JAMES E. KOCHER*

SOCIOECONOMIC DEVELOPMENT AND FERTILITY CHANGE IN RURAL AFRICA†

This paper addresses the issue of the effects of socioeconomic development on human fertility in rural areas of Africa. Much of the theoretical framework utilized and the data discussed are derived from the author's Ph.D. dissertation which analyzed the determinants of fertility levels in selected areas of northeastern Tanzania (11). Reference will also be made to studies carried out elsewhere in Africa.

The importance of the topic need not be argued. The achievement of rapid development and improvements in living conditions remains a high priority objective for most African governments. Levels of living in rural Africa are low. About 75 percent of the African population resided in rural areas in 1975 (excluding northern and southern countries) (12).

The overall population growth rate in Africa is estimated to exceed 2.5 percent annually and annual growth rates in some countries (for example, Ghana and Kenya) may exceed 3 percent. Moreover, prospects are that growth rates will rise in coming decades because mortality is still high. The crude death rate for sub-Saharan Africa is probably about 20 per 1,000 population and provides considerable potential for rising population growth rates in the years ahead.

Barring a devastating catastrophe, the prospects are that the African population will at least quadruple by the middle of the next century due to the momentum provided by current age distributions and fertility and mortality rates (8). Growth rates and population sizes during the twenty-first century will be enormously affected by what happens to fertility in the next few decades.

The theoretical framework to be used in the analysis of the relationships between socioeconomic development and fertility change is outlined in the next section. This is followed by the presentation of data on the determinants of fertility in rural Africa. In the next section the light these findings shed on the

effects of socioeconomic development on fertility in rural Africa is discussed. Some conclusions and comments on policy implications are presented in the final section.

THEORY: THE DETERMINANTS OF FERTILITY AND FERTILITY CHANGE[1]

The concept of demand for and supply of children by parents is the cornerstone of the analytical framework used here. Supply of children means the actual number of surviving children the parent has while demand means the number of surviving children the parent wants. The focus is on the relationships between socioeconomic characteristics and fertility of the family, the household, or the individual.

Within this framework, a parent's supply of children is determined by certain of her or his individual characteristics together with certain characteristics of their culture and society. Demand for children is determined by other individual and societal characteristics. Thus, a parent's supply of children and her or his demand for children are assumed to be determined essentially independently, and each may change over time—again independently of what is happening to the other.

It is hypothesized that in a traditional society, women (used henceforth as a shorthand for parent or parents) typically want more surviving children than they actually end up with; that is, they experience excess demand. As one initial consequence of economic, educational, and health improvements, the typical woman's supply of surviving children increases. The rise in average number of children marks the end of the strictly traditional condition and the beginning of socioeconomic and demographic transition. The rise in the average number of surviving children (due to causes to be discussed and analyzed later) presumably has no effect on the number of surviving children desired.

The next significant event is when demand for children starts to decline. Its onset is presumed to come about only after a prolonged period of socioeconomic change and development which eventually persuades parents that they would be better off with fewer children than most members of their society have wanted in the past.

The last period is reached when women begin to restrict fertility for the specific reason that they want no more children. Prior to this time fertility could be rising, falling, or unchanged, depending on the unintended consequences of other changes in the environment or in the behavior of members of the community (for example, absence of men, improved health of women, reduced infant mortality). But now fertility declines unambiguously because parents want it to.[2]

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[1] This analytical framework is similar to one presented by Easterlin (7).

[2] Women who want more children may, however, practice birth control to help achieve a more desirable interval between births. Ware found in a sample of 1,050 urban Nigerian women who had practiced birth control that, within marriage, spacing—and not the limitation of family size—was the most prominent reason for contraceptive practice (22). To the extent women are successful in achieving longer birth intervals, fertility will of course be lower. The criteria for entering the last stage of the transition, however, is that supply either equals or exceeds demand and that a woman practices birth control because she wants no more children.

