or in the back streets of a fishing village in the south, visual signs of the Gulf traffic are prolific. It seems as though every other house is

a newly-built (or half-finished) brick house, sometimes with a showy entrance and maybe a TV antenna on the roof, all in striking contrast with the palm leaf hut in the back yard that was the family seat. Inside, one's eye is usually drawn at once to a disproportionately large glass showcase in a strategic spot in the living room, its shelves loaded with status symbols—sophisticated toys, glasswear, and electric kitchen gadgets (irrespective of whether the house has an electricity supply). The women themselves often bear signs of their recent stay abroad: gold jewelry and significantly better clothing than their nonmigrating sisters. In the very hot Hambantota area they wear the long-sleeved heavy frocks they were used to wearing in the Gulf.

There is certainly variation to this typical migrant community, but in general the materialism is striking. It is also a most powerful and effective stimulus for migration. Everybody wants a share of the bounty.

Survival strategy

There is one clear aspect of female migration: it is almost without exception the poorest strata of society that send their women to the Gulf as housemaids. The reasons for this must be sought in both the economic and the sociocultural fields.

Salaries in the Arab countries are high compared to the remuneration for equivalent work in Sri Lanka—usually 8–10 times as high. They are also high compared to the general wage level for unskilled labor (male or female) in Sri Lanka. However, three factors tend to reduce the value of wages earned in the Middle East:

First, for a majority of the migrants there are high social costs involved. It is not out of a sense of adventure that

young mothers leave behind their small children for periods of two years in exchange for uncertain prospects in a strange country. Second, there are high transaction costs just to obtain a Gulf job. The agencies that recruit women often charge a fee amounting to 7,000 rupees—about 3 months' salary from the Middle East. This might imply that the poorest people could not afford to go, but trailing in the wake of the recruiters are moneylenders with instant loans. In these cases the additional cost of interest is considerable. Third, sociocultural aspects also have an impact insofar as performing paid housework tends to be regarded as a low-status occupation and is therefore less attractive to households that have alternative means of income.

The main driving force behind the female exodus is the need for sup-

plementary income, or sometimes any income at all. There are hardly any local possibilities of employment for these poor, unskilled women. It is characteristic of their households that only the combined efforts of the whole family make subsistence possible. A common feature of these households is that *no one* has any stable income whatsoever. For them, Middle East employment has thus become the prime means of family maintenance.

Target savers

One category of migrants (male or female)—often called “target savers”—is motivated to migrate primarily by the chance to accumulate quickly some targeted amount of savings. The wage differential between the home country and the host country clearly caters to this, though there are some



Sri Lankan village now has a video shop as a result of Middle Eastern money.

asymmetrical effects on the standards of living of different income groups.

There are variations in the propensity to save and invest in lasting assets. Building or extending the house is almost invariably given high priority, and most of the migrant households seem to spend at least some money on this. If any other member of the household besides the migrant has a permanent income, however small, the likelihood that some saving and economic planning takes place is significantly higher. The number of dependents, of course, also has an impact. But where, as is often the case, there is hardly any other source of income, most or all of the migrant's income is spent on daily consumption and maintenance of the family. In such cases, one contract in the Gulf may not solve the household's basic problems. Almost on the contrary: having become used to a fairly high, regular monthly income, the family faces difficulties when the contract is terminated. Consequently, repeat migration is common. The poorest families have sent their women abroad 3 or 4 times already.

The more fortunate families invest in some lasting goods: a better house, furniture, electricity, or TV set, cassette player, jewelry, and so on, but hardly anyone invests in income-generating activities to get off the ground and independent of future migration! Unmarried women who save for their dowries *do* invest in their future, in a sense, as do parents who spend money on their children's education. However, so far this kind of investment does not seem very prevalent.

As for economic repercussions on the migrants' communities, some local demand is definitely generated. For example, daily-paid housebuilding

jobs are created for the men. Much more significant is the mushrooming of moneylenders who sometimes seem to be the real beneficiaries of the migration. The heavy demand for instant cash to pay the (illegal) agent fees creates a seller's market. The interest rate is commonly 20% per *month*.

Exposed to the world

Interviewing the "Dubai women," as they are sometimes known, opens doors to many dramas of daily life. Watching them walk with their few belongings toward a Boeing 747 and a completely strange destination is a poignant experience. This striking challenge to structural and traditional limitations is likely to have a significant impact on the lives of these women, as well as on their society.

