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SUMMARY AND OVERVIEW

The Effects of Old-Age Pensions on Household Structure,
Marriage, Fertility and Resource Allocation in
Rural Areas of Developing Countries*

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The purpose of this summary and overview is to provide the reader with at least a general idea of the scope and contents of the complete report with special emphasis on (a) what has and has not been learned from this and all preceding studies on the subject and (b) the implications for theory, policy and further research.

The primary purpose of the project was to explore as thoroughly as possible with the existing literature and the available data one important reason why people want children, namely for old-age security. Judging by the existing economic and demographic literature and especially the empirical studies on the subject, one would not suppose the motive to be very important. On the other hand, if one were to judge by what people in developing countries tend to say about their motives for (high) fertility, the motive would seem to be of crucial importance. How can this paradox be explained?

Although there are widely differing views (a) about the relative importance of the old-age security motive, ranging from Leibenstein (1957, 1975) and others who have argued that it is the most important motive to Lindert (1980, 1983) and others who have argued that it cannot be important, and therefore also (b) about the wisdom of introducing old-age pension systems in developing countries, there is certainly unanimity with respect to the fact that the old-age security motive is the least thoroughly analyzed motive for fertility.¹ It was for this reason that the old-age security motive was chosen as the focus of this study.

The presentation of this Summary and Overview is organized as follows: Section I identifies the conditions in which one would expect the motive to

¹An especially prominent statement of this conclusion see George Stolnitz' recent presidential address to the Population Association of America, Stolnitz (1983).

be important and argues that such conditions are likely to prevail in rural areas of developing countries and especially among women. Section II reviews the literature of existing studies, explaining why the conclusions drawn in most of them are either irrelevant or misleading. Section III presents some prima facie evidence that the motive is important in those for whom the conditions identified in Section I are satisfied, namely rural women in all but the least developed of the developing countries. Section IV characterizes the standard economic modelling approaches to each of the major links between old-age security and fertility and evaluates them in the light of the descriptive literature (mainly from fields other than economics) on each of these subjects.

Section V characterizes the theoretical and econometric methods employed in this study and explains how these approaches reduce the problems that have plagued previous studies on the subject. Section VI summarizes the empirical results obtained from the two micro data sets used in the study, namely the Additional Rural Income Survey of rural India (undertaken by the National Council of Applied Economic Research with AID support) and the Malaysian Family Life Survey (undertaken by Rand and Survey Research Malaysia, again with financial support from AID). Section VII distinguishes what has from that which has not been learned from the study and finally Section VIII summarizes the policy and other implications of the study.

I. Conditions Under Which the Old-Age Security Motive Could be Important

In order to test the hypothesis that the old-age security motive for fertility is an important one, three conditions would have to be satisfied. First, one would have to be able to measure variations in intensity of the motive. Since motives are generally not directly observable, this implies the need to proceed more indirectly by identifying a priori conditions which could be expected to influence the intensity of the motive. Second, one would have to be able to observe fertility behavior in conditions differing with respect to the intensity of the old-age security motive (or in those factors underlying that motive) while holding other factors as constant as possible. Third, it would be necessary to establish that the causality in any observed relationship actually goes from the old-age security motive to fertility behavior and not vice versa.

As we shall demonstrate in Section II below, the greatest shortcoming of existing studies is with respect to the first of these conditions, namely the identification of the factors or conditions giving rise to the old-age security motive. In our opinion, moreover, it is primarily the failure to satisfy this condition that has led to the gross underestimation of the importance of the old-age security motive in most economic and demographic studies. It is, therefore, to the identification of conditions in which the motive could be expected to be strong to which we now turn.

To put the issue as simply as possible, old-age security is likely to be an important motive for fertility when the relevant parent is both uncertain about his (her) own ability to provide for himself (herself) in old age and dubious that there are other more reliable or more effective means of such support than from his (her) own children.

In what circumstances or environmental conditions are these basic conditions likely to coexist? Because for any condition there may be various combinations of circumstances from which the condition can be derived, one might well be able to come up with many alternative combinations of conditions that could be considered necessary and sufficient for a strong old-age security motive. Nevertheless, for expository purposes we shall limit ourselves to the following: (1) the underdeveloped state of capital markets, (2) uncertainty about the accumulation necessary for old age, (3) the absence and/or inefficiency of private or public old-age and disability insurance programs, (4) confidence in the loyalty of children to their parents, (5) the absence of well developed labor markets for women and children (non-standard labor), (6) underdeveloped markets for the goods and services that elderly people consume, (7) the absence of a spouse who is of considerably younger age, and (8) the relative importance of old age in one's life cycle.