Determinants of Demand for Children

Parents are assumed to want children because of the satisfaction they provide. Leibenstein identifies three types of satisfaction or utility which children (potentially) provide to parents: income utility (income or wealth, net of their costs), security utility (financial and emotional support, particularly when parents are old), and consumption utility (personal enjoyment or satisfaction from having children) (*13*). Within this framework, parents are assumed to be rational, to have limited material resources, and to prefer to allocate their material resources so as to maximize their satisfactions subject to their preferences and the prices of available goods. Children represent one of a large number of potential acquisitions among which they can choose in attempting to maximize satisfactions. Hence, parents' demand for children is assumed to be the outcome of the interaction of their incomes, the relative prices of children vis-à-vis other goods, and their preferences for children vis-à-vis other goods. Demand for children is assumed to be positively related to parental income, negatively related to the price of children vis-à-vis other goods, and positively related to the strength of parental preferences for children vis-à-vis other goods.[3] The opportunity cost of time spent by parents in rearing children, as emphasized by Becker(*1*, *2*), Schultz (*18*), and others, is probably of little importance in rural africa.

Determinants of Supply of Children

The date when a woman bears her first child, the date when she bears her last child, and the spacing of births between are determined by various biological characteristics of herself, her spouse, her co-wives, and her society. These include her fecundity, the age at which she first has coitus, its frequency thereafter, and the amount of time the woman subsequently abstains from coitus during fecund periods. The latter may be the result of disrupted marriage, absence of spouse, or sexual abstinence due to a lactation taboo or other cultural practice. First (or at least first frequent) coitus might not occur until marriage. The frequency of coitus might depend in part on the length of time the woman breast-feeds (*21*) which in turn depends on cultural practices, individual preferences, and whether the child survives to weaning.

[3] Of course the net price of children could be negative, meaning that when the child's future costs and contributions to parents' income or wealth are appropriately discounted, the child makes a net contribution to parents' wealth. Additional children would then increase instead of reduce the amount of parents' resources available for the acquisition of non-child goods in which case parents would want as many children as possible. This may have typically been the case in traditional African societies although there is very little evidence either way. Caldwell believes that parents in rural West Africa still typically expect children to make a net contribution to parental income during the parents' lifetimes (*3*, *4*). Mueller, after reviewing available data (mostly non-African) on child costs, child labor, and wage rates, concluded that children almost never make a contribution to parental income, even in peasant societies (*16*). Cleave, however, reported data from farm surveys in Uganda, Gambia, and Tanzania which indicate that children between ages 10 and 15 spend almost as much time in farm work over the course of a year as their parents, although even the time spent by parents in farm work (not including food preparation and other domestic chores of women) averages only 3 to 4 hours per day (*6*). Moreover, in many rural areas of Africa, children help out by age 5 or 6. Boys frequently help tend grazing livestock. Girls carry firewood and water, assist with other household chores, and at an even earlier age help look after a younger sibling, thereby freeing older female members of the household or community for more productive or more pleasant work.

In nearly all rural African societies, one consequence of socioeconomic changes might be changes in all (or most) of these characteristics, and there is evidence that such changes are occurring. Although changes in these supply characteristics affect both average fertility and average number of surviving children per woman, they presumably have no direct effect on the number of children women want.

Until parents consciously adopt measures to prevent or delay conception or live births, both fertility and the number of surviving children are determined by supply characteristics alone.[4] The basic societal and individual characteristics change continually once the transition begins and these changes affect both supply and demand determinants throughout.

Supply and demand variables have distinctly different roles in determining fertility. Contrary to most theories and models of the economic determinants of fertility which assign an almost exclusive role to demand variables in determining fertility levels, changes, and differentials (19, 20), the studies reported here show the dominance of supply influences during early stages of the transition. Demand determinants first manifest a potential for affecting either fertility or number of surviving children when demand and supply are equal, and they realize this potential only when women begin to restrict fertility for the specific reason that they want no more children.[5]

It is assumed that the desires of parents in rural Africa are couched more in terms of number of children surviving than number born. As for demand relationships, presumably the extent to which parents desire more births than survivors is determined by the mortality among their children. If no children die, the two would presumably be equal.