The traffic has certainly changed the economic role of the woman in the family social context. When she is abroad she becomes the main, if not the sole, breadwinner. Having daughters has now become an asset: more daughters mean more potential migrants; before they were mainly an expense—someone to be supplied with a dowry. Domestic work has become a skill that can be sold on the international labor market. The "invisible training" that takes place within the household is valuable all of a sudden.

There are some indications that the status of the woman in her household and her local community is also changing. Educated and well-off people seem to look down upon the Middle East maids because of the very low status accorded to housework, in Sri Lanka and elsewhere. Some middle-class men told me that they would never consider sending

"their women" to another man's house. On the other hand, within the sending communities migration means access to the status symbols so ostentatiously displayed.

Resentment from the middle classes could also reflect envy of the easy money made by the lower classes in the Middle East. The middle classes themselves face an uphill struggle to maintain their standard of living. Members of the lower-middle class find themselves confronted with a dilemma: whether to accept a substantial squeeze on their standard of living by staying at home, or whether to alleviate their problems through migration (Mohamed Adel-Fadil 1985). Their status is threatened by the vast groups within the lower classes who achieve some improvement in their living standards through the petrodollars.

The question of status within the migrating communities needs some qualification. The economic aspect may be predominant, but role conflicts arise in the wake of the females' going abroad.

The inclination of women to participate in income-generating activities depends largely on their ability to manage multiple roles; i.e., their economic activities are inclined to be compatible with their reproductive role, particularly child rearing. Often the income-generating activity is a direct extension of their domestic responsibilities, as for example within the so-called informal sector. In the context of Middle East migration this picture applies only to a certain extent. The work in the Arab households is certainly compatible with the traditional sphere of female work. It is *reproductive* work, although it is for a wage. At the same time the women are geographically removed

from their own reproductive chores, which means that they cannot comply with their daily sex role within Sri Lankan society. They cannot raise their own children, take care of the other household members, or keep up the house.

Though the Middle East work is compatible with their traditional sex role in terms of the kind of work they are undertaking, the fact of their leaving represents a threat in that their men folk are deprived of daily control over them. Living in a stranger's house can lead to suspicion, which may lead in turn to a bad reputation in the women's local community. People within the migrating communities say they suspect that "there is a lot of prostitution going on over there among the Sri Lankan women." (This probably reflects attitudes more than reality.) The "Dubai women" (and their households) may achieve higher status, but perhaps at the expense of their reputation in society. And it is questionable how lasting will be their change in status when the jobs abroad dry up.

Cultural diffusion

Not only are the migrant women themselves exposed to a very different society (the Sinhalese more so than the Muslims), with different values and ways of living but also the whole community at home gets a concept of "abroad." On streetcorners close to the slum pockets of Colombo, streetsellers offer passport application forms alongside their regular wares; in the villages of Hambantota the postman carrying a bunch of air-mail envelopes under his arm now is a common sight; and "Dubai" cartoons appear regularly in the newspapers.



A nonmigrant household in southern Muslim village of Sri Lanka.

The Dubai Syndrome

Throughout the whole South Asian region the term "Dubai Syndrome" refers to a sense of disorientation resulting from harsh working conditions, social isolation, culture shock, and psychosomatic disorders. However, data on this are hard to collect in the short term, and lack of data prohibits a full examination and analysis of the syndrome. It is also difficult to isolate the effects of migration from other factors.²

Nevertheless, many of the married migrant women leave behind small babies, some as young as two months old. Doubtless this causes stress both for the woman and the child. Interviews with school principals also indicate changes in behavior among the "Middle East children."

Female migration and the state

Turning to the overall effects of this phenomenon of migration on society as a whole, I would like to focus briefly on the list of pros and cons from the point of view of the sending governments, and see how some of them relate to *female* migration.

One adverse effect of migration for the state that does not apply to the migrating maid is the brain drain or skill drain. The maids seldom have had a paid job in Sri Lanka prior to their departure and have not had any expensive training. Not counting possible long-term social costs, Sri Lanka so far has probably had a net economic gain from female labor exports. And the women do not expect to seek employment upon their return to Sri Lanka, as the men do. With these two important exceptions, most of the adverse economic effects such

as inflation and dependence on migration as a source of foreign income are similar for both male and female migration.

On the other hand, the gains to society could be more substantial. First, the salaries are significantly higher, which means that the foreign income per person is also higher. Consequently the ability of saving and possibly investing should be better. Second, the skills obtained in the Middle East could also have some benefit to Sri Lankan society after the women return.