1. Absence of Means of Accumulating Capital for Use in Old Age

When there exist profitable and reliable means of accumulating assets for use in old age, children would certainly be less necessary for old-age security purposes. While numerous relatively profitable accumulable assets exist in developed countries, and even to a considerable extent in the urban areas of developing countries, rarely do such assets exist in rural areas of developing countries. Aside from children, the available assets in such areas are generally limited to currency, gold, commodities, livestock and land (and structures). Currency is a notoriously bad store of value because of its vulnerability to inflation, theft and fire. Gold is subject to price uncertainty and to theft and sometimes to legal sanctions

against its use. Commodities and livestock are generally either not capable of being stored for long periods or are storable only at prohibitively high cost. Land and structures may be somewhat better stores of value but they too are risky in the sense that they may be overrun by squatters, and subject to other sources of insecurity, to very incompletely defined property rights and/or to arbitrary changes in the nature and allocation of those rights over time. Quite frequently, even when these alternative forms of asset accumulation are available and practical, children may be essentially complementary since their presence may contribute very substantially to the protection of such assets, or to their worth and productivity.

Why don't more satisfactory markets for land, structures, draft animals, agricultural machinery and other second-hand assets exist? While a complete answer to this question may involve several factors, a very important one is the principle of "adverse selection." Adverse selection arises when the quality of such assets (just like used cars) varies considerably (as they in fact do) and asymmetry in information on quality exists between potential sellers and buyers (such that the sellers, i.e., the previous users, alone, are in position to know the quality of the asset, and buyers are likely to suspect that those assets for sale are of low quality, i.e., "lemons." Although markets for land, animal traction, structures and other assets do in some cases exist, they are usually sufficiently thin and the prices discounted by adverse selection and high transaction costs to such an extent as to make the accumulation and subsequent sale of such assets to be a quite unsatisfactory strategy.

2. Uncertainty about the Accumulation

Necessary for Old Age and Disability

Even if the markets for such capital assets were well developed, complete and free of adverse selection, of market imperfections and of transaction costs, still they would offer insufficient protection against insecurity in disability and old age. This is because, in general, the individual knows neither the age at which disability or death will occur nor therefore the magnitude of the value of the assets that would have to be accumulated for disability and old age. In other words, even in the best of circumstances, accumulation is a poor substitute for insurance. Disability and old-age insurance are what are needed to provide old-age security.

3. Absence and Inefficiency of Private and Governmental

Old Age and Disability Insurance Programs

While disability, old-age and life insurance policies are widely available in developed countries and even in urban areas of developing countries, virtually never do they exist in rural areas of developing countries, where the risks of disability are perhaps the greatest. It is most important to realize, moreover, that the dearth of disability and old-age insurance in rural areas of developing countries is no mere accident. There are indeed several factors characteristic of such areas that tend to undermine the viability of such programs.

In the first place, the geographic dispersion of human settlements, the low levels of per capita income and consumption, the exchange risks and other costs involved in converting from kind (crops) into cash to buy insurance and then from cash back into kind at the time of receipt of annuities, all combine to make the transaction costs of such insurance

extremely high. Second, given the wide variations in health, strength and life style, and hence also in insurance risk, from one individual to another, the information requirements and transaction costs for identifying appropriate premiums for different individuals are excessively high. This is especially true because of the asymmetry of information, wherein the relevant information is available to the individuals or households buying such insurance, but not to the firms selling it. As a result, the costs of instituting a system of individual-specific premiums are prohibitive. In practice, therefore, virtually all insurance programs have to settle for one or two basic premium rates which of course cannot pretend to be appropriate for everyone. In voluntary, private systems, this leads once again to "adverse selection", wherein only those whose insurance risk is actually greater than the premium assigned, opt to participate in the program. Since the more insurable potential participants opt out, such programs are not viable in the long run. By making such programs compulsory, the adverse selection problem can be avoided but, on the other hand, "free rider"² and "moral hazard"³ problems are more likely to arise. The presence of large public sector insurance funds also raises the possibility of their misappropriation.

²The free rider problem arises as people try to avoid paying for the system or taking advantage of the system unnecessarily. Free riding, therefore, undermines the long run viability of the system. Free riding is of course more of a problem in rural areas where because individuals are more dispersed and much poorer insurance premiums are more difficult to collect than in urban areas where payroll deduction and other premium collection programs can be utilized, thereby minimizing the extent of free riding.

³The moral hazard problem arises when the knowledge that one is insured by such a program induces one to engage in behavior that is subject to higher insurance risk. Hence, the moral hazard problem, which is more likely to arise when the insurer is distant from the insured both in geographic terms and in personal terms, also tends to undermine the viability of disability and old-age insurance programs. The moral hazard problem can be reduced by close monitoring but that is likely to be prohibitively expensive when it has to be done by outside agents.