From the perspective of supply relationships, it is much less complicated to analyze determinants of number of children born than the number surviving. A potentially larger number of variables affects mortality and fertility together (and hence survivals) than affects fertility alone, although the influences affecting fertility may be more subtle. Hence, most of the analysis and data reported in the remaining portions of this paper will address the question of the determinants of number of children born (fertility) rather than number surviving.

DETERMINANTS OF FERTILITY: EMPIRICAL EVIDENCE

The main body of evidence in support of this theoretical framework is provided by interviews of about 750 married women in rural areas of Northeastern

[4] Exceptions would be societies where differential preference for male survivors results in relative neglect of females and associated higher female infant and child mortality rates.

[5] Caldwell put forward a related model of socioeconomic and demographic transition which is generally consistent with this supply-demand disequilibria transition model (3). There are, however, some important differences between the two. The kingpin in his model was the direction of the net inter-generational transfer of wealth. He contended that in primitive and traditional societies, the net transfer is from older to younger. He argued that economic rationality dictates having as many children as possible in the former and zero fertility in the latter. However, he used the word "economic" in the limited sense of "financial returns" (or "price"). Tastes and income were omitted as demand determinants. Thus, in his model, demand should decline precipitously once the net wealth transfer switches and goes from older to younger (i.e., the price of children becomes positive instead of negative). In the model presented here, however, even after crossing this divide, demand may still exceed supply because tastes, which are determined by the social and psychological value parents attach to children, may change much more slowly than do prices.

Tanzania late in 1973 (*11*). The sample was about equally divided between women aged 20-29 and women 30-39. None had had a previous marriage. Multiple regression was used to separately test supply models and demand models of the determinants of the number of children ever born to women.

Independent variables in the supply model were number of years married, reported number of months children were breast-fed, number of deceased children (as a proxy for the effect of the death of a lactating child on the timing of the next birth), and whether or not the woman was married to a polygynous husband (a dummy variable). Independent variables in the demand models were various proxies for household income, relative prices of children, and relative preferences for children. Some of these are discussed below.

It was expected that fertility would be positively related to the number of years married and to number of deceased children (due to earlier resumption of ovulation following the death of an infant), negatively related to the length of lactation (due to prolonged amenorrhea), and lower for women married to polygynous husbands than for wives of monogamous husbands.

The supply models produced relatively large R^2s and high levels of statistical significance for the independent variables. The R^2 for the age group 30-39 was .45 and coefficients for all independent variables had the expected sign and were statistically significant at the .01 level. The R^2 for the age group 20-29 was .56 and coefficients for all independent variables except the dummy for polygyny had the expected signs and were significant at the .01 level.

The R^2s for the demand models were low and few of the coefficients for the independent variables were statistically significant although most signs were in the expected direction. Several formulations of the demand model were tested using various combinations of independent variables. All R^2s were below .04 for age group 20-29 and below .02 for age group 30-39.

Some results from one demand and one supply model are given in Table 1. Estimated value of household crop production during the 12 months preceding the survey and whether or not the husband had a wage-paying job were used as proxies for current income in the demand model (columns 2 and 4). An index of the quality and value of the household's buildings was used as proxy for permanent income (wealth). A dummy variable which indicated whether the woman answered yes or no when asked whether there were advantages to having a large number of children was a proxy for relative prices. A dummy variable which indicated whether the woman's religion was Christian or non-Christian was a proxy for preferences. The number of years of formal schooling was assumed to be a proxy for both relative prices and preferences.[6]

For age group 20-29, coefficients of two of the independent variables in the demand model consistently had the expected sign and were statistically significant (in some cases only at the .05 level), although the coefficients were relatively small. These were building quality and value (coefficient was positive)

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[6] Values of the building index ranged from 0 (lowest) to 6 (highest). Levels of formal education for women ranged from 0 to 7 years (end of primary school) but very few women had attended school beyond grade 4. Detailed data on these and other independent variables are given in Kocher (*11*).

