

Perspectives
on Population Policy
and Research

RONALD G. RIDKER

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Contents

Preface

1. *Perspectives on Population Policy and Research* /
RONALD G. RIDKER
2. *Income, Wealth, and Their Distribution as Policy Tools in Fertility Control* / JULIAN L. SIMON
3. *Direct Economic Costs and Value of Children* /
ROBERT G. REPETTO
4. *The Economic Value of Children in Peasant Agriculture* /
EVA MUELLER
5. *Education and Human Fertility: Sociological Perspectives* /
DONALD B. HOLSINGER AND JOHN D. KASARDA
6. *Population Growth and Educational Policies: An Economic Perspective* / DENNIS N. DE TRAY
7. *The Effects of Nutrition and Health on Fertility: Hypotheses, Evidence, and Interventions* / WILLIAM P. BUTZ AND
JEAN-PIERRE HABICHT
8. *Interrelationships Between Mortality and Fertility* /
T. PAUL SCHULTZ
9. *The Roles of Rural Women: Female Seclusion, Economic Production, and Reproductive Choice* / RUTH B. DIXON
10. *Female Employment Creation and Family Size* /
JAMES L. MCCABE
11. *Mass Media and Modern Consumer Goods: Their Suitability for Policy Interventions to Decrease Fertility* /
DEBORAH S. FREEDMAN
12. *Residential Location and Fertility* / DAVID GOLDBERG

Conference Participants

References

Index

Perspectives on Population Policy and Research

RONALD G. RIDKER

Within the broad spectrum of proposals aired at the Bucharest World Population Conference in 1974, the two policies most commonly advocated for reducing population growth in poor countries were more rapid economic growth and more effective family-planning programs. The former, it is believed, creates the desire for smaller families and the latter provide the means. There is evidence to support both positions. No country has ever achieved a high standard of living without experiencing a significant decline in its birth rate. Nor has any sizable country in modern times experienced low birth rates over sustained periods in the absence of significant economic growth. One can argue about the degree to which these generalizations apply to this country, or that, and can find historical counterexamples.¹ Moreover, some hopeful signs in one or two of the developing countries indicate that birth rates may fall in the next few decades before general economic development occurs. But as generalizations go in this field these two are better than most.

There is also growing evidence from a variety of countries which suggests that easier access to the information, services, and supplies provided by modern family-planning programs is effective in reducing the gap between desired and actual family size (Berelson 1974; IBRD 1974, ch. 5; Mauldin 1975). The extent of the effect in relation to the

¹New evidence on the demographic transition in nineteenth-century Europe indicates that in some areas birth rates began declining before the spread of a number of important aspects of development, such as rising standards of living, industrialization, urbanization, and declines in mortality. This fact, plus the substantial differences between nineteenth-century Europe and today's less developed countries, should make us pause before assuming that development today is either a necessary or a sufficient condition for a decline in birth rates, despite the high correlation between the two. For an excellent summary of this viewpoint, see Teitelbaum (1975).

effort involved is difficult to judge because of substitutions between methods, simultaneously occurring social and economic changes that also influence family size, and difficulties in measuring levels and quality of effort. But there is no reason to doubt that such programs are capable of reaching and influencing those persons who are already motivated or easily encouraged to have small families.

For countries with good prospects for rapid socioeconomic development and reasonably good administrative infrastructures, sustained efforts in both these directions may indeed prove to be sufficient, though the time lags involved could be substantial. The most difficult problem arises in those countries that cannot achieve adequate rates of development in the near future, just because of rapid population growth. In such cases, the number of persons desiring small families may not grow fast enough to give even the best-run family-planning program enough to work on. If population growth is to be curbed reasonably soon, such countries must search for a third approach. This volume is dedicated to that search.

Each of the essays presented here focuses on one hypothesized socioeconomic determinant of fertility believed to be amenable to policy manipulation. The authors were asked to review what is known about the linkages between these determinants and fertility, to consider policies that might affect these determinants in a direction favorable to a decline in fertility, and to discuss research needs and possibilities to fill gaps in our understanding of these linkages and the efficacy of possible policies. Not all determinants and policy choices have been discussed. In general, we have limited ourselves to possibilities of changing the environment within which marital and parental decisions are made so as to increase the costs and decrease the benefits, broadly defined, that are perceived to be associated with the bearing and rearing of children, focusing on those that seem compatible with other goals, such as economic development, political stability, and individual freedom of choice. Within this set the choice has been further limited by a number of practical considerations, including the availability of information and hunches about promising possibilities. For example, legal and legislative changes pertaining to such factors as the age of marriage, school attendance, and child labor were set aside on grounds that while they do reinforce and sanction changes in attitudinal and behavioral patterns that are already under way, they cannot in general *initiate* such changes in an environment that is not ripe for it. In contrast, we have given substantial, though far from exclusive, emphasis to economic variables, since much of the business of government is to manipulate these variables. While many of them seem to be less strongly associated with fertility than some psychological and sociological variables, the policy

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emphasis of this volume makes us much less interested in explanatory power than in the "instrumental" capacity of a possible determinant of fertility.

Our focus is on poor countries that believe they have a population problem and are actively trying to do something about it. Because of the paucity of data on any one country, however, we must utilize evidence wherever it can be found. This problem—as well as the proclivities of some of the authors—has led to a greater emphasis on research needs and findings than on policy. Stronger emphasis on matters of policy would require getting into specific cultural, economic, institutional, and political issues within a particular country or even a region of a country—which it would have been highly inappropriate for us to attempt at the distance from which our observations were made. The governments involved must take the responsibility for utilizing the available evidence and sponsoring the additional studies necessary to turn general suggestions of the type presented in this volume into specific sets of policies that make sense in each locale. We shall be satisfied if the volume contributes to that process. Indeed, one indicator of success will be the rapidity with which this volume is made obsolete by more detailed, policy-oriented studies in specific countries.

Income and Its Distribution

A wide array of results are found in studies that attempt to relate income to fertility. Some find a positive, others a negative, and still others a curvilinear relationship as family income rises from low levels; and in a few studies no relationship at all is found. Part of the reason for these mixed results is the poor quality of the available data. *Income*, for example, should mean the full family income a couple expects to receive over their lifetimes, not the money income received in a particular year and certainly not some per capita regional or national average. But the most important reason is a failure to separate statistically the demographic effects of income from those of other variables. Practically all socioeconomic variables that might be important in explaining fertility are correlated with income; unless these variables are identified and measured and adjustments are made for their effects, one cannot properly assess the pure effect of income, however carefully defined and measured it may be.

Julian Simon tries to make sense of these studies by dividing them in two groups: those that are more or less appropriate for measuring what he calls the short-run, direct effects of income and those that come closer to measuring the long-run, total effects. The latter include the

effects on fertility that operate indirectly through such variables as education and health, which are also influenced by the change in income. Since the immediate effect of an increase in income is to make it easier to finance marriage and support children, one would expect that the short-run, direct effect is positive: more income encourages larger families. This is just what Simon finds. In contrast, he finds that the long-run, total effect tends to be negative, at least above the lowest income levels. While a number of hypotheses have been put forward to explain these long-run results—and we shall come back to some of them in other sections—statistical problems make it difficult to put forward any explanation in which great confidence can be placed.

Unfortunately, these findings are of little help in making policy recommendations. The short-run effect is positive rather than negative, and to take full advantage of the long-run effect requires general economic development, which presumably is being pushed as fast as it can be in any case. But more to the point, these findings are too general and unspecific to be useful for policy. The effect of a change in income is likely to vary depending on whose income is being changed (which socioeconomic groups and which family members), how it is changed (through transfers, changes in the labor market such as increased wages or opportunities for more work, or changes in the ownership of wealth, for example), whether the change is considered transitory or permanent, and whether it is provided without reference to fertility behavior or is offered upon the condition of a change in such behavior (that is, as an incentive). It is at this level of detail that we are likely to find useful policy suggestions. For example, while the short-run effects on fertility of an increase in adult male earnings and opportunities for child labor are likely to be positive, both the short-run and the long-run effects of an increase in female wages or opportunities for work outside the home could well be strongly negative.² Similarly, there is good reason to believe that a conditional transfer of income will have a strong negative effect on fertility, even if the underlying pure income effect is positive.

Such issues are discussed later in this chapter. In the remainder of this section we concentrate on the question of which family incomes are being raised. Specifically, what difference would a change in income distribution have on fertility rates?

Recent thinking about economic development has shifted somewhat away from an exclusive emphasis on general economic development

² Such results are found in a number of U.S. studies. See De Tray (1972), Cain and Weinger (1973), and Lindert (forthcoming, ch. 5). But also see chapter 10 in this volume for a contrary view.

toward a concern for the poorest segments of the population. Frustrated attempts to raise national growth rates to acceptable levels in some countries, growing evidence that the poor often do not participate in whatever national growth there is, and recent concerns that the rural poor may *have* to be enlisted in the development process if adequate supplies of food and agricultural raw materials are to be forthcoming for other segments of the population have all come together to explain this new emphasis. Parallel with this shift in focus of development programs have come suggestions that redistribution of income might also encourage a more rapid rate of decline in the birth rate.³ Typically, the poorer 60 percent of households receive 30 percent of the income but have fertility rates some 50 percent higher than the richer 40 percent of households. If socioeconomic development were concentrated here, perhaps the birth rate could be reduced by a larger amount per dollar of investment than it could by means of an across-the-board approach.