Many such funds tend to be invested in low return activities or managed on a pay as you go system as in the U.S. and much of Latin America. All of these factors compound to make it unlikely that government programs will actually be able to deliver what is required in terms of old age and disability annuities when they are needed. Even if they were able to do so, especially in rural areas the long history of broken promises on the part of government to rural residents would lead such residents to perceive that the programs would not deliver.

The high information and transaction costs underlying these adverse selection and moral hazard problems apply to formal insurance programs only but not to family insurers. Indeed, family and household insurers are likely to (1) have excellent information on the relevant insurance risks and (2) be in a better position to monitor, penalize and thereby minimize behavior of the moral hazard and free rider varieties.⁴ Moreover, since intergenerational transfers within extended households are usually provided in kind, the transaction costs and exchange risks can be minimized if not altogether eliminated.

4. Loyalty of Children to their Parents

The aforementioned system of intergenerational intrahousehold transfers provides a potentially efficient mechanism for combining capital accumulation with insurance. Nevertheless, the system can be relied upon

⁴Rather than having to adopt arbitrary retirement ages or standards of qualification for disability, since the household has at its disposal a large variety of incentive mechanisms, it can encourage household members to work as hard as they can and as long as they can. Persons who to formal insurance programs would qualify as totally disabled, in the household insurance context can be encouraged to work part-time. This minimizes the magnitude of the transfers required, and make the household a particularly efficient source of providing old-age and disability insurance.

by parents for old-age and disability protection only if the loyalty of their children toward them is assured. In most traditional cultures the care of elderly parents age by children is an important cultural norm. Such norms are typically maintained by assessing strong sanctions in the form of ill-repute to those who deviate from such norms and by offering positive rewards in the form of inheritance and honor for those who adhere to them. Once the norms are inculcated, individual preference functions are affected. Individuals come to feel pride and satisfaction in being able to fulfill their obligations to their parents.⁵ The most important locus for loyalty-training is the household itself and the most important dispensers of such training are usually the women of the household in part because it is they who shoulder more of the responsibility for household activities.⁶ Loyalty training is likely to be more successful when it is unencumbered by formal education and conditions 1, 2 and 3 identified above are fulfilled as they usually are in rural areas of developing countries.⁷ Parents who have migrated to urban areas can help simulate such conditions by sending their children to be with their rural grandparents.

Neither perfect adherence to such norms nor the complete assurance of child loyalty are required for the old-age security motive to be important.⁸ The frequently heard parental complaints about the insufficiency of

⁵On the effect of social norms on individual preferences see Blau (1964), Pollak (1982), Kuran (1983a, 1983b) and Datta, Nugent and Wang (1983).

⁶As shall be pointed out below, another reason why it is usually women is that it is they who are most dependent on their children and hence have most to gain from providing loyalty training.

⁷As noted by Smith (1962), Goode (1963), Oppong (1973) and Sanchez (1976).

⁸Indeed, some uncertainty about child loyalty or a low rate of return on children may in certain circumstances make high fertility more necessary than it would otherwise be.

the services received from children may simply be another means of inducing greater flows of such services. Moreover, it need not be the case that the expected transfers from children should more than compensate for the direct and indirect costs of raising children. Hence, as Willis (1978, 1979) has emphasized, existing studies showing that children do not always transfer as much to their elderly parents as the latter would like and/or that the rate of return to children is negative [Enke (1960), Lindert (1980, 1983)], do not necessarily imply that the old-age security motive for investing in children is unimportant. To the contrary, a low or even negative rate of return on children may be indicative of the importance of the old-age security motive in the absence of better alternative mechanisms for satisfying that motive.

Modernization and development introduce various forces which tend both to reduce the strength of the traditional norms of family and community, and to erode loyalty. This erosion process, however, is a very slow and gradual one. Moreover, because of substantial differences that exist in personalities and their dynamic interaction over time, in environmental conditions and in random events across households and over time, the rate of breakdown of such norms and the degree of loyalty in children for their parents are rather difficult to predict. Nevertheless, the loyalty of children to their parents could be expected to be influenced by educational opportunities, extra-household employment opportunities,⁹ the size and sta-

⁹The greater the extent to which parents directly control the employment opportunities, the easier it should be for them to induce loyal behavior on the part of their children. The greater the availability of extra-household employment opportunities, the more difficult it should be for parents to induce loyalty from their children. Likewise, the more agricultural land that the parents possess even in the presence of outside employment opportunities, the more attractive intrahousehold employment should appear to children and hence the more loyal behavior on the part of their children that parents should be able to induce.

bility of the community,¹⁰ inheritance rules, the amount of inheritable wealth possessed by the parents¹¹, and the character and strength of penetration of influences from the mass media. All of these factors are such as to make it likely that children are likely to remain loyal to their parents longer in rural areas than in urban areas and in developing countries relative to developed countries.