The majority of the migrants are now female and their share is increasing. The prospects for continued male migration are fairly low—indeed, the government fears that it will come to an end in the not-too-distant future. However, the government expects growth in the female contingent in the years to come; therefore the importance of female migration will increase: a relative example of “the comparative advantage of women’s disadvantages” (Charlton 1984).

Dilemmas for development

From the state’s point of view, there are strategic dilemmas attached to labor migration. It may merely postpone or temporarily displace internal structural problems in the economy, unless the society has the productive capacity to absorb the exported labor upon repatriation. And the consequences may be different at the individual and the aggregated levels: the individual migrant may experience improved living conditions, but at a cost to the state of greater dependen-

Transitory income—future dependency?

In a southern agricultural district in Sri Lanka some miles inland and dominated by fairly well-to-do Sinhalese rice farmers is a small Muslim village surrounded by Sinhalese landholders. The village main street is flanked by rows of attractive four- or five-room middle-class houses—many of them only half finished—with wooden window frames and tiled roofs. All but two of the 50 households have at least one woman working in the Middle East.

Before the first woman left the village in 1980, the houses were all palmleaf huts. The village was poor, since no one had land nor any other permanent source of income. The men earned some money as daily-paid labor in the Sinhalese paddy fields, and most households received government support in the form of food stamps.

Soon after the first contingent of maids returned from the Middle East, the house projects started. The bright new prospects encouraged the pioneers to build big, nice houses, setting the standard for the whole village. In this particular village, everything left over from daily living expenses is invested in housing. Not a single chair or cassette player is to be seen inside the houses. Hardly any of the houses are completed: the standard was evidently set too high.

After the exodus had begun, the men stopped

whatever work they used to do and instead began supervising their own housebuilding or helping to build neighbors’ houses.

The households spend an increasing portion of the Middle East money on daily consumption. Most households told me that they had increased spending on food and daily living because of the external money. At present the village is almost completely dependent on this source of income. But there is no land to be bought and there are no prospects for employment in the neighborhood.

For these households the Middle East offers an escape route from pure poverty. But it could be a serious trap. When the day comes that the women have to stay home (for whatever reason), the households will most probably be back to square one, or worse. The population will have increased on the fixed amount of land and the investment in housing will have been so substantial that moving out of the village will appear impossible.

There are many places in Sri Lanka like this little Muslim village, although perhaps not as extreme. Even though the escape route to the Middle East provides badly-needed supplementary income today, it may prove to offer only a fleeting and costly glimpse of Mecca.

cy on migration, or the other way around.

The prospects for Sri Lanka are uncertain. The government expects the contingent of female migrants to grow, though against this is the fact that Sri Lanka now faces stronger competition in female labor exports from other countries in Asia—notably the Philippines and India. Sri Lankan maids are considered “cheap,” but in a double sense: they are paid less, but the quality of work is alleged to be commensurate and there have been complaints about their poor educational standard.³

Changes within the Arab economies may also influence the propensity to employ foreign female labor in the future. The demand is influenced by the general prosperity and by the domestic labor market in the Gulf countries. In addition, signals coming

from some of the Arab receiving countries lately indicate concern about the undermining of Muslim culture by the influence of large groups of workers from other ethnic and cultural backgrounds. This applies particularly to those housemaids whose duties include raising Arab children. A consequence of this is that *Muslim* Sri Lankan women are presently in relatively high demand in the Gulf.

Given these dilemmas and uncertainties, the labor export business seems to create vulnerabilities both for the Sri Lankan state and for the migrants' households.

NOTES

1. This description of conspicuous consumption is a common feature of studies of migrating communities in developing countries and often has moral connotations. What is

important is to ask what are the *alternatives* to the prevalent pattern of expenditure; whether any “rational investment avenues” are available. Riad Tabbarah (Tabbarah:1985) observes that the expenditure of migrants' families is generally similar to that of other families at their new and higher income levels, and the differences (e.g., higher proportions spent on housing construction and repayment of debts) reflect their recent, more modest origins. He also stresses that in conditions of underdevelopment, increased consumption, particularly in education, nutrition, and housing, often has a long-term effect, as productive investments in human capital.

2. The data available in this field are usually not longitudinal and are not able to indicate whether a situation might have occurred without external migration. Differentials between migrant- and nonmigrant households may be indicative but do not provide conclusions about the causal relationship between labor migration and social changes (Shah and Arnold 1985).