The little evidence that is available is certainly encouraging, as Simon's review indicates. But several questions can be raised about this approach. First, why *should* a redistribution of income in favor of the poor be effective in lowering their birth rates? If the argument is based on the assumption of emulation of upper-income-class norms, it is not at all certain which way completed family size would be affected. Is it the desire of lower-income groups to emulate the consumption patterns or the completed family size of the rich? If the former, the poor should now be having *fewer* children than do the rich, since larger shares of their incomes must be laid out in attempting to achieve those expenditure norms per child, and in this case an increase in their income would raise their fertility. If the latter, fertility would fall with an increase in income as the poor acquired the knowledge and means to purchase modern contraceptives. But if inadequate knowledge and contraceptive supplies are the principal reasons that the poor have more children than the rich, surely a cheaper way to close this gap is through a focused program of family planning. If the argument is based on the long-run, total effects of the change in absolute level of income, as Simon suggests, we must ask whether these total effects are likely to occur as a consequence of income redistribution alone; that is, without concomitant changes in the provision of social overhead capital and other structural changes—perhaps even including urbanization and occupational changes—which are normally associated with modernization and development.

³ See chapter 2 in this volume for references to the literature. In addition, the World Bank has recently added a strong voice to this chorus. See IBRD (1974, ch. 5).

6 POPULATION AND DEVELOPMENT

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Second, the evidence is based on data that do not permit us to answer such questions. It is virtually impossible to hold cultural and institutional variables constant in cross-country comparisons, and data from the national level, while suggestive, provide little basis for indicating whether it is the relative or the absolute income effect of the redistribution that is important or which of the many variables normally correlated with income have also to be changed to bring about the desired effect.⁴

Third, as Simon demonstrates, the specific measures utilized to implement the redistribution are likely to be more important than the redistribution itself. For example, on the basis of survey data indicating that family size among peasants increases with landholdings, he suggests that the net effect of land reform could be an increase in aggregate fertility. This finding is, of course, very shaky, and as Eva Mueller points out, uniformly small holdings, as they exist in Taiwan, would reduce both the need and the opportunities for employment of children in peasant societies. The most promising approach, Simon believes, is redistribution of educational facilities, providing in particular more primary- and secondary-level facilities in rural areas.

Such redistributions, however, are difficult to implement, and their effects on fertility could take several decades to be felt. For these reasons, but even more important because redistributions involve political acts of profound dimensions, it is unrealistic to believe that they will ever be proposed for the primary purpose of reducing fertility.

The overall impression with which one is left is that unconditional transfers of income, while they could well be effective in lowering fertility in the long run, operate through a wide variety of other variables associated with modernization and development. If one is to speed up the process, either these other variables must be identified and the most critical ones changed as a package along with income (or the capacity to produce income), or the transfer must be made conditional upon an appropriate fertility response. This is a theme to which we will return after reviewing the possible impact of a number of these other variables.

Economic Value of Children

No one would claim that children are desired solely or even primarily because of their value as productive economic assets, but it would be a

⁴ An exception to this statement may be a recently completed (but not yet published) study by Robert G. Repetto of households in Puerto Rico in which he tries to separate the relative from the absolute income effect and finds that the latter is more important.

rare case in which this consideration was entirely absent. And so long as it is present to some degree, the economic benefits and costs of children are worth investigating, for they are far more capable of being influenced by policy than are most of the noneconomic benefits and costs associated with children.

Given the broad view of their field often taken by economists, practically everything to be discussed in this volume affects the economic value of children. But here we consider just two principal components: the net contribution that children make to the family's income through their work (that is, their production minus their consumption) and the contribution they make later in life to the support of aging parents. Unfortunately, the available evidence is not only spotty and scarce, it is also ill suited for policy analysis. It is most useful for answering questions on the extent of the economic contributions and costs of children, while the fundamental need, as Repetto points out, is for information on how fertility changes when these economic benefits and costs change, no matter what the extent or even the sign of the net contribution. Still, an understanding of the economic role played by children may provide some hints about the feasibility of different policy alternatives and about the likely value of additional research to generate the more appropriate kinds of data.

Attitude surveys, anecdotal evidence, and even some a priori reasoning suggest that raising children provides some net economic benefits to parents, at least in peasant societies. But after carefully sifting through the evidence Mueller finds that children are usually a heavy economic burden. Up to some age between fifteen and nineteen they produce substantially less than they consume; indeed, aggregate production does not equal aggregate consumption, even by a male, until some time in his twenties, when he begins to have his own children to support. This finding is particularly significant because, first, Mueller makes an extreme effort to find positive asset values for children at birth (for example, by choice of assumptions on hours of work, wages, and consumption, and by not discounting) and, second, because if such values are negative in peasant societies, they are surely negative for the rest of society, in particular for urban areas where the costs of child rearing tend to be higher and the possibilities for contributing to family income at early ages tend to be lower.

This conclusion is supported by evidence indicating that in developing countries children under the age of fifteen do little economic work (that is, work contributing to marketable output) and that their productivity when working, even during peak seasons, tends to be low (productivity being judged according to the wages that would be received for the same work in the marketplace). It can be argued that this defi-

tion of productivity excludes housework by children, freeing the mother for additional economic work. But since children also create the need for additional housework, a correction for this factor is unlikely to change the overall result significantly. It can also be pointed out that the use of wages, even during peak seasons, represents an underestimation of the importance of having children available to fill in when needed. But it is difficult to believe that day labor hired during peak seasons would be more expensive than children who have to be supported throughout the year. School attendance by children under the age of fifteen certainly provides part of the explanation for low labor-participation rates by children; but low attendance rates and the possibility of fitting farm work in around school work suggest that this is not the principal reason. The most likely and obvious explanation for these findings of low child labor-participation rates is, simply, that labor in general is in excess supply in the countrysides of the developing countries with which we are dealing. If this analysis is correct, we must reckon with the likelihood that efforts to increase agricultural output through providing the necessary capital and modern inputs, unless accompanied by other offsetting changes, will result in increased employment opportunities for children as well as for labor in general.

Combining this evidence with that reviewed by Repetto on the extent to which changes in the demand for child labor might be expected to change fertility, we must conclude that the scope for policy intervention at this point is quite limited. Few studies deal with the change in demand for child labor per se (as opposed to changes in child labor-participation rates which are influenced by supply as well as demand); most researchers, moreover, fail to isolate the effects of other variables such as school participation and family income (thereby leading to incorrect inferences about lines of causation). As a consequence, Repetto has little to work with. But the relevant bits and pieces of econometric, historical, and sociological materials combine to suggest that while a decline in demand for child labor will lead to a decline in fertility, the effect is likely to be small and the time lags involved quite long. Given Mueller's findings that child labor-participation rates are already low, plus the likelihood that investments in the agricultural sector may increase the demand for child labor, there is little room for manipulating this variable by itself.

The evidence with respect to old-age support is mostly qualitative and indirect. As Repetto points out, it emerges strongly in attitude surveys in countries where strong family ties are traditional, but little is known about the actual extent of the transfers. Mueller finds that older rural males continue working on family farms until very close to the

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age of death and thus may not be receiving substantial transfers from their children. But little is known about the kind and productivity of the work involved or whether this finding is applicable to those without the opportunity to work on family farms. Moreover, labor-participation rates for older women are considerably lower than for elderly men, suggesting that some transfers must be forthcoming at least for them.

Perhaps more to the point, one can ask whether investments in children are the best way to provide for one's needs in old age. A plausible case can be made that they are not: there is no certainty of a child's surviving and being willing and able to provide support; there are periods during the life cycle when surpluses are easier to accumulate; and there are mechanisms available to transfer these surpluses to later stages in life. With respect to the last point, Repetto argues that markets for the transfer of capital and land exist, that rates of return in these markets are high, and that methods are available by which even those with relatively small amounts of savings can take advantage of these opportunities. Land could be purchased in small increments; small additional amounts of agricultural output could be set aside for sale in the peak price season; and even those in debt could increase their uncommitted income significantly simply by reducing their indebtedness.

On the other hand, there are substantial risks involved in attempting to save and transfer surpluses from one period to another over one's lifetime. Farm investments are illiquid; money and jewelry can depreciate or be stolen; commercial institutions can go bankrupt. Indeed, because of inflation and the risks of theft, fire, floods, confiscation, and other calamities, the perceived, long-run rate of return on many possible investments may well be negative. At least the peasant may feel that the situation is too dangerous to rely on any one approach, that a better course of action for him may be to save *and* to have children in case one of these approaches fails. In fact, the best plan may be to try to have a son when the father is between the ages of forty and forty-five, for at that point the probability of the father's surviving to ripe old age is high, and the probability of the child's surviving long enough to help his parents (that is, until he marries and has his own children to support) is fairly good. In addition, the cost of bringing children into the world is not very high, and the costs of supporting them are spread over at least ten to fifteen years. Accordingly, even if the economic return for having a child is negative, it may be less negative than alternative investments.