5. Absence of Markets for Non-Standard Labor (such as for Women and Children)

Whereas markets for regular labor (i.e., full-time male labor) are rather universal, markets for part-time and non-standard labor, e.g., for children after school or for women when not caring for their children, are by no means universal. Indeed, the extent of development of markets for non-standard labor varies considerably from place to place. Extra-household employment opportunities for such labor are likely to vary by region, by occupation and by social status or caste. Since wage rates and hence independent earnings tend to be greatly affected by regularity and

¹⁰In small, stable communities, disloyalty can be easily detected and communicated, making it difficult for disloyal children to obtain worthwhile spouses, employment, credit and communal help when needed. The detection of and the assignment of penalties for disloyalty are obviously more difficult to accomplish in large communities and in communities characterized by substantial in- or out-migration.

¹¹The more land and other property that is potentially inheritable, the more children are likely to want to qualify for inheritance by being loyal. Inheritance rules can of course influence the importance of the inheritance motive for loyalty. For example, in those societies where inheritance is prescribed along lateral lines among siblings, the inheritance motive for loyalty of children will be dissipated. Likewise, even where inheritance follows the traditional patterns of patrilineal or matrilineal descent, if the heir is pre-designated by law, e.g., when primogeniture, ultimogeniture or bequest-sharing are mandated, parents are in a less favorable position to induce loyalty, even if they have considerable property [Habakkuk (1955), Goody (1972), Parson (1983a, 1983b), Berkner and Shaffer (1978)].

intensity of employment experience, and in most societies females have the primary responsibilities for child care and rearing activities, female employment tends to be less regular and female wage rates tend to be considerably below those of males, especially in rural areas. As a result, except in those relatively rare societies where the sex roles are reversed, females are far more dependent on males for support than vice versa and more so in rural areas of developing countries than in urban areas and developed countries. The existence of and rate of remuneration of part-time and other employment opportunities for women are, therefore, relevant because they affect the extent to which wives are likely to be employed during marriage, and the extent to which they will be able to provide for their own support during widowhood. Where such opportunities are relatively well developed, as is frequently the case in urban settings where domestic servant, clerical, sales and professional employment opportunities for women are widely available, the old-age security motive, at least on the part of women, is likely to be much weaker.

6. Underdeveloped Markets for the Goods and Services that Elderly People Consume

Even if viable, efficient and dependable means of accumulation and forms of insurance for old age could be found, such developments would be of little use if the goods and services that the elderly consume directly are not purchasable in the desired form and at reasonable prices. Getting products from market to home is likely to be a major problem for the elderly, especially in rural areas of developing countries. Likewise, whereas consumer durable goods, like automatic washers and driers, dish-washing machines, and garbage disposal units, and even more basically pub-

lic goods like potable water and sewage systems, are increasingly pervasive in developed countries and in urban areas of developing countries, the machines, the public goods and the power to run them are seldom available in rural developing country households. Without such conveniences, the satisfaction of the daily subsistence requirements of the elderly in rural areas of developing countries is no simple matter. All these activities are time-consuming and laborious. Even if the manual labor for such activities could be purchased in the labor market, their efficient and dependable provision would require coordination and supervision that elderly or disabled persons, by themselves, may be unable to provide. Servants may be trained but there are almost always more serious questions of their efficiency, loyalty and dependability than in the case of children, grandchildren and other members of the household.

It should not be surprising, therefore, that the old-age security motive for fertility should be expected to be particularly strong in conditions characterized by lack of monetization of economic activity in general and by underdeveloped markets in the aforementioned goods and services that elderly people consume directly in particular. These conditions are clearly most characteristic of rural areas of developing countries.

7. Absence of a Young Spouse

If an individual adult is free to take on a much younger spouse, as for example in a second marriage or in situations in which polygamy and polygony are allowed,¹² the need for children for support during old age and disability can be reduced.

¹²For example, among the Tiwi of North Australia where both polygamy and polygony are possible, both men and women take younger spouses for the specific purpose of providing for care during old age and disability [Hart and Pilling (1960)]. Where polygamy is practiced in Africa, it is sometimes

By and large, however, married females are much less likely than married males to have a younger spouse. Three reasons may be given for this. First, women tend to be several years younger than their husbands at first marriage. Second, life expectancy for adult women is considerably greater for females than males. Third, societal rules generally make it easier for males to divorce and remarry than females. Even aside from the last factor, the typical wife in developing countries can expect to outlive her husband by somewhere between five and fourteen years. While the expected period of widowhood may not seem important relative to a long life expectancy of 75 years in developed countries, relative to the expected number of years from marriage to death, the period of widowhood in developing countries can be relatively high, e.g., on the order of 20 to 30 percent as indicated in Table 1.1 of the main report.