3. Information from Sri Lanka, Ministry of Labour, February 1986.

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GRETE BROCHMANN

With earnings from Dubai, migrants are able to upgrade their Sri Lankan homes.

by Alice D. Harris

Migration and Settlement: A Multiregional Comparative Study, edited by Andrei Rogers and Frans J. Willekens. Dordrecht, Boston: D. Reidel Pub. Co., 1986. xix, 496 pp. US \$54.00 ISBN 90-277-2119-X.

The population problem in most regions of the world has two dimensions: growth (both positive and negative) and spatial distribution. Concern about population growth has led to studies of fertility and the effectiveness of family planning programs. The issue of population distribution has just begun to receive attention as countries attempt to stem rural-to-urban migration and regulate population movement to new economic areas. To understand better the mechanisms behind population movements, the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, undertook in 1976 a multinational study of internal migration and population distribution patterns in the countries of its member organizations. The study, in which scholars from 17 member organizations participated, incorporated recently-developed techniques of multiregional demographic analysis as its framework. It was concluded in 1982, and its principal products of six research reports and 17 national case studies are available from IIASA in a three-volume boxed set. The theory, applications, and the data reported therein form the basis of this book.

Part 1 describes the Migration and Settlement Study, summarizes the

contents of the work, and considers details related to the study's data base. It explains and contrasts the two accounting frameworks used in the case studies: movement accounts, which focus on migrations as recurrent events, and transition accounts, which focus on migrants and their places of residence at different times.

Part 2 is a report of the attempt to use age-specific fertility, mortality, and migration data for 139 regions in 17 countries to make regional comparisons.

Part 3 indicates that most of the IIASA countries have levels of reproduction below replacement. Population aging and spatial redistribution are the focus of chapters in this section.

Part 4 is devoted to a brief exposition of multiregional mathematical demography and to the methodological advances generated by the Migration and Settlement Study in life table construction and in stable population theory. Chapter 10 presents the crux of the life table construction problem: the estimation of age-specific survival probability transition matrices using data on interregional moves or on interregional transitions. It demonstrates that a stable population across ages and regions is implicit in any multiregional population projection matrix, although it may be subject to short-run fluctuations.

The concluding chapter sums up the accomplishments of the study in spatial population dynamics, measurement and analysis of migration patterns, and formal demographic methods for modeling

transitions between states other than regions.

This work presents in a single source much of the research reported earlier in numerous IIASA working papers, reports, and reprints. Some of the mathematical demography in part 3 may be hard going for general readers. For those who just want to understand the significance of the study itself, it would be better to read parts 1 and 2 and the conclusion. Executive Report No. 9 from IIASA provides a brief overview of the study and is suitable for those without time to read the entire book. Copies of *Migration and Settlement* can be ordered directly from Kluwer Academic Publishers, 190 Old Derby St., Hingham, MA 02043, USA.

Fertility in Developing Countries: An Economic Perspective on Research and Policy Issues, edited and introduced by Ghazi M. Farooq and George B. Simmons. New York: St. Martin's Press, 1985. xxiv, 523 pp. US \$37.50. ISBN 0-312-28752-6.

In 1972 the International Labour Organisation (ILO) began receiving generous financial support from the United Nations Fund for Population Activities to conduct a program of research and publication on the interrelationships among population growth, economic development, and labor mobility. Within the last ten years the program has produced a prodigious quantity of working papers and monographs on topics ranging from household economics to community-level and individual

fertility variables in family size. The dominant theme in nearly all the research has been fertility. The present book, *Fertility in Developing Countries*, reports the conclusions drawn from many of the earlier publications as well as new ideas on the integration of demographic and economic factors prevalent in academic circles today.

Edited by Ghazi M. Farooq of the ILO and George Simmons of the Center of Population Planning, University of Michigan, the volume contains an overview of the more important theories of fertility and a thorough discussion of general problems encountered when applying economic models of fertility. Part 1 describes the theories of fertility and their limitations, suggests ways of making the theories more policy relevant and theoretically adequate, and looks at the implications of fertility research for policy and action. Part 2, consisting of six chapters, discusses methodological issues, including the definition and measurement of fertility and key explanatory variables, and such empirical questions as time-series versus cross-sectional and pooling techniques, aggregation and specification problems, simulation and econometric approaches, and the use of anthropological techniques to supplement econometric approaches. The final section, consisting of seven chapters, presents seven empirical case studies from Kenya, Nigeria, India, Turkey, Yugoslavia, Mexico, and Costa Rica. The last chapter deals with the effect of income distribution on fertility, using cross-sectional data for a sample of developing countries.