But all such arguments may be overshadowed by the fact of long widowhood in societies where women have little economic power and even less knowledge of economics. To them, children, especially sons,

10 POPULATION AND DEVELOPMENT

may appear to be all that will save them from destitution after their husbands are dead, no matter what the economic facts may be.

This area should be a fruitful one for research, and both Repetto and Mueller provide good suggestions for further work. In addition, the findings that have already been made have several interesting policy implications that do not depend on the results of further research. Efforts to improve access to savings institutions and to reduce the risks and improve the returns from such investments would be helpful in reducing the pension value of children as well as being useful for general economic development. So, too, would the promotion of life insurance, private pension plans, and other contractual savings arrangements, since they tend to bring about a net increase in the average rate of savings. Life insurance for children, or at least for the oldest son, would have an even more direct effect on the pension value of children. Government-sponsored social security programs would also make sense, but they could be quite costly unless they were made conditional on the number of children a couple had.⁵

Education

The linkage between education and fertility poses a paradox for both researcher and policy maker. On the one hand, probably no other socio-economic variable has a stronger negative association with fertility. Parents with more education have smaller families and parents whose children have more education also have smaller families. These relationships hold in both cross-sectional and time-series studies at both the national and the family levels and whether or not other important variables, such as income and place of residence are controlled. While in some studies it has been found that the relationship is positive for families with only a few years of primary education—suggesting the possibility that it is necessary to achieve a certain threshold before the negative impact takes hold—these are exceptions to the general impression to be derived from reviews of the literature. On the other hand, research has not provided

⁵ Mueller argues that the cost need not be great, since men continue working until close to the age of death. But it is likely that they do so out of necessity, and that if social security were provided to them, they would retire somewhat earlier. Moreover, if the effect on the birth rate were not significant, it would be difficult for the government to accumulate the surplus to pay the pensions. This problem could be overcome if the size of the pension varied inversely with the number of surviving children. Some suggested ways to do so are provided by Ridker and Muscat (1973).

adequate explanations for these correlations, with the consequence that most policy recommendations in this area remain on uncertain ground. Do the correlations imply causation or are other factors—such as industrialization and urbanization—at work to induce parents both to want fewer children and to give each a better education? Is the effect direct, or does it operate through other variables, such as female labor-force participation and wages, that might be influenced by policy more easily and quickly? Does education operate through changes in attitude, through changes in lifetime earnings potential, or both? Does its effect arise only when other factors are present, so that a number of policies—for example, education and jobs—must be combined for any to have a significant effect?

This volume presents two major attempts to answer these and related questions: the contribution by Donald B. Holsinger and John D. Kasarda, written from a sociological point of view, and the chapter by Dennis N. De Tray, written from the vantage point of an economist. In addition, a number of other contributions—in particular those of Robert G. Repetto, Eva Mueller, and Ruth B. Dixon—touch on educational policies in significant ways. It is difficult to summarize these diverse and sometimes conflicting contributions. I will try to do so by organizing the material in the following way. If parents could be persuaded to keep their children in school longer, what would be the likely effects, first, on the parents' desire for additional children and, second, on the children's desire for offspring when they reached reproductive age?⁸ Third, to what extent are these effects associated with quantity of schooling and to what extent are they, or can they be, influenced by changes in the content? Fourth, how can parents be induced to keep their children in school longer or to provide them with a better education? In answering the first two questions, we divide the effects into three categories, the effects of changes in tastes and preferences induced by the education, income and wealth effects, and the effect on relative prices and costs.

The Effect on Parents' Desire for Additional Children

It is difficult to see what kinds of effects on parents' tastes and preferences might arise solely by providing more education to their children,

⁸ An additional question pertains to the possible effects of providing more education for parents. But since there was general agreement that such a policy would not be as effective as providing additional education for their children, it is not discussed here. De Tray, however, does include a brief discussion of adult education policies in chapter 6.

except on subtle levels that can probably be ignored. But there are several income and price effects that could be important. First, the additional years of schooling place two burdens on the family budget: they reduce the income which children would otherwise contribute to the family and, depending on the way in which the costs of education are divided between private and public budgets, they increase the direct cost of rearing children. Second, the additional schooling increases the parents' expectations of receiving larger income transfers from a given child later in life, reducing the number of children needed to help with old-age security. And third, if the effective price of schooling were reduced, it would become more profitable for parents to invest more in fewer children, substituting "quality" for "quantity," along the lines suggested by Repetto and De Tray.

Doubts can be raised about the importance of these effects, especially in peasant societies. Mueller, for example, argues that up to the age of fifteen the work contribution of children is small and can be fitted in after school and during vacations and that beyond that age it is not feasible in poor peasant societies to consider significant extensions of universal education. The direct costs of sending children to public schools, especially in primary years, is typically small and in any case is offset by the baby-sitting function served by schools (although the value of this service is undoubtedly small where older children are available to care for younger). Moreover, economic transfers from better-educated children later in life are far from certain, not only because of high death rates but also because educated children are more likely to leave the extended family network of ties and obligations. Unless death rates fall and the net returns to education are increased significantly, parents may not be willing to give up security in numbers for improvements in quality. In any event, the time lags involved in trying to persuade them to do so are likely to be substantial. Nevertheless, even small changes add up over time. Since, as discussed below, the cumulative effects could be quite substantial after some decades, policies that might induce such shifts should not be ignored.

The Effect on Children's Subsequent Fertility

Here we can be somewhat more confident of finding a significant negative effect on fertility. First, there are a number of attitudinal changes associated with the acquisition of education that are likely to reduce the desire for a large number of offspring, independent of any effects induced by changes in income and prices. Education, according to Hol-

singer and Kasarda, increases exposure to appeals in the communications media aimed at encouraging family planning; increases aspirations for upward mobility and the accumulation of wealth, making one less interested in—or at least more desirous of postponing—the rearing of a large family; imparts a sense of ability to control one's own life and environment, thereby making family planning and the use of contraceptives appear less foreign; and encourages one to think about nontraditional ways of living one's life.

Working in the opposite direction is the income or wealth effect of education, which, independent of all other effects, makes it possible for the better educated to afford large families. But as De Tray points out in reviewing studies attempting to separate and measure the income and relative-price effects, the latter are all negative and appear to be sufficiently important quantitatively to offset the positive effects of income on fertility. These relative-price or cost effects are thought to be of the following types: education of women enhances opportunities for employment that are competitive with having and rearing children, thereby increasing the opportunity cost of children. Education of both parents tends to raise the educational norm that they are expected to provide to their children, thereby raising the cost of child rearing. It also seems to increase the capacity for effective use of contraceptive devices and for communication between husband and wife about such sensitive matters as family size and the use of contraceptives, thereby lowering the effective cost of achieving a given family-size norm. Since school and marriage are generally considered incompatible, the provision of more education tends to delay the age of marriage. Education helps parents reduce child mortality, thereby lowering the number of births required to achieve a given family-size norm and encouraging investments in quality rather than quantity, as discussed below. Finally, as a consequence of increased education, parents are more likely to be able to take care of themselves in their old age, thereby needing children for this purpose to a lesser extent.

As can be seen from the authors' valiant efforts to find quantitative information on the magnitude of these effects, empirical data are scarce and generally of poor quality. For example, as Holsinger and Kasarda have pointed out, years of schooling completed, rather than school days attended, is almost invariably used as a proxy for quantity of schooling, even though there is likely to be a low correlation between the two, especially across country and regional observations. Nevertheless, it appears likely that all these effects acting in concert could have a sizable effect on the fertility behavior of those receiving additional schooling. The time lag, of course, is quite long.

Content Versus Quantity of Schooling

An additional difficulty with the work on education and fertility is the nearly universal emphasis on quantity (however measured) as opposed to content. This is the emphasis of the authors in this volume as it is of other writers on the subject. De Tray mentions the importance of type of education and curriculum only as a caveat, and Holsinger and Kasarda delve into these issues only with respect to what has been termed *population education*. As reasons for not doing so to any greater extent, they point to the dearth of research on the topic in developing countries and to the suggestions to be found in the few relevant studies which do exist that quantity is more important than content. For certain of the effects discussed above—for example, the baby-sitting services provided, earnings forgone, and the postponement of marriage while attending school—time spent in school is clearly more important. But it is difficult to believe that it is so—or that it needs to be so—with respect to any of the other effects that operate through changes in attitude, self-perception, and the productivity of human capital. Negative findings about the effects of educational content in this area are more likely to be explained by inadequate measuring devices, lack of variation in content between schools, and the difficulty in linking content imparted at one point in the life cycle to behavior in another.