Therefore, while husbands are in large part taken care of during their old age by their younger wives, on average at least, wives have relatively long periods of widowhood to which to look forward [Cain (1982)]. If as is commonly the case and especially where purdah is practiced, wives are not able to provide for themselves through extrahousehold employment, and inheritance by women is limited by law or custom, wives are likely to be heavily dependent on their children for support during their old age.¹³

¹²(cont.) the wife who asks her husband to take on another younger wife so as to help take care of her. Other examples arise in those societies, e.g., in those parts of rural Iran, where the institutions of levirate and sororate are relatively common. In the levirate a man, usually a younger brother, may be obliged to marry his older brother's widow. In the sororate a younger sister may be obliged to marry her older sister's widower.

¹³Where formal old-age security programs exist, as demonstrated, e.g., by Laroque (1972), U.S. Department of Health, Education and Welfare, Social Security Administration (1973), Gelber (1975), Task Force (1978), Ben Israel (1979), Voirin (1982) and Oppong (1982), they typically provide systematically fewer and smaller benefits to women than to men.

As a result, the old-age security motive is stronger for women than for men, and especially so in rural areas of developing countries, and in societies where female employment opportunities and rights to inheritance are limited by law or custom.

8. Relative Importance of Old Age in the Life Cycle

Obviously, old-age security can be an important factor in human behavior only if it is considered to be relevant to the human life cycle. In the least developed countries, especially where life expectancy, even of those over 10 years old, is extremely low, old age may simply not be a relevant consideration. The least developed countries may, therefore, not be the best places to conduct tests of the importance of the old-age security motive. In between the bottom end of the least developed countries and the developed countries where other necessary conditions are violated, however, there is a wide range of developing countries where it may at least be relevant to test.

One factor that may tend to make it more difficult to construct strong tests of the old-age security motive is that several of the above explanations for the importance of the old-age security motive may apply to other possible explanations for fertility and/or for the direction of transfers as well. For example, some of these conditions coincide with the exploitation stage in Caldwell's stage theory of transfer reversals and demographic transition [Caldwell, ed. (1977), Caldwell (1982)], whereas others, such as the absence of insurance, are shared with Cain's (1983) more generalized theory of high fertility as a response to general risk. Nevertheless, once the conditions of each such explanation are carefully laid out, differences

in conditions would no doubt be apparent, making it in principle possible to distinguish between these theories in empirical tests.¹⁴

¹⁴For example, with respect to Caldwell's exploitation theory, the rationale for high fertility is a motive for the male head of household not for the wife-mother as suggested above it would be in the case of old-age security motive. Likewise, with respect to Cain's theory, empirically it should be possible to compare the explanatory power, with respect to variations in fertility rates over time and space, of factors like instability in crop yields, wage rates, agricultural incomes and the like with that of various proxies for the importance of old age and disability risk.

II. Existing Empirical Studies and Their Limitations

While one might well presume that old-age insecurity would increase the demand for children and hence actual fertility, consideration should be given to several possible offsetting influences such as that greater horizontal extension of households might substitute for children, that the quality of children might substitute for the quantity of children, and that the wider spacing of children might significantly reduce the number of children required to provide any given level of dependence on children. Likewise, the direction of the net effect on fertility of the introduction of a formal old-age pension system cannot be determined a priori inasmuch as goal-recognition effects and numerous other positive effects could arise.¹⁵ A considerable portion of the overall effect on fertility of such programs, moreover, would presumably occur only indirectly by way of effects on household structure, age at marriage, labor force participation and savings and investment, the effects of which could again be either positive or negative. All these factors lead to the conclusion that neither the direction nor the magnitude of the overall effect on fertility of the introduction of an old-age pension system can be determined without detailed empirical studies.

Following the lead of the pioneering empirical study of the issue by Friedlander and Silver (1967), the most numerous and best known studies¹⁶ have utilized international cross-section data to determine the extent to

¹⁵Numerous references to such effects are contained in Nugent and Gillaspay (1983).

¹⁶See especially Hohm (1975), Kelly, Cutright and Hittle (1976), Entwisle and Bollen (1981) and Entwisle and Winegarden (1983).

which variations in social security participation across countries can explain the intercountry variations in fertility rates. While not surprisingly (because of differences in data sets, measures of the relevant variables and methods used), the results of these studies vary somewhat from one study to another, by and large the results obtained by Friedlander and Silver have set the pattern by showing that there was little or no relation between the old-age pension participation variables and various measures of fertility, especially in developing countries. Something of an exception is the more recent study of Entwisle and Winegarden (1983) which, after allowing for a 15 year lag in the effect of social security participation on fertility behavior¹⁷ and non-linear control variables for both the level of development and the extent of family planning, found a fairly significant negative relationship. Even so, however, the relationship was not particularly strong and, like most international cross-section studies, the results would probably be rather sensitive to the inclusion or exclusion of a few countries with rather extreme values of the social security and fertility variables.