TABLE 1.—REGRESSION RESULTS FOR SUPPLY AND DEMAND
MODELS OF NUMBER OF CHILDREN EVER BORN
TO WOMEN CURRENTLY MARRIED AND MARRIED
ONLY ONCE IN RURAL AREAS OF
NORTHEASTERN TANZANIA, 1973[*][a]

(1) Independent variables	(2)	(3)	(4)	(5)
	Age group			
	20-29	20-29	30-39	30-39
Supply variables				
Number of years married		0.278^{b}		0.221^{b}
		(16.940)		(11.030)
Number of deceased children		0.678^{b}		0.691^{b}
		(7.870)		(8.245)
Length breast-fed last baby weaned (*months*)		$-.024^{b}$		$-.037^{b}$
		(4.698)		(4.186)
Polygynous marriage		0.058		$-.753^{b}$
		(0.371)		(3.592)
Demand variables				
Value of household crop production	-.001		0.000	
	(0.119)		(0.120)	
Building quality index	0.127^{b}		0.092	
	(2.628)		(1.307)	
Husband held wage-paying job	-.317		-.088	
	(1.709)		(0.307)	
Woman thinks there are advantages to large family	-.061		-.006	
	(0.367)		(0.026)	
Woman's religion is Christian	-.120		0.289	
	(0.608)		(1.072)	
Woman's amount of formal education	$-.102^{b}$		-.036	
	(2.655)		(0.513)	
Constant	3.060	1.516^{b}	5.357^{b}	2.872^{b}
	(16.570)	(8.970)	(20.420)	(7.799)
R^{2}	.035	.558	.013	.449

*Data are from James E. Kocher, "A Micro-economic Analysis of the Determinants of Human Fertility in Rural Northeastern Tanzania," Ph.D dissertation, Michigan State University, East Lansing, 1976, Tables 18 and 29.

[a] Regression coefficients are outside parentheses; t-ratios are inside parentheses

[b] Denotes significant t-ratio at .01 level

[c] Denotes significant t-ratio at .10 level

and the woman's years of formal education (coefficient was negative).[7] None of the coefficients for age group 30-39 were statistically significant.

The very large differences in the explanatory power of the supply models compared to the demand models indicate that the supply characteristics chosen here explain much about fertility levels and differentials in the study areas while the demand characteristics explain very little. The differences are so great that their significance is probably not diluted very much even after allowing for the probably greater accuracy with which women's supply characteristics were measured as compared to their demand characteristics.

Evidence from a few other studies in Africa is consistent with the results from the northeastern Tanzania study. Henin found that in the Sudan, settled rural communities had considerably higher fertility than nomadic groups of the same tribe (9, 10). Those communities which had been practicing settled agriculture for about two generations had higher fertility than those which had practiced settled agriculture for one generation. The higher fertility in the settled communities was caused almost entirely by supply characteristics (in the context of the framework used here). Women in settled communities tended to be younger at the time of their first birth and marital disruption was less common. They had better health, a lower incidence of sterility, and less pregnancy wastage. The incidence of polygyny was lower and average duration of breast-feeding was notably shorter.

Caldwell concluded that usually in West Africa fertility is lower in polygynous than in monogamous marriages and that in many rural areas polygyny is on the demise (5). Morgan reported that in Nigeria the custom of prolonged postpartum sexual abstinence ("lactation taboo")—which traditionally lasted about three years or until the child was weaned—is breaking down and in many rural areas birth intervals which traditionally averaged about four years are now declining (15). He also concluded that the increase in fertility resulting from a declining average interval between pregnancies (caused by shorter periods of breast-feeding and increasing bottle-feeding) probably more than offsets the decline in fertility caused by a rising age at marriage.[8]

Preston, after reviewing the results of several studies, including three from Africa, concluded that particularly for populations at low levels of development the death of a child who is being breast-fed has a strong tendency to reduce the birth interval between it and the next child due to the earlier resumption of ovulation (17). Snyder also found a strong replacement effect among a sample of women in Sierra Leone (20).