Two types of change in content have at times been suggested: the introduction of population education and literacy programs. The first, according to Holsinger and Kasarda, holds some promise, though it has not yet been tried to any significant extent, but they find no indication that literacy per se—that is, apart from the general effects of more schooling—has any significance. It can be argued that literacy makes contraceptive information more accessible and enhances the status of women, but it probably has to be part of a broader program the other components of which are necessary for literacy to be useful.

Apart from such specific components of educational programs, a number of more general changes in content could be considered, both for their value in achieving other societal goals as well as for their effects on fertility. It goes without saying that educational programs could be geared more toward advancing the productivity of human capital. Female labor-force participation could be fostered by setting up specific programs and training schools for girls and more subtly by portraying women in productive, nontraditional roles. The sense of being able to control one's own life can be fostered by improving the individual's problem-solving capacity (as opposed to emphasizing rote

learning and memorization) and by projects emphasizing doing and making and then observing the consequences (as opposed to passive absorption of information). People can be encouraged to think about nontraditional ways of living by learning about the variety of ways that people in other cultures both within and beyond the borders of their own country handle common human problems. These examples are meant only as illustrations. More specific analyses are necessary to determine appropriate interventions in given contexts. All we can do here is point out that this is a neglected and difficult, but challenging and potentially fruitful, area for further work.

School Attendance

While the problem of inducing parents to provide their children with more and better education is discussed in both chapters on education, we will give only brief space to it here, not because of its lack of importance but because, once again, we cannot move far beyond generalities without digging deeply into specific cases.

Perhaps the principal need everywhere is for more and better facilities and teachers, but given the budgetary constraints that exist in low-income countries with rapidly growing populations, these deficits will not be made up quickly. Under the circumstances, any additional resources made available to the education sector must be allocated with care. There was general agreement that highest priority should be given to primary education in poor rural areas where birth rates are highest. One objection to such an allocation policy is that it seems to reward high fertility rates. While this is true in one sense, it is difficult to believe that parents would decide to have more children in order to influence the geographic distribution of educational facilities. Nevertheless, this objection could be eliminated and an immediate antinatalist effect introduced by allocating facilities within this high-priority area on a conditional or incentive basis—that is, to those rural villages meeting certain family-planning targets.

But lack of facilities is not the only problem. One important indication of this is the observation that available facilities are frequently underutilized. There are four possible ways to ameliorate this situation. The first, compulsory attendance laws, can be set aside as unworkable. The second, subsidies or monetary incentives for attendance, does not seem promising in view of budgetary stringencies, plus the possibility of a significant positive income effect on fertility in poor areas. Here again, however, these problems could be overcome in large measure by providing the subsidy as an incentive, given only to those families with

fewer than a certain number of children, as is being tried experimentally in Taiwan (Finnegan and Sun 1972, Wang and Chen 1973). A third possibility is to improve the quality of the education provided and increase its relevance to the individual's daily life. A peasant has little incentive to keep his child in school if he believes that the child is not receiving much of value. But there is another way to enhance the value of education, namely, to change the environment in ways that increase the *need* for education. An education is of little value to a girl who will never take a job; even literacy is of little value unless there is some need to read. In a broad sense, urbanization and industrialization serve this purpose. So do reductions in infant and child mortality since, as discussed below, they have the effect of increasing the rate of return on investments in human capital. But it may be possible to affect the situation in more specific, deliberate ways. Suppose, for example, that jobs in the education and health sectors requiring a certain number of years of schooling were made available to girls. Such a change could make the difference between sending and not sending a daughter to school. Undoubtedly other possibilities for specific interventions of this type can be found. The principal point, however, is that one must look outside as well as inside the education sector to find ways of inducing parents to provide more education for their children.

Unfortunately, there is little or no evidence available to support all these presumptions and suggestions. As indicated at the outset, while we know that educational attainment is strongly correlated, inversely, with family size, we know precious little more; this information is of little help in formulating policies within this sector. All the suggestions made above, therefore, should be taken as hypotheses to be tested, and research priorities in this area should be developed accordingly.

Mortality, Morbidity, and Nutrition

It is frequently alleged that a fall in child death rates and better health and nutrition are necessary preconditions for a fall in fertility.⁷ Cross-country and historical evidence tend to support this proposition. But what role do these health-related factors play independent of changes in income, education, and social structure? How much effect can policies aimed at reducing mortality and morbidity and improving nutrition levels be expected to have on fertility, and with what time lags?

It is clear that pure biological linkages cannot explain the positive correlation between morbidity and mortality on the one side and fertility on the other. They might even suggest the opposite, that improve-

⁷ On the relation with nutrition, a somewhat less well-known argument, see Berg (1973).

ments in health, while not directly increasing the number of births, do increase the *capacity* to have more children. There is good evidence that raising the nutrition level of females results in earlier menarche, later menopause, and shorter periods of postpartum amenorrhea in nursing mothers. The linkage between male fertility and morbidity probably works in the same direction, although William P. Butz did not find any evidence to this effect. Reductions in adult mortality, because they decrease the number of widows and widowers of reproductive ages, also increase the potential for more births. Only reductions in deaths among nursing infants point in the opposite direction, since the period of lactation and postpartum amenorrhea are thereby made longer; but the contraceptive effect of this change is far from sufficient to account for the observed declines in birth rates as infant death rates have fallen. Another biological linkage is that between lower birth rates and improvements in health, both for the mother and her children. While this direction of causation also helps explain the positive correlation found in cross-sectional studies, our emphasis here is on causal linkages running in the opposite direction that might be useful for policy making. If the correlation between morbidity, mortality, and fertility is to be explained, one must look for behavioral changes. Four in particular have been emphasized in the literature reviewed by Butz and Jean-Pierre Habicht and by T. Paul Schultz.

First, setting aside responses to uncertainty for the moment, a decline in child mortality can be expected to increase desired family size, since the expected cost of rearing a survivor is thereby reduced and the benefits increased. An improvement in general health would work in the same direction.

Second, a decline in child mortality means that fewer births are required to achieve a given number of survivors. Schultz shows that, given plausible assumptions about response elasticities, the net effect of these first two factors is to reduce births. But this decline in births is unlikely to be sufficient to offset the increase in population growth resulting from the decline in mortality unless additional behavioral factors are brought into play.

One such additional factor is the response of parents to uncertainty. A plausible response is overcompensation: parents may well prefer to have too many rather than too few surviving children. If this is the case, a reduction in child mortality, which is generally accompanied by a reduction in uncertainty as well, would reduce births by somewhat more than is implied by the first two factors alone.

Fourth, and perhaps most important, improvements in the rates of mortality and morbidity and in nutrition at all ages increase the returns on investments in human capital in relation to investments in nonhuman

18 POPULATION AND DEVELOPMENT

capital and on investments with long gestation periods in relation to those with shorter ones. These effects should encourage parents to invest more in both their own and their children's education and health and make them willing to have fewer children in order to finance such expenditures. They could also make it somewhat more attractive to postpone marriage to the extent that marriage and early child rearing are incompatible with investments in education.

Other possible effects mentioned by these authors include the need to save more for old age and a more rapid rate of increase in family income and wealth in the course of time. These conditions might also reduce fertility, the former because it increases the need to conserve on current consumption and the latter because it is akin to Simon's long-run effects of income (in this case increasing child-expenditure norms, thereby inducing an even greater shift from quantity to quality).

While all these effects are plausible and more or less consistent with the evidence, there is very little information on their quantitative magnitude and none that adequately separates the various effects and lines of causation, including the biological, from each other. It is typical in less developed countries to find that the decline in child death rates precedes the decline in birth rates by at least a decade and that the decline in the latter compensates for less than the total decline in the former, leaving family size and the growth rate of population somewhat larger. But the variance around this average is sizable—Schultz, for example, finding that in about half the studies he reviewed response rates in excess of unity are implied—and an explanation for these differences is lacking. One cannot go further than this with the data, virtually all of which are cross-sectional, and methods available at present. With these difficulties in mind, Schultz and Butz and Habicht devote considerable space to the development of theoretical models for statistical analysis that define what data are necessary and how they should be utilized.

At one level the policy implications of these authors' materials are relatively straightforward. It seems reasonably certain that improvements in medical and health care will eventually encourage some decline in fertility. Beyond this statement, however, lie many unanswered questions, particularly concerning the extent and speed of the decline, the resulting effect on the population growth rate, and the overall cost-effectiveness of alternative methods of improving medical and health care. The authors address these questions only peripherally, Butz and Habicht reviewing the reasons for integrating health, nutrition, and family-planning services and Schultz surveying the reasons for the decline in mortality in less developed countries and concluding that

future declines will depend more heavily on improvements in general economic conditions for the mass of the population.