In the light of the conditions identified in the previous section for a strong old-age security motive, however, these international cross-section studies would seem largely irrelevant to the issue in the sense that participation in social security programs has thus far been confined to developed countries and urban areas of developing countries where few of the aforementioned necessary conditions for the importance of the motive are satisfied. This implies that in each such study there is little or no variation across the sample with respect to social security coverage

¹⁷In part, this adjustment is in order to avoid ambiguity in the direction of causation for which the authors have quite correctly criticized other studies.

in rural areas of developing countries which should be required for such empirical evidence to be relevant to the hypothesis under consideration.

There are three studies, however, which, although using the same cross-section methodology, overcome the principal weakness of the aforementioned international cross-section studies by focusing on rural areas of developing countries, and indeed on regions in which the conditions identified in the previous section are clearly satisfied. Two of these, DeVany and Sanchez (1977, 1979) and Nugent and Gillaspay (1983), utilize state and county cross-section data for Mexico while the other, Cain (1981a, 1981b and 1983), utilizes a cross-section of four villages in India and Bangladesh.

While the DeVany and Sanchez study was not explicitly directed to the old-age security motive for fertility, it is, nevertheless, quite relevant inasmuch as they argued that, because of (a) the incompleteness of land markets, (b) the existence of excess demand for land and hence land rationing, and (c) the insecurity of land, the presence of children provided parents with land-retention benefits and freed parents from having to remain on the land at all times. Hypothesizing that the land-retention and other benefits of children to their parents would be greater for those living on ejidal land (which cannot be bought or sold) than for those on privately owned land, DeVany and Sanchez used cross-section data from the Mexican population census of 1970 to show that, even after controlling for infant mortality, female labor force participation, income and education, both fertility and marriage rates were positively related to the share of ejidatarios in the agricultural work force, thereby supporting their hypothesis.

Since (1) in practice the restrictions on rental of land by ejidatarios are not well enforced, (2) certain credit institutions have been

developed especially for providing credit to ejidatorios and, (3) privately held land is also very insecure because of the threat of invasion by squatters (thereby giving children a land-enhancing value even on private land), the rationale for expecting especially high fertility among ejidatarios would seem questionable. Other shortcomings of their study are (a) multicollinearity, which makes the results rather sensitive to small changes in specification, and (b) the crudeness of the proxies used to measure both the relative importance of ejidos and some of the control variables, especially income. Not surprisingly, therefore, the aforementioned subsequent study by Nugent and Gillaspay, which included changes in the ejidal share of total landholdings as one of the right-hand-side variables in explaining the intertemporal changes in fertility across communities in rural Mexico, found the coefficients of the ejidal share on fertility to be insignificant (though positive).

More in the tradition of the earlier international cross-section studies, the Nugent and Gillaspay (1983) paper was focused on the effects on fertility of Mexico's social security program. Since the early 1960s this program has been applying to some farmers and rural workers but not to others. Because the principal crop covered by the old-age pension and invalidity programs of social security is sugar cane, this study focuses on a cross-section of 34 countries in the principal sugar cane-growing area of Mexico, the Papaloapan River Basin. Measuring participation in the program by the proxy variable $s/(1+s)$ where s is the share of income from sugar in total agricultural income, Nugent and Gillaspay found that fertility was negatively affected by the social security proxy variable. The findings of this study, however, need to be qualified by the following actual or possible shortcomings: (a) the small size of the sample, (b) the likely sensitivity of such cross-section results to the inclusion or exclusion of

observations with extreme values, (c) the possibility of selectivity bias that would arise if people wanting smaller families would choose to live in sugar cane growing areas so as to be covered by social security and (d) that the effects attributed to the old-age security program could in fact be due to the dissemination of information about and propaganda in favor of birth control which in recent years at least (though supposedly not at the time the observations were taken (1970)) has also become a component of the program.

The most intriguingly simple and straight-forward empirical study of relevance to the hypothesis is Cain's (1983) study. As Cain stresses, in practice the insecurity that characterizes rural areas of developing countries is by no means limited to old age and invalidity. Indeed, calamitous events, such as the destruction or confiscation of property, bad weather and other sources of crop failure, wars, local insurrections, crime and so on, can occur at any age. Because children can offer protection against virtually all such sources of insecurity, all such sources of insecurity could be expected to contribute to high fertility.