Comparison of the regression results of the supply model (Table 1) between age groups 20-29 and 30-39 confirms the expected differential effects of the various supply variables. Coefficients for all independent variables (with the exception of polygyny for ages 20-29) are statistically significant at the .01 level. However,

[7] The main reason that wealth is positively related to fertility is probably because it is also negatively related to the woman's age at marriage (and statistically significant). Thus, women who married relatively wealthy husbands are likely to have married earlier and to have had more births by any future date as compared to other women of the same age.

[8] This contrasts with results from the northeastern Tanzania study which generally indicate that the negative fertility effect of rising age of marriage exceeds the positive effect of shorter duration of breast-feeding (11).

number of years married has a larger positive effect on fertility for ages 20-29 than for ages 30-39. There is no difference in the effect of a child's death for the two age groups, length of breast-feeding has a 50 percent larger effect for ages 30-39 than for ages 20-29, and the effect of polygyny on the fertility of women ages 20-29 is essentially zero while for ages 30-39 it is -.75 and significant at the .01 level (implying that the independent effect of being married to a polygynous husband for women ages 30-39 is a reduction of 0.75 births as compared to women married to monogamous husbands). All of these differential effects on fertility between the two age groups are as expected.

Thus, all the results summarized above support the theoretical framework presented earlier. They indicate that in traditional societies and in rural areas which are still at relatively low levels of development, supply characteristics are more important determinants of fertility levels and differentials than are demand characteristics.[9]

EFFECTS OF SOCIOECONOMIC DEVELOPMENT ON FERTILITY

Changes in socioeconomic conditions in the four rural areas where the Tanzania study was conducted occurred at different times and the degree and nature of change varied from one area to another.[10] Around 1900 these were still traditional rural societies. Almost all residents still adhered to traditional religions. Very little commercialization of agriculture had taken place. Birthrates were high and death rates were probably not yet much below their historic average levels. Crude birthrates were probably close to 50 per 1,000 (with average unlikely that crude death rates were below about 40 per 1,000 (with average expectation of life at birth of about 25 years) giving a natural rate of increase of about 1 percent per year. Almost no one had received any formal education. Non-traditional forms of housing had only recently been introduced by European settlers but had not yet been adopted by Africans.

By 1973, crude death rates had declined to about 12-15 per 1,000 in the study areas, average expectations of life at birth were 50-55 years, crude birthrates were in the mid-40s (per 1,000), and the populations had increased four to five times in size since 1900. Relatively few residents still followed traditional religions, and most children were receiving at least some primary school education. Substantial numbers of households in some areas resided in non-traditional houses, and almost all households participated in the cash economy. By most standards, however, per capita incomes remained low; they were certainly below

[9] Snyder concluded that the results of a regression analysis of data from Sierra Leone supported the demand theory of the determinants of fertility (20). While it is true that the coefficients of his proxies for income (husband's education) and prices (wife's education) had the expected signs, the t-ratios were small and most were not statistically significant even at the .10 level. In the same model he has the supply variables women's current age, age at her first birth, and the mortality experience among her children. Almost without exception the t-ratios for these variables were considerably larger than those for the demand proxies, and they no doubt accounted for much of the R^2s (which ranged from .16 to .49). From his results one could justifiably conclude that supply characteristics are more important than demand characteristics in determining fertility in his sample of Sierra Leonean women.

[10] Two of the study areas were in Moshi District in Kilimanjaro Region. The other two were in Lushoto District in Tanga Region.