The last issue is a particularly interesting one because it seems to lead us full circle back to the need for general economic development. It has two principal bases: First, there are studies indicating that declines in mortality in less developed countries have not occurred independent of economic development, as has often been suggested, and second, there is the argument that the major remaining causes of child mortality are gastroenteritis and diarrheal diseases associated with nutritional deficiencies, diseases that have resisted the efforts of medical researchers and appear to be related primarily to the level of private physical wealth and educational attainment. These judgments may be somewhat harsh. First, studies indicating the extent to which general economic development is associated with declines in mortality typically fail to hold constant investments in public health facilities such as potable water, sewage, and sanitation works that could be, and sometimes are, made independently. Second, diarrheal diseases are associated with contaminated water and with habits of personal hygiene; public health investments in providing potable water and sanitary waste-disposal systems in rural areas, plus education campaigns directed specifically at this problem, should have a high rate of return independent of general advances in economic welfare.⁸ Here as in other areas there appear to be possibilities of finding specific interventions that might make it unnecessary to wait for general economic development.

Female Roles and Labor-force Participation

The next two chapters, those by Ruth B. Dixon and by James L. McCabe and Mark R. Rosenzweig, while different in subject matter and especially in methodology, conclude with similar implications for policy and research. Dixon, a sociologist, argues that high fertility rates

⁸ It is sometimes alleged that such investments are so expensive that general economic development is necessary to create the surpluses required for the task. In large part, the level of expense arises from the assumption that international standards and capital-intensive methods of treatment will be used. But recent research by Richard Frankel has demonstrated that high levels of treatment can be obtained using inexpensive local materials for the filtration medium (for example, shredded coconut husks) and storage (ceramic crocks) and transport (bamboo). By obviating the need for chemicals, cast metal parts, and machinery, he has brought the cost down to a small fraction of what Western treatment facilities require, significantly reducing the dependence on foreign assistance or general economic development (see Frankel 1973).

in many developing countries are related importantly to the social and economic roles assigned to women and that the best way to change this situation is through changes in female employment. McCabe and Rosenzweig take an econometric approach, questioning the extent to which changes in female wages and job opportunities do in fact lead to changes in fertility. Since in the end both recommend experiments involving the manipulation of the female labor market, they are most conveniently discussed together at this point.

Women in a large number of developing countries, and especially in the rural sectors of these countries, are described by Dixon as powerless, economically and socially dependent, and isolated from the mainstream of life outside the immediate family circle. In Moslem societies, on which she concentrates, this situation is related to the practice of female seclusion, typically justified as an assurance of chastity before marriage and faithfulness thereafter. Among other things, it leads to limitations on economic activities outside the home. This makes daughters a greater economic burden on their parents, resulting in their receiving less education and leaving them with fewer ways to attain status and security besides early marriage and the production of children. While arising for different reasons and in different guises in non-Moslem societies, the more general features of this situation are not unfamiliar in large parts of Latin America and Africa.

The possibility that provision of better wages and jobs for women outside the home could change this situation and lead to a decline in fertility arises for two reasons: The roles of worker and mother tend to be incompatible, and a job and an independent source of earnings may give a woman a greater voice in family decision making.

The first factor has been stated most rigorously by economists in the following way: an increase in the wife's market wage rate will have two economic effects. First, it will increase household income, making it possible for the couple to afford a larger family. Second, it will increase the opportunity cost of the wife's time spent in nonmarket activities, inducing her to reallocate her time in favor of market activities. If child rearing is more time-intensive for the wife than are other nonmarket activities, the opportunity cost for children will increase by more than will that for other demands on her time, encouraging a decrease in desired family size. While the net effect of these offsetting tendencies cannot be judged entirely by reasoning a priori, studies in developed countries indicating a negative relationship between female work hours and fertility have led to a general presumption that the second effect, the substitution or price effect, tends to outweigh the income effect. But studies in less developed countries have not always indicated a negative

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McCabe and Rosenzweig obtain strong positive associations between female wages and fertility. While this finding may be explained by the unconventional way they have specified their statistical models for testing, a topic to which we shall return, there can be no doubt that they have effectively questioned the automatic applicability of results from developed countries to the conditions of less developed countries.

There are several reasons that a positive relationship between female labor-force participation and fertility may occur in developing countries. First, the income effect could be much stronger at low levels of income. Indeed, it was argued by one of the discussants that poverty forces many women into the labor market even when it means a reduction in the quality of the care their children get; this is equivalent to saying that, for these women, an increase in their wages could well permit them to work *less*, increasing the amount of time they would have available to bear and rear children. Second, large families and extended families make it easier to find substitutes for the mother's time in child rearing. Finally, the jobs set aside for women in developing countries often permit caring for children while working, or at least they make the two roles less incompatible than they tend to be in industrial countries. These last two factors are stressed by McCabe and Rosenzweig, who feel that they could even be strong enough to lead to a positive substitution effect; whether that is true or not, however, they certainly lead to a reduction in the magnitude of the negative effect. Role incompatibility, therefore, cannot automatically be assumed in conditions prevailing in developing countries. To ensure a negative effect on fertility, the additional jobs provided for women must be deliberately chosen or designed to be for the most part incompatible with child rearing.

The second factor presumed to lead to a decline in fertility, the greater voice in family decision making resulting from a job, is stressed by Dixon. There can be little doubt that girls with an independent source of income are in a better position to resist pressures to marry than are those without jobs. Moreover, evidence suggests that there is a positive correlation between the extent of the wife's involvement in family decision making and use of contraceptives. But once again, whether the provision of jobs per se under conditions prevailing in poor rural areas would be sufficient to encourage a greater role in decision making, and whether that in turn—*independent of other changes*—would lead to a decline in fertility, is open to question. It is more likely that a number of changes together—the provision of certain kinds of jobs and conditions of employment and pay, possibly combined with a self-help organization to provide educational, legal, and

22 POPULATION AND DEVELOPMENT

psychological support—would be required for a significant, sustained effect to be observed. A good deal of Dixon's chapter is devoted to the search for the appropriate set of changes.

The authors appear to recognize these problems and try to take them into account in their proposals for both research and policy. This is particularly true of Dixon, whose carefully worked-out suggestions are centered around the establishment of rural industrial cooperatives employing only women. Her suggestions, as well as those of Aziz Bindary (1975) and others, to establish special workshops or industries for women, are attractive in many ways. At the very least a specific number of jobs will in fact be created. But several arguments can be raised against this approach. First, all such proposals involving the development of new institutions and special projects are difficult to establish, replicate, and operate on a large scale, and the history of efforts to do so (to develop rural producer cooperatives, for example) provides few success stories. Second, investments in such special projects are often expensive on a per-person basis and could run counter to the goal of maximizing total output. Third, such efforts may fail if the male unemployment rate is too high, because men will either preempt the jobs or demand that the investments be made in directions more directly useful to them. If the projects are conceived as self-financing and involve work in areas where women have a comparative advantage (whether it be natural or culturally imposed), the last two points may be less important. A case in point is provided by recent investments in electronic assembly plants in Malaysia in which most of those employed are women despite high urban male unemployment rates. But such opportunities are likely to be difficult to find on a large scale.

These problems with the special project approach have led some to argue that it is more effective to concentrate efforts on reducing the general unemployment rate (through across-the-board policies such as increasing the artificially low price of capital in relation to labor) and allowing the demand for female labor to increase as a natural consequence. Such a trickle-down approach seems to account in part for the increase in female employment in Pakistan, where, according to one commentator, women began to be employed in traditionally male jobs when better-paying jobs for men opened up elsewhere. But there are problems with an exclusive reliance on this approach as well. The immediate impact of such policies could well be pronatalist since they imply an increase in male earnings before female employment increases. Indeed, it could even result in some reduction in the supply of female labor as women, no longer forced by poverty into the labor market, withdrew to devote more time to child rearing. Moreover, while it is

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true that special projects are difficult to set up on a large scale, it has proved equally difficult to reduce general unemployment rates. To do so often requires a correction of factor-price distortions and an increase in the general rate of economic growth, and there have been few success stories here also. But most important, such across-the-board efforts to increase the demand for female labor do not provide the package of changes that Dixon suggests is necessary to obtain a commensurate increase in the *supply* of female labor.

Fortunately, however, these two approaches are not mutually exclusive. While everything should be done to lower the general unemployment rate, there is no need to wait until it is reduced to acceptable levels to begin experimenting with different institutional forms and interventions in the female labor market. Such experimentation will be needed in any case and can proceed on a sufficiently small scale so that it does not threaten male employment. It is only when some success has been achieved and attempts are made to expand the scale of operations that a conflict between these two approaches may arise. We are far from that point now.

Preferences and Tastes

Up to this point the possibilities of influencing preferences, or tastes, in relation to fertility have been discussed only in passing—that is, as they might be affected incidentally or indirectly through other variables. Now we want to consider such possibilities more explicitly. While very little in the way of a theory of taste formation is available, it seems plausible that preferences can be influenced in the following three ways. First, education might directly or indirectly alter tastes—directly by inculcation of new attitudes and indirectly by helping to place a person in a new socioeconomic or occupational reference group with different fertility norms. Second, a person's desire for goods and services, in competition with bearing and rearing children, might be stimulated by mass media, advertising, or the increased supply of attractive consumer goods. Third, a person's norms regarding appropriate age of marriage and family size can change as a consequence of exposure to different life-styles. Such exposure can occur through direct contact with new acquaintances, often as a result of migration, or less directly through mass media (and education) in which different life-styles and different ways of handling common problems are portrayed. We have already discussed education and its possible effects on tastes. Here we consider the second and third possibilities.