Cain compared three villages in Maharashtra and Andhra Pradesh states of India with one in Bangladesh. The Bangladesh village was characterized by considerably greater risks of the aforementioned type than any of the Indian villages. All villages were poor, but the Indian villages seemed to have better sources of credit and stronger lateral relations within extended family households than the Bangladesh village, thereby allowing Indian villagers to adjust to unwanted calamities more easily than Bangladesh villagers. Cain pointed out that fertility rates have remained high in the Bangladesh village but were low and falling in the Indian villages. The differences in fertility were attributed to the differences in risk and risk-coping institutions between the two groups of villages.

Since women were particularly limited in their ability to cope with such risks in the Bangladesh village because of their exclusion from market activities due to local Islamic practice and tradition, they were more dependent on children for support, especially during widowhood, than their Indian counterparts. As heart-rending evidence of the consequences of the greater risks in Bangladesh, Cain showed that a higher percentage of widows without surviving sons were forced to sell their land, or, if they didn't have land, to become completely destitute in the Bangladesh village than in the Indian villages.

The main shortcoming of the study is, of course, that it provided really only two data points, i.e., the two groups of villages, thereby making it difficult to distinguish between the effects on fertility of each of the different kinds of insecurity, and in particular that between old-age insecurity and insecurity at younger ages, and the many other factors that may have varied between the two groups of villages.

All of the above studies are inferential and indirect, and utilize aggregate data which are, of course, far from ideal in testing relationships that are microeconomic in nature or more broadly apply to individuals rather than to groups. There is, however, one important study which is both more direct and based on micro-level interviews, namely that of Carol and Michael Vlassoff (1980). The Vlassoffs' study was based on a questionnaire consisting of a number of old-age security-related questions addressed to a sample of 357 ever-married men in a rural village in the state of Maharashtra, India. From their interpretation of the responses obtained, the Vlassoffs concluded that the old-age security motive was unimportant as far as fertility was concerned. Their interpretations, however, would seem questionable in a number of respects, suggesting that

their negative conclusion with respect to the importance of the old-age security motive may have been, at best, premature and quite possibly invalid.

First, the Vlassoffs argued that the prevalence of joint living arrangements of adults with their parents and/or with their children, rather than being viewed as motivated by the need for support during old-age, should be seen only as a stage in the life cycle of the family. Second, "because of the long (time) interval between fertility and security received from sons in old age," they argued that the present value of such benefits could never have been large enough to affect fertility. (p. 488). Third, from responses to their questionnaire indicating that elderly men seldom retire, become senile or stop working (even if they live with their sons), they concluded that "the magnitude of old-age security in agricultural, less developed societies is, therefore, extremely limited" (p. 498).

Fourth, from responses indicating that even the older men interviewed seldom "reflected upon" (p. 491), "thought about" (Table 3, p. 492) or "were pessimistic about" (p. 493) their old-age security, they concluded that further doubt should be cast "upon the role of subsequent filial support in motivating fertility decisions" (p. 498). Finally, since village men willingly allow (some of) their sons to migrate to urban areas, frequently say that they had provided their fathers with better support than the limited support they were receiving from their sons (p. 495), and feel more secure if they are wealthier, they suggested "that economic resources, not an abundance of sons, are relevant factors, that determine security in old age" (p. 499).

The rebuttal of each of the inferences from each of these observations would require more space than is available here.¹⁸ The basic pitfalls in the arguments can, however, be explained rather briefly. First, with respect to joint or extended household living arrangements, while it is true that most households in rural areas of developing countries tend to follow a rather definite life cycle, other research¹⁹ has shown that both systematic variations in such patterns and the basic pattern itself can be explained in part by the old-age security advantages of such living arrangements. Second, as pointed out in the preceding section, in the absence of better alternatives for resolving old-age insecurity, even rather definitive evidence (lacking in this case) of the negative present value of such benefits as calculated at age of marriage for example, is in no way inconsistent with the importance of the old-age security motive. Third, the fact that few men retire (whether or not they live with their sons), are senile, enjoy much leisure, express worry about old age, are very poor, actually say they receive considerable support from their children, and prohibit their sons from living and working elsewhere, in no way contradicts the importance of the old-age security motive. Quite to the contrary, and as noted in the previous section, most of these observations such as that men work until they no longer possibly can, should be seen as evidence of the transaction-cost, moral-hazard and adverse-selection advantages of the traditional intrahousehold system of providing insurance against old-age insecurity. Likewise, the facts that men accumulate land and other assets and allow some of their sons to move and work away from home are all aspects of and evidence of old-age insecurity-reduction strat-

¹⁸For details, therefore, the reader is referred to Datta and Nugent forthcoming.