Most of the papers indicate the need to go beyond the family plan-

ning approach to reduce fertility. They suggest more comprehensive population and development programs and improvement in the status of women as effective means to lower fertility. Even the design and implementation of family planning programs may be strengthened by an awareness of the context in which fertility and contraceptive decisions are taken. That is why this volume should be particularly useful to researchers and data collectors in developing countries who are responsible for conducting fertility research that can provide guidelines to policymakers and program planners. The volume should also be of interest to students of population economics and to government officials, especially economic planners. It contains numerous tables and graphs, a bibliography and index, and notes on the contributors. At US \$37.50, it is moderately expensive but contains a wealth of detail and is a worthy addition to any demographic or family planning library. For information, write: St. Martin's Press, Inc., 175 Fifth Avenue, New York, NY 10010, USA.

Urbanization and Migration in ASEAN Development, edited by Philip M. Hauser, Daniel B. Suits, and Naohiro Ogawa. Tokyo: National Institute for Research Advancement, 1985. Distributed outside Japan by the University of Hawaii Press. xiv, 373 pp. US \$25.00. ISBN 0-8248-0996-3.

This volume contains the papers from an international conference held in Tokyo in 1982 for the purpose of examining the problems of

migration in relation to economic development in the ASEAN countries. The conference was sponsored jointly by the Population Institute of Nihon University and the National Institute for Research Advancement.

ASEAN, the Association for Southeast Asian Nations (the Philippines, Indonesia, Malaysia, Singapore, and Thailand), was established in 1967; in 1976 its cooperative agenda was extended to cover population problems in the region. Except for Singapore, its member countries are predominantly rural, but they are experiencing urbanization and internal migration along with a change from agrarian to industrialized economies.

Philip Hauser presents an overview of the transformation process. His chapter is followed by several kinds of regional analysis, ranging from a review of ASEAN agriculture by James to an assessment of urbanization and migration trends by Ogawa, a study of labor migration by Stahl, and a paper suggesting areas for further research on migration and development in ASEAN countries by Jones.

Subsequent sections focus on the individual countries of Indonesia, Malaysia, the Philippines, and Thailand, presenting several papers on each. The contributions illustrate problems common to all countries as well as those that may be unique to a given country. Each selection contains illustrations and bibliographical references. The authors have presented their own perceptions of government policies and suggested programs to remedy the problems associated with urban growth and out-migration from rural areas. One conclusion that

emerges from these papers is that it is impossible to apply generalizations about all developing countries to the ASEAN context.

Because each contributor was free to develop his material without a stated framework for comparability, as in the World Fertility Survey, the volume does not present a holistic

view of the ASEAN region. The papers do indicate what progress has been made in the last two decades in an important region of Asia, however. It would be useful to see a compilation of this kind for other regions as well. The volume provides a good beginning for a study of the ASEAN population

situation and as such would be a worthwhile addition to general academic collections having an Asian focus as well as to more specialized population libraries. The book is distributed outside of Japan by the University of Hawaii Press, 2840 Kolowalu Street, Honolulu, Hawaii 96822, USA.

Estimating Census . . .

(continued from page 13)

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Appendix

The use of an exponentially defined growth rate r when person years lived are being defined geometrically introduces a bias that depends primarily on the growth rate and is scarcely influenced by the ratio k_1/k_2 , at least for values of this ratio that are likely to be encountered in practice, in the range 0.75 to 1.35. Simulations were carried out for this range of values to establish this conclusion. The bias overestimates k_1/k_2 for positive growth rates, and underestimates it for negative growth rates. The size of the bias in k_1/k_2 may be as much as three per thousand for growth rates of plus or minus 4 percent, but is very small indeed for growth rates smaller than plus or minus 2 percent.