Deborah S. Freedman reviews the literature and evidence pertaining to possibilities involving the use of mass media and modern consumption goods in her chapter. Apparently, no evidence exists that mass-media programs aimed directly at promoting family planning increase rates of acceptance or change basic attitudes about family-size norms; the best that can be said for them is that they increase awareness, information, and willingness to listen to other appeals. There are serious methodological problems involved in trying to judge the indirect effects of mass media, and data are very scarce. From what little there are, however—in particular an extensive survey of Taiwanese husbands—Freedman finds evidence indicating that even after eliminating the effects of income, education, literacy, and ownership of modern objects, increased exposure to mass media is associated with increased use of contraceptives, higher consumption aspirations, lessened fears of child mortality, increased awareness of the financial costs of children, and so on. The effects are small, but not much smaller than those of such variables as education and income. She also finds from the same data that both aspirations for and ownership of modern consumer durables are associated with the use of contraceptives, other things being held constant.

From these findings, she concludes with three interesting suggestions for research. The first is to make television available to inhabitants of rural and urban sample sites and compare the inhabitants' behavioral and attitudinal responses over a five-year period with those of inhabitants of control sites (making family-planning services equally accessible to both groups). The second is a survey to determine what are modern consumption items in a given context, who buys them, whether their ownership is in fact competitive with having children, how work effort and savings are affected, and the extent to which marketing and production activities are found in communities with high levels of ownership, adjusting for the effects of income. If the second study shows a potential market for modern consumer goods, a favorable fertility impact, and no offsetting negative impacts (on work effort or savings, for example), a third study would be recommended: an experiment involving subsidies for the marketing or production, or both, of certain kinds of goods in sample areas. While her suggestions for field experiments would have to be worked out in much more detail, Freedman goes far enough to indicate that they are likely to be feasible.

An objection to these proposals can be raised on grounds that they might encourage socially unacceptable cultural values, in particular the consumption of luxury goods at the expense of investment in essential commodities. This objection can be answered on a number

of levels. First, mass media can carry any message desired: it is not necessary that they encourage profligate styles of living. Second, the package of goods that constitutes an appropriate set of "modern consumption goods" is not the same everywhere; it will vary greatly depending on the specific cultural and economic context being considered. In poor peasant societies, it is more likely to include sewing machines, bicycles, power pumps, water taps, tubing for wells, and improved farm implements rather than phonographs, air conditioners, and aids to personal beauty. Third, one should not automatically assume that the consumption of such goods is always a deterrent to savings. Freedman's Taiwan data suggest that both aspirations for and ownership of what are appropriately defined as modern consumption goods in that context are *positively* correlated with savings, with income, education, and duration of marriage held constant. But finally, a good many of her research suggestions are designed specifically to determine whether there would be any negative effects from the policy suggestions she proposes investigating. Especially in this area, where data are so poor and where policies must be designed within the specifics of a given setting, such fact-finding research is an obvious first step.

David Goldberg's chapter raises another possibility for population policy, one that has been largely overlooked. From sample surveys that include information on respondents' residential locations within two metropolitan areas, Ankara and Mexico City, he finds that a significant proportion of fertility-related behavior is explained by residential location, over and above the effects of respondents' income, education, and place of birth. It is not possible to determine from his data whether this association is the result of a self-selection process—persons with similar attitudes tending to live in the same area—or whether people tend to take on the characteristics of those around them. Most likely, as Goldberg suggests, both effects are present, but to the extent that the second explanation is correct an appealing possibility for influencing fertility patterns presents itself.

Within limits the settlement patterns of rural migrants in urban areas can be influenced by public policy. The layout of vehicular access roads, sewage lines, and piped water are important determinants of the attractiveness of given locations. So too are renewal, rehabilitation, and public housing programs. To a large extent, this influence is negative, the poor migrant locating in areas where urban infrastructure and rehabilitation programs are not present, since only there are land values likely to be low enough for him. This fact tends to make migrants cluster together in urban slum areas, where many rural attitudes and behavior patterns are reinforced. If planners were to locate urban

infrastructure and renewal programs in such a way as to encourage small rather than large migrant clusters and to encourage less segregation between older and newer migrants, perhaps the new migrants would become urbanized—and in the process give up their high fertility patterns—more rapidly.

At this stage, these ideas, plus the likelihood of their being politically feasible, must be presented in a very tentative way. But given the data presented by Goldberg, the possibilities appear sufficiently promising that further testing and exploration are warranted. He suggests a number of ways in which this might be done, including extensions of the techniques used in his Ankara and Mexico City studies and careful monitoring of experiments or quasi experiments already under way. Rapidly growing cities, where significant locational decisions will have to be made in the next few years in any case, are attractive candidates.

Overall Research Implications

The individual chapters in this volume are too rich in research suggestions for summarization here. There are, however, two broad issues that can be usefully raised at this point. One is the problem of specifying statistical models for testing and the other the pros and cons of social experimentation as a technique of data collection.

Insights into the determinants of fertility and policies for influencing them can come from many sources, including personal observation, a priori reasoning, and—perhaps most promising but least utilized to date—the application of anthropological methods. But in the last analysis, hypotheses so derived must be tested by means of statistical techniques. To do this properly is no easy task. A large number of variables influence decisions involving marriage and procreation. These variables are linked together in complex ways, since some are simultaneously determined and many are explanatory in one relationship and dependent in another. Often these variables move together over time making it difficult to isolate their independent effects. Time lags of unknown length are involved in many of the relationships. Measurement of these variables is often indirect, using proxies for what is really desired. And there are reasons to believe that some of the relationships are temporally and spatially unstable. While there is no single best way to cope with this situation, it helps enormously if the unit of observation is the individual decision maker, rather than some average across a geographic region, if these persons can be followed over a period of time rather than being interviewed only once, and if

at least some variables can be held constant while others are manipulated specifically, as it might be possible to do in a field experiment (or in a quasi-experimental setting in which a new policy is being introduced in part of the universe to be studied), or where the size of the sample is sufficiently large that it can be partitioned into homogeneous groups. If the data are of this quality, it then pays to utilize sophisticated statistical methods, often involving, for example, simultaneous equations, as opposed to single-equation techniques, even if the latter are multivariate in nature. It is almost never the case that all these conditions are fulfilled. Usually researchers must pick up data collected for other purposes when and where they can, data that are often not suitable for careful and elaborate statistical analysis. The resulting studies must be interpreted with considerable caution to avoid incorrect or misleading implications.

While several of the chapters in this volume exemplify problems of this type, the empirical portion of the chapter by McCabe and Rosenzweig is especially useful to illustrate some of these points. To obtain an indication of the likely effect of wage subsidy for women workers on female labor-force participation and on completed family size, they set up a series of regression equations utilizing data from the Puerto Rican census for 3,000 married women between the ages of thirty-five and forty-four with spouses present. In one of these equations, children ever born is the dependent variable and the wife's *potential* wage, her age and education level, the husband's education and wages, and the nonlabor incomes of both are the independent variables. In another equation, hours worked is the dependent variable, and the set of independent variables is the same. The results indicate that women with higher potential wages work more hours and have a *larger* number of children. Should we conclude that in Puerto Rico, at least, a wage subsidy would be pronatalist?

Before drawing any such conclusion, one must look further into the methods used by these authors, particularly at their concept of potential wages. They argue, quite rightly, that the wages actually received by the women in the sample are affected by the numbers of children they have: the more children the less work experience and seniority they have and hence the lower their wages. What is needed is an indication of the wages a woman could have received if this effect of children on wages were not present. To obtain such an indication in the absence of work histories, the authors introduce a new variable—potential wage, which is derived from a subsidiary regression equation on unmarried women between the ages of eighteen and forty-four—in which wages are the dependent variable and age and education are the independent

variables. By substituting this new variable, the authors are in effect saying that married women would have received the same wage as do unmarried women of the same ages and with the same education had they not married—that is, that there are no other differences between them. Since the wages offered to married women can be expected to move in the same way as potential wages, movements in the latter can serve as a good proxy for what is really wanted, the effect of an exogenous change in wages without the feedback effects of independent changes in fertility.