$100. While these were clearly not yet modern rural societies, they were no longer traditional. They had experienced considerable social, economic, and cultural transition although there were large differences among households in the extent to which they had participated in and benefited from these changes.

The supply variables had changed in the following ways:

1. Average age at first marriage had risen, due primarily but not entirely to primary schooling for women.

2. The duration of lactation had shortened.

3. The incidence of polygyny had declined, with the spread of Christianity as the single most important cause, but with women's education and general nontraditional influences also important.

4. Infant and child mortality had declined, although not as much as they might have in the absence of unhygienic bottle-feeding.[11]

It is not possible to know what the net effect on fertility has been or will be because this depends largely on the mix of the various changes taking place. Rising age at marriage reduces both fertility and number of surviving children, ceteris paribus. Earlier weaning increases both, except to the extent that it may cause somewhat higher young child mortality (due to bottle-feeding) in which case average number of surviving children would be lower. Declining incidence of polygyny increases both fertility and number surviving, ceteris paribus. Finally, reduction in average number of children dying (per woman) reduces fertility but increases average number of surviving children.

It seems probable that the net effect of the above changes in supply variables (resulting from development) is that the average number of surviving children will rise somewhat, since of the above changes only rising age at marriage unambiguously reduces number of surviving children. This conclusion—that the net effect of changes in supply variables is likely to be an increase in the average number of surviving children while the net effect on fertility could be change in either direction or no change whatsoever—was postulated in the theoretical framework.

The regression results for the demand models reported earlier indicate that demand variables have little immediate effect on fertility. This is contrary to the expectations engendered by most economic models of the determinants of fertility. There is some evidence from this study that development affects demand characteristics (income, relative prices, and preferences) and that these in turn affect parental demand for children (number of children desired), but the effects are probably delayed and not enough time has elapsed for them to have much impact on fertility in the study areas.

[11] Regression analysis of the determinants of survival rates generally gave disappointing results although there was a consistently strong positive relationship between survival rates and whether or not the mother delivered her last baby in a hospital. It appears, however, that luck plays a major role in differential infant and child mortality among households. The relationship between a woman's education and the survival rate among her children was expected to be positive but instead was consistently negative although not strong. One explanation might be the adverse effects of bottle-feeding on survival rates—early weaning and bottle-feeding being less common among uneducated women. Lindner, in a study of health and nutrition practices in the Kilimanjaro area, similarly found that infant and child mortality rates did not decline as a mother's education increased, and she concluded that this was largely due to earlier weaning and bottle-feeding (*14*).

The patterns of responses to two sets of questions suggest that over a long period of time the net effect of socioeconomic development in these study areas will be to reduce the number of children desired. The distribution of responses to questions about the advantages of both large and small families is consistent with the relative amounts of socioeconomic changes among them. The two areas which had experienced the most development over the longest period of time with the least unequal distribution of the benefits of development also had the highest proportions indicating that parents thought there were advantages to small families and that there were no advantages to large families. (These responses were not invariably combined.) In addition, for given numbers of surviving children, higher proportions of both women and men in the two more developed areas said they wanted no more children as compared to the other two areas.

Additional evidence is available from a discriminant analysis of the differentiating characteristics of respondents who said they wanted no more children compared to those who said they wanted more (11, pp. 143-72). The relationship of income to the desire for more children is generally weak and inconsistent. On the other hand, there is a strong and consistent relationship between views about the advantages of large and small families and the desire for more children. A much higher percentage of respondents who want more children also thought there were advantages to large families. The converse was also true.

Thus, although the evidence of changes in demand for children is weaker than evidence of changes in supply, it appears to show that the average number of children desired is declining and that this decline is associated with socioeconomic development.