The bias can be largely eliminated by defining the growth rate in geometric terms as the intercensal popula-

tion change, $N2(a+) - N1(a+)$, divided by geometrically estimated person years lived. If we call this growth rate $R(a+)$, its observed value $R^O(a+)$, and the difference between the two $\Delta R(a+)$,

$$R(a+) = \frac{N2(a+) - N1(a+)}{N(a+)} \quad (A1)$$

and

$$R^O(a+) = \frac{N2^O(a+) - N1^O(a+)}{N^O(a+)} \quad (A2)$$

$R(a+)$ can be written in terms of observed quantities and completeness factors as

$$\begin{aligned} R(a+) &= \frac{(k_1 k_2)^{1/2} [N2^O(a+)/k_2 - N1^O(a+)/k_1]}{N^O(a+)} \\ &= \frac{[N2^O(a+)(k_1/k_2)^{1/2}] - [N1^O(a+)(k_2/k_1)^{1/2}]}{N^O(a+)} \end{aligned} \quad (A3)$$

Thus

$$\begin{aligned} \Delta R(a+) &= R(a+) - R^O(a+) \\ &= \frac{N2^O(a+)[(k_1/k_2)^{1/2} - 1] + N1^O(a+)[1 - (k_2/k_1)^{1/2}]}{N^O(a+)} \end{aligned} \quad (A4)$$

For values of k_1 and k_2 that are approximately equal,¹

$$N2^O(a+) [(k_1/k_2)^{1/2} - 1] + N1^O(a+) [1 - (k_2/k_1)^{1/2}] \\ \cong [N2^O(a+) + N1^O(a+)] [(k_1^{1/2} - k_2^{1/2}) / (k_1^{1/2} k_2^{1/2})^{1/2}] \quad (A5)$$

Thus

$$R(a+) \\ \cong \frac{[N2^O(a+) + N1^O(a+)] [(k_1^{1/2} - k_2^{1/2}) / (k_1^{1/2} k_2^{1/2})^{1/2}]}{N^O(a+)} \quad (A6)$$

We now rederive equation (9), beginning with equation (3) and using

$$R(a+) = R^O(a+) + \Delta R(a+) \quad (A7)$$

for $r(a+)$ in (3), rather than the exponential expression (5a). This gives, in place of (9), the estimation equation

$$\frac{I[N2^O(a)N1^O(a)]^{1/2} + N1^O(a+) - N2^O(a+)}{N1^O(a+) + N2^O(a+)} = \\ = [(k_1^{1/2} - k_2^{1/2}) / (k_1^{1/2} k_2^{1/2})^{1/2}] \\ + \frac{(k_1 k_2)^{1/2}}{k_3} \frac{D^O(a+)}{[N1^O(a+) + N2^O(a+)]} \quad (A8)$$

Thus using a growth rate with geometrically calculated person years lived in the denominator maintains a linear relationship, subject to the approximation (A5), with the same slope but a different intercept.

If a fitted line estimates this intercept as I , the fourth root of the ratio k_1/k_2 can be found by solving the quadratic equation

$$(k_1/k_2)^{1/2} - I(k_1/k_2)^{1/4} - 1 = 0 \quad (A9)$$

Two solutions symmetrical around unity will be found. The correct value can be identified by inspection since a

positive I implies $k_2 > k_1$, whereas a negative I implies $k_1 > k_2$.

This approach is much less convenient to apply, but it does eliminate growth rate dependent bias at the cost of bias if k_1 and k_2 are very different. This latter bias is very small for k_1/k_2 ratios between 0.75 and 1.35, for which range simulations were made, but could be reduced if necessary by applying the method once, adjusting one census count on the basis of the first estimate of k_1/k_2 , and then reapplying the method under conditions in which k_1 and k_2 would be approximately equal.

NOTE

1. This approximation can be seen as follows. We can re-write the left hand side of equation (A5) as

$$N2^O(a+) \frac{k_1^{1/2} - k_2^{1/2}}{k_2^{1/2}} + N1^O(a+) \frac{k_1^{1/2} - k_2^{1/2}}{k_1^{1/2}}$$

Both terms in k have the same numerator. The denominators are also similar if k_1 and k_2 are approximately equal, and both can be replaced approximately by their geometric mean, $[k_1^{1/2} k_2^{1/2}]^{1/2}$, making the left hand side of equation (A5) approximately equal to

$$[N2^O(a+) + N1^O(a+)] [(k_1^{1/2} - k_2^{1/2}) / (k_1^{1/2} k_2^{1/2})^{1/2}]$$

Note to Readers

This issue of the *Forum* is the last under the capable stewardship of Griffith Feeny and David Ellis. Editor Feeny has taken a sabbatical leave from the institute to pursue his own research at the University of California at Berkeley, and Managing Editor Ellis has left the institute to pursue a master's degree in communication at Ball State University. Analysis of the *Forum* reader survey David organized last year will be a major part of his master's work. Dr. Linda G. Martin has agreed to assume editorial responsibility for the *Forum* beginning with the August issue, and a new managing editor is being recruited.