Apart from other questions that can be raised about this procedure,⁹ the validity of this interpretation depends on what is assumed about self-selection. To what extent do women marry and have more children over their lifetimes because their market opportunities are restricted, and to what extent do preferences for marriage and children determine whether women enter the labor market and, if they do, what conditions of work they will accept? Indeed, it can be argued, as did one commentator on this chapter, that the difference between potential and actual wage (roughly equivalent to income forgone) is a proxy for tastes or preferences for children, in which case a positive coefficient is to be expected, since such a coefficient merely says that women with higher preferences for children have more children.¹⁰

Because of the absence of work histories, there is no way to obtain a good answer to these questions from McCabe and Rosenzweig's data. Their finding is useful, therefore, mainly as a warning that an across-the-board wage subsidy may not always work and that it may be necessary to apply such a policy to a limited range of jobs, those that are more clearly competitive with child rearing. It cannot be used, as the authors acknowledge, as firm evidence to argue against experiments with or trials of such policies. McCabe and Rosenzweig go on to analyze data from a cross section of countries in which an attempt is made to look at the effect of jobs with different characteristics (degree of compatibility with child rearing) and which supports the hypothesis that the type of job is important. Another set of problems and doubts can be raised about this analysis, however, in particular the lack of adequate wage data.

⁹ Why use women between the ages of thirty-five and forty-four, many of whom have not yet completed their reproductive period; why compare them with women between eighteen and forty-four; and why include some of the determinants of wages in the same equation as wages itself? The authors have answers for these questions, some of which are included in their chapter.

¹⁰ In the version of the paper appearing in this book, the authors test this hypothesis and conclude by rejecting it.

This discussion leads directly into the question of social experimentation, for in the last analysis it is difficult to believe that any body of nonexperimental data, no matter how good, can provide answers acceptable to policy makers about the long-run quantitative effect on fertility of specific policies to improve labor-market conditions for women. Can social experiments provide the data necessary to obtain more useful answers?

There is much to be said for social experimentation as a research tool for studying population policy. First, if the changes that policy is designed to bring about have never been experienced before, non-experimental data obviously cannot be very helpful. The effects of an increase in wages beyond the range previously experienced, an incentive never before offered, and a new housing policy are cases in point. Second, if it is possible to assign a large number of treatment and control areas on a random basis, it is not necessary to know as much about all the variables that could influence the situation as it is if non-experimental data are used. While an ideal situation is seldom found in practice, the closer it can be approximated the more confidence one can have in the results of testing simple or partial models. Third, social experimentation can turn up unexpected side effects that might be important in deciding whether to implement a policy. Even if it is known that women will have fewer children if job opportunities become available to them, policy makers will also want to know what the effects will be on male labor markets and attitudes. Finally, whether they deserve to be or not, analyses derived from social experiments are more easily understood by policy makers than are those derived from the manipulation of nonexperimental data. The former are more like trial runs, whereas the latter, at best, can only simulate the situation and then only under a number of limiting assumptions.

But social experimentation has its problems as well. It is a more costly way of acquiring information (that is, assuming that the non-informational benefits—the births prevented by the experiment and the additional quality of information obtained, for example—are not subtracted from the costs, as they should be). It may be unacceptable on political or ethical grounds because treatment and control groups must be treated differently. It may be difficult to avoid “contamination”—that is, spillover effects between treatment and control groups that distort the outcome. [It is of interest to note that neither of these last two problems proved to be serious in the large-scale experiments involving the negative income tax conducted in the United States between 1968 and 1972 (Kershaw and Fair 1975, Kershaw 1972). Such problems could be serious in other contexts, however.] It is often

30 POPULATION AND DEVELOPMENT

impossible in practice to set up and monitor more than one or two treatment and control groups, although the classic experimental design calls for a large number spread at random through the population. The seriousness of this failing depends on the nature of the information one wishes to obtain and on the alternatives available (in particular on the weaknesses likely to be present in nonexperimental data concerning the same phenomenon). Finally, to obtain useful information, it may be necessary to run a fertility experiment for a long time, longer than is feasible (although, of course, no longer than is necessary to obtain useful nonexperimental time-series data).

Clearly, there is a need for both experimental and nonexperimental studies. But, when all is said and done, neither method is likely to provide adequate answers to some questions within a reasonable period of time. To illustrate the latter conclusion, consider the problem of determining the effect of different educational programs on completed family size. The problem of following the recipients through a number of years and eliminating the effects of other influences along the way places an almost insuperable burden on any method of gathering data. In such cases decisions about policy will have to be made a priori. If the policy appears reasonable and has other more general advantages—is beneficial for general economic development, for example—it would be best to proceed directly to implementation without trying first to reduce uncertainty through additional research. The suggestions made by Mueller to improve access by rural families to lending and savings institutions are a case in point. Research may never adequately prove that such a change is useful in reducing births, even though it is reasonable to believe that it does have that effect. In view of the seriousness of the population problem in many developing countries, moreover, it makes no sense to demand a greater degree of certainty in this area than is present in others in which policy makers are forced to proceed without any stronger factual underpinning.

Some Broader Policy Implications

It is now time to take up several policy issues that cut across all aspects of the subject under study. The first issue is that of incentives—that is, changes that are conditional upon a favorable change in fertility-related behavior. While Simon, in his chapter on income, is the principal author to discuss them, incentives could as well be considered in conjunction with education, public health, housing, or the provision of employment opportunities for women. The second issue is the need for a group of

closely related and mutually reinforcing changes. Finally, we must consider the question of priorities: given all the possibilities we have surveyed, can we say anything about which is likely to have the highest benefit-cost ratio, defining benefits and costs to include more than just the economic magnitudes involved?

Incentives

A wide variety of incentives has been suggested and a number are being tried. They can be positive (payments for acceptance of a vasectomy, for example, as in India) or negative (increased hospital and maternity fees and lower priority for public housing for parents with larger families, for example, as in Singapore). The incentive can be provided to the couple themselves (the only kind to be discussed here), to "motivators," or to the community at large (funds for public works projects dependent on achievement by a village of certain targets, for example, as once proposed for use in Maharashtra). They can be provided for changes in behavior ranging from the use of a particular method of family planning, changes in the age of marriage, increased spacing, or smaller completed family size. They can involve transfers of cash, goods, or services (the Taiwan education bond and the Pakistan proposal to offer life insurance for the oldest son, for example). Such transfers can be immediate or deferred (as in the case of the tea-estate experiment in India, in which payment at the time of retirement varies inversely with the number of children). While evidence on the effects of such schemes is sparse at present, it is likely to improve substantially in the next few years as the schemes under way mature to the point at which evaluation becomes feasible.¹¹

Whatever their nature, there are five principal arguments in favor of incentives. First, they are known to work in other fields. Price incentives to induce farmers to shift to new varieties and differential tax rates to encourage investments in some fields and discourage investments in others are cases in point. Second, the conditional nature of the offer is useful in overcoming the positive income effect associated with many social changes. In addition this factor reduces the social cost and risk involved in policy changes that would otherwise be difficult to reverse if the expected fertility effect is not forthcoming. These last two points can be explained by reference to an old-age security scheme: if the pension varied inversely with the number of children a couple had, the

¹¹ For a description of these schemes, plus discussion of their pros and cons, see Pohlman (1971), Hickman (1972), IBRD (1974, ch. 6), and works cited in these publications and in chapter 2 of this volume.

pronatalist effect of the higher lifetime income would be counteracted, and the scheme could be set up in such a way that no pensions would be provided unless fertility actually fell. Fourth, incentives can help to overcome the time lags inherent in many forms of social change. The principal effect of providing additional schooling to rural youths is likely to be felt only after they become adults, but if this schooling were offered on the condition that their parents limited family size, at least some of the effect would be shifted to the present generation.

Finally, and most important, the use of incentives obviates the need for knowing in detail the nature and strength of the principal determinants of fertility. Incentives should work so long as something considered to be of value by the recipient is provided, whether or not it compensates him in kind for the loss he incurs from having fewer children. It is likely to be more socially acceptable if it does provide such a compensation; but it is the perceived, not the real, value of children that counts in gaining such acceptability and that is easier to discover through research.

This point can be pushed further by considering the three main views held about the general nature of the population problem in less developed countries. Some argue that people want to limit fertility but do not have effective means. Others assert that individuals have reason to limit fertility but are not sufficiently motivated because of lack of knowledge and the persistence of old attitudes and values. Still others argue that given the present environment within which parents in less developed countries live, they do not have good reason to lower their fertility and cannot be motivated to do so in the absence of substantial social, economic, or political change. Incentives can be effective no matter which of these explanations is correct. If the first is correct, the incentive will induce people to find effective methods or demand that they be given them. If the second proves to be correct, the incentive will help speed up the adjustment process, just as high "incentive" prices for food grains in India and Pakistan in 1967-68 increased the rate of adoption of the new hybrid seeds. If the third explanation is correct, the incentive serves as a substitute for the social change that has not yet occurred. At a minimum it will change behavior without affecting attitudes in any fundamental way, but given normal dynamics of attitude formation, changes in attitude will follow the changed behavior in order to justify and rationalize the latter, thereby reinforcing the behavioral change.

There are, of course, a number of arguments on the other side. If used by itself, the incentive may have to be quite large, causing budgetary and possibly also political problems. In any event, some types of

incentives may be considered distasteful, despite the fact that they are openly and blatantly used in other walks of life. Third, implementation of incentive programs sometimes poses difficult administrative problems, among which are possibilities for the misuse of funds. Fourth, a number of persons might receive payments who would have behaved as they did in any case; where such a problem exists, special efforts must be made in the design of the scheme to minimize this consequence.