CONCLUSIONS AND IMPLICATIONS

The reformulation of the theory of the determinants of fertility presented here postulates that supply characteristics of individuals and their societies dominate the determination of fertility levels and fertility variations in traditional societies and during early stages of socioeconomic development, and that demand characteristics become dominant only after parents experience sufficient excess supply of surviving children so that they are prepared to use contraceptives or other practices to successfully prevent future births. Results of the study of rural areas in northeastern Tanzania together with some evidence from other areas in Africa generally are consistent with this theory. Evidence from the Tanzania study indicates that demand determinants probably also change as a consequence of socioeconomic development but that the expected positive relationship between income and either actual or desired number of children is weak. The results suggest that development causes relative prices to shift in favor of other goods vis-à-vis children.

The probable net effect of development is to increase the average number of surviving children and to decrease the average number of children desired. The initial net effect on fertility could be either a rise, a fall, or little change depending on the strength of the relationships between various supply variables and fertility and the mix of changes in the supply variables. The very long-term effect of development is probably a decline in fertility, but the study areas in northeastern Tanzania have not yet reached this stage.

These results suggest that we must specify more carefully the stage of socioeconomic and demographic change or transition which the target population is in before deciding what types of policy interventions may be most suitable. For populations still at relatively low levels of socioeconomic development, policies which affect determinants of the supply of children are likely to have more immediate effect on fertility than policies intended to affect demand for children. Policies which raise the age at first marriage, discourage early weaning, and reduce infant and young child mortality all contribute to lower fertility. Presumably education—especially for women—and health care are likely to have the most favorable effect on these three supply variables. But educational content is perhaps as important as school enrollment itself. Curricula for upper level primary school students should include instruction in the value of prolonged breast-feeding, simple and effective family health care, and family nutrition and child-feeding practices.

Policies intended to reduce fertility by changing supply variables should be considered essentially short-term, probably "one shot" in character. There are limits to how much marriage age is likely to rise, mortality to fall, and weaning to be delayed, and these limits imply a rather modest maximum decline in fertility (perhaps 10 to 20 percent). This means that any long-term, sustained, and substantial fertility decline—for example, a reduction by one-half in average number born—can only come about by reduced demand for children accompanied or followed by parental use of effective means for more nearly matching actual number born with number desired—for example, the effective use of modern contraceptives. Policies which raise educational levels, improve health, raise incomes, and improve access to consumer goods which compete with children for parents' time and income will all speed the decline in demand for children.

Can this long-term process be circumvented or speeded up by providing family-planning services and promoting the values associated with their use? The tentative answer suggested by this analysis is, "perhaps yes, but only to a limited extent and the timing has to be right." It appears that some development would have to take place to change supply and demand for children enough so that a sizable proportion of parents in later childbearing ages will experience excess supply and want no more children. Family-planning programs introduced into rural areas which have experienced little or no socioeconomic transition will probably find little demand for their services. Because their purposes run counter to traditional values, they may generate an adverse response and perhaps make it more difficult to promote birth control successfully at a later, more suitable time.

On the other hand, once a considerable amount of socioeconomic transition and economic development has taken place, there may very well be substantial and increasing numbers of parents—particularly women—who could be persuaded to use contraceptives. A well designed and implemented program which results in a satisfied first group of participants might find the demand for services increasing as a growing proportion of women feel that they have too many children and would like to prevent additional births. It seems unlikely that a family-planning program could cause parents to feel that they have too many children, or feel that they want no more, which is more likely, but a good

program might be able to exploit such feelings when they exist. Such a program might find acceptors now in the more developed areas of northeastern Tanzania, like Moshi District. It seems most unlikely, however, that there would be much market for family-planning services in the least developed of the four study areas.

A program promoting the advantages of family planning for child spacing, however, as Tanzania's family-planning program does, may reduce fertility simply by lengthening the birth intervals. If this program is accompanied by expansion of maternal and child health care services which promote breast-feeding, later weaning, and better mother and child nutrition, the consequential reductions in child mortality, operating through the supply mechanism, could cause parents to reach "the point of excess supply" where they are willing to consciously limit births.

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