Whatever stand one may take with respect to incentives, they do appear to be an excellent instrument for social experimentation. Indeed, the doubts and questions about incentives can probably not be answered otherwise. How else, for example, can one determine how large the incentive must be or whether the administrative problems can be solved and whether favorable or unfavorable changes in attitudes are likely to occur as a result of their use?

A Package Approach

Up to this point we have considered policy possibilities one at a time, as if they were alternatives. This was done for convenience in discussion and presentation, even though we know that a group of closely related and mutually reinforcing changes are likely to be much more effective than a piecemeal approach. An incentive for girls to postpone marriage will be far more effective if combined with increased opportunities for them to use their time constructively. The provision of increased educational opportunities may not be taken advantage of unless it is clear that the education is useful and needed and that it opens up additional job opportunities. Mass media may stimulate the desire for a higher standard of living, but the result will be frustration unless opportunities are provided for improving the standard of living.

This point can be carried further. To induce parents to value "quality" over "quantity" will require opportunities to increase lifetime income, better training to take advantage of these opportunities, reduced mortality to increase the expected returns from long-term investments, and, quite possibly, some kind of community or peer-group support to encourage the individual to break with tradition and bear the uncertainties involved in a new approach to lifetime planning.

The situation is similar to that encountered in efforts to modernize traditional agriculture, in which planners have concluded after many frustrating years of effort that there is no single touchstone, that it is not sufficient to provide extension services or new credit institutions, better marketing and storage facilities, adequate supplies of new seeds, fertilizer, and water, or even land reform and consolidation, separately,

that some combination of these incentives plus adequate prices appears necessary to break traditional patterns. But agricultural planners have also discovered that it is easy to overload local officials and the production capabilities of complementary sectors. The problem is to choose just the right set of changes, sufficient to induce the proper behavioral response yet not so comprehensive as to be infeasible. In the last analysis the determination of the appropriate package probably involves more art and intuition than it does science. And so it is and must be in the planning of population policy. We can say that a package of changes is necessary and identify some of its ingredients; we can warn planners not to overload the system; but the right balance and mixture cannot be specified without adding to the studies reviewed in this volume a large measure of intuition and judgment about specific local circumstances.

Toward a Priority List

After this review it should be clear that it is impossible to provide anything like a ranking of the various approaches to population policy according to their likely benefit-cost ratios. Educated guesses could be useful if additional information about specific countries were added but are of little value at a more general level. A first step in this direction can be taken, however, by considering the appropriateness of broad classes of policy options depending on the seriousness of the population problem in different countries.

In all cases, of course, countries should start with vigorous programs of family planning. In countries that do not anticipate any serious problems associated with population growth, such a supply-oriented approach may be sufficient. But if population pressure is expected to be severe in the future, even though it is not today, and if there are good prospects for growth and modernization in the meantime, it would be useful to add a demand-oriented approach that tries to influence the economic-development program in ways that speed up a country's transition to a low-fertility regime. The provision of more and better primary and secondary education in rural areas, especially coupled with an attempt to attract girls into the schools, the correction of factor-price distortions that dampen the demand for labor (including, of course, female labor), the elimination of discrimination against women in labor markets, and the movement of people out of traditional agricultural areas into more modern sectors as quickly as development permits are all cases in point. It is at least as difficult to establish priorities within this area as it is to indicate how to get general development going. But it is likely that placing an emphasis on such high demographic-impact

programs would alter the style and composition of development in significant ways.

As we have seen, a number of the programs that would be included in such an approach can have positive income effects in the short run; indeed, it could take several decades before the long-run negative effects gathered sufficient strength to offset them. If the population problem is more immediately pressing or is likely to become so before this approach has time to work, more emphasis should be placed on the use of incentives, deliberate efforts to alter preferences (using mass media and other approaches), and institutional and organizational changes (for example, of the type suggested by Dixon) that represent somewhat more direct intervention into the determinants of the family's decision-making process.

If, however, the population problem is more urgent yet, creating severe short-term pressures and threatening to swamp the development program altogether, more coercive measures, such as prolonged separation of the sexes through drafts for military and work-camp service and compulsory sterilization after the bearing of a certain number of children, may be called for. We have deliberately not considered such measures in this volume. If we get on quickly enough with the tasks of developing and testing less draconian policies, we may hope that the number of cases in which they have to be used will be few and far between.

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I recently asked a panel of distinguished experts to review our activities in the population field within the World Bank.

They took a hard look at everything we have been doing since 1969, and they rightly reproached us for a tendency to treat population too much in isolation from our other activities.

They pointed out that we have been prepared to lend for population projects, and were ready to bring specialized analysis to population issues when they were of obvious immediate importance.

But too many of us in the Bank had proceeded as if population issues could be left to specialists, rather than considered automatically in all aspects of our investment and development programs.

In short, they asked us to think about the problem in a more comprehensive way—and deal with it accordingly.

They were right. And that is exactly what we plan to do.

Let me, now, summarize and conclude the central points I have made this evening.

VI. SUMMARY AND CONCLUSIONS

The argument I have made is this.

It now appears that a significant decline in fertility may have at last begun in the developing countries. The data are not yet fully conclusive, but the indications are that the crude birth rates have fallen over the past two decades by an average of about 6 points, or nearly 13%.

By major region, the decline has been 6.5 points in Asia; 5.4 points in Latin America; and 2.3 points in Africa.

Further, the decline appears to have been general and widespread. It has occurred in 77 of the 88 countries for which estimates are available.

If these indications are confirmed by the censuses scheduled for 1980, then what we are seeing here is something of historic

importance. It would mean that the period of rapid acceleration in the rate of growth of the world's population has finally reached its peak and is now definitely moving downward towards stabilization.

But as welcome as this is, the fact remains that the current rate of decline in fertility in the developing countries is too slow to avoid their ultimately arriving at stationary populations far in excess of acceptable levels.

Unless governments, through appropriate policy action, can accelerate the reduction in fertility, the global population may not stabilize below 11 billion. That would be a world none of us would want to live in.

But governments can take action, and can accelerate the process, given the resolve and determination to do so.

The critical point is this: for every decade of delay in achieving a net reproduction rate of 1.0—replacement-level fertility—the ultimate steady-state world population will be approximately 15% greater.

Governments, then, must avoid the severe penalties of procrastination, and try to hasten the process forward.

But how?

The causes and determinants of fertility reduction are extremely complex, but it appears likely that there are a number of key linkages between that reduction and certain specific elements of socio-economic development.

The factors that appear to be the most important are: health, education, broadly distributed economic growth, urbanization, and the enhanced status of women.

These factors are at work in the developing world today, but their progress is too slow to be fully effective.

Without additional intervention on the part of governments, the current population in the developing world is going to continue to grow at rates very substantially in excess of those that would permit far more economic and social progress.

There are two broad categories of interventions that governments must undertake: those designed to encourage couples to desire smaller families; and those designed to provide parents with the means to implement that desire.

The first set of interventions sets out to alter the social and economic environment that tends to promote fertility, and by altering it to create a demand among parents for a new and smaller family norm.

And the second set of interventions supplies the requisite means that will make that new norm attainable.

To create the demand for a change in family norm, governments should try to:

- Reduce current infant and child mortality rates sharply.
- Expand basic education and substantially increase the proportion of girls in school.
- Increase the productivity of smallholders in the rural areas, and expand earning opportunities in the cities for low-income groups.
- Put greater stress on more equitable distribution of income and services in the drive for greater economic growth.
- And above all else, raise the status of women socially, economically, and politically.

To satisfy the demand for a change in family norms, governments and the international community should:

- Provide a broad choice of the present contraceptive techniques and services to parents.
- Improve the delivery systems by which parents can get the services they wish.
- And expand present levels of research seeking better techniques and services.

Both categories of interventions are necessary.

Recent studies confirm that the effect of family planning pro-

grams is greatest when they are joined to efforts designed to promote related social goals.

We know that eventually the world's population will have to stop growing. That is certain.

What is uncertain is how. And when. At what level. And with what result.

We who are alive today can determine the answers to those questions. By our action—or inaction—we will shape the world for all generations to come.

We can avoid a world of 11 billion, and all the misery that such an impoverished and crowded planet would imply. But we cannot avoid it by continuing into the next quarter century the ineffective approach to the problem of population that has characterized the past twenty-five years.

Man is still young in cosmic terms.

He has been on earth for a million years or so. And our modern ancestor, *Homo sapiens*, for a hundred thousand years.

But the universe of which he is a part is some twenty billion years old.

And if we represent the history of the universe by a line a mile long, then modern man has appeared on that line for only a fraction of an inch.

In that time perspective, he is recent, and tentative, and perhaps even experimental. He makes mistakes. And yet, if he is truly *sapiens*—thinking and wise—then surely there is promise for him.

Problems, yes. But very great promise—if we will but act.