¹⁹See especially Kolenda (1968), Shah (1974), Carter and Merrill (1979) and Parry (1979).

egies which are complementary to the receipt of support from children. The most serious misinterpretations are perhaps the failure to distinguish between what was observed, namely actual transfers or support from children, from that which is relevant to old-age security, the expectation of such support when it is needed. Finally, as should be clear from the previous section, even if the Vlassoffs were correct in their conclusion that old-age insecurity is not important for rural men, since it is women who would be expected to be more subject to the motive, the hypothesis that it is important in explaining fertility behavior, household structure and other phenomena should not yet be rejected. Thus, as in other studies, the most telling error is that they have chosen an inappropriate sample, males instead of females.

Before embarking on costly programs of social policy, the benefits of which are uncertain, frequently governments or other institutions attempt to overcome the usual problems of the type noted above in econometric studies of behavior under uncontrolled conditions by undertaking controlled experiments with pilot applications of the relevant policies. Notably, however, despite the shortcomings of the aforementioned studies of the effect of old-age pensions, and the obvious applicability of experimental techniques in studying their effects, no such experiments have yet been carried out on old-age pensions. The only experiment that is even remotely related²⁰ is that with respect to a "No-Birth Bonus Scheme" (NBBS) offered to married women on selected South Indian tea estates beginning in 1971, the results of which were reported in Ridker (1980).

²⁰While a no-birth bonus scheme is, of course, something quite different from an old-age pension scheme, the fact that the no-birth bonus was to be paid into an account which was usable only upon "retirement", in this case the end of the fertile portion of the woman's life cycle, gave it a character which was a combination of an old-age pension system and a bonus scheme.

The women in the study were located on 18 different tea estates, divided into three groups, namely, three estates on which the NBBS was offered along with a comprehensive maternity, child care, educational welfare program designated CLWS which aimed at promoting the quality instead of the quantity of children, nine estates on which only the CLWS was initiated, and a control group of six estates in which neither program operated. Records were kept on approximately 1000 women in each of the three groups of estates. The results indicated that between 1971 and 1977 the crude birth rate fell, and contraceptive use increased in all three groups. The changes in the control group, however, were in keeping with the national trends in India, whereas in the other groups the trends were accentuated, especially in the group with both NBBS and CLWS.

Shortcomings of the study are (1) the limited representativeness of the sample,²¹ (2) the failure to account in any way for prior affiliation with the existing old-age security type pension fund, (3) the less than optimal ways in which the schemes were implemented and administered,²² (4) the exclusion of all statistics other than group means and of all differences between groups other than educational levels, (5) the insufficient length of the time period studied, and (6) at least for current purposes, its limited relevance to the old-age security motive. Nevertheless, despite the shortcomings both in the study and the experiment itself explained in Ridker (1980), the considerably sharper reduction in the crude birth rate in the pension-type NBBS-CLWS group than in the CLWS only or control groups is certainly worthy of attention.

²¹Unusually high percentages of the population on such estates are members of the Christian religion and tribal minorities

²²Many people on the estates were left uncertain about their participation, the nature of the benefits, and the purpose of the program.

III. What People Say about the Old-Age Security Motive for Children

The previous section has documented the dearth of both systematic and sufficiently realistic theorizing and technically sound and relevant empirical studies concerning the old-age security motive and/or the effects of the introduction of formal old-age and disability pension and insurance systems in rural areas of developing countries and especially on female attitudes and behavior where and for whom these motives and systems would be of greatest importance.

Given the rather negative conclusions as to the importance of the motive that have been drawn from the existing studies, and especially some of the better known ones, we deem it relevant to turn to a somewhat different literature, mainly descriptive case studies and village surveys, to see what rural people in general and rural women in particular have had to say about the old-age security motive.

While we do not pretend that our survey of this literature is exhaustive, we have made a deliberate attempt to draw upon the literature for many different regions of the world so as to minimize the danger of generalizing from unrepresentative interviews.

Among societies where interviews have turned up the importance of children as sources of old-age security are: Bangladesh, Botswana, China, India, Indonesia, Japan, Kenya, Korea, Malaysia, Mexico, Nepal, Nigeria, Philippines, Solomon Islands, South Africa, Sri Lanka, Thailand, and Yugoslavia.

This brief list of societies in which the old-age security motive has been alleged to be of considerable importance in fertility behavior is certainly incomplete. Undoubtedly, it could be extended quite considerably.

One of the more comprehensive investigations of the importance of the old-age security motive for children in a variety of countries is the Value of Children Project. The second phase of this project involved detailed, in-depth interviews with some 29,403 married young adults in nine countries, two of which are highly developed, Germany (Federal Republic) and the United States, and one of which may be regarded as somewhat developed, Singapore, and the rest less developed, Indonesia, Korea, Philippines, Taiwan, Thailand and Turkey. Each respondent was asked to indicate, using a 3-point scale, how important each one on a long list of reasons was. The results as reported in Kagitcibasi (1982, Table 1, p. 34) are given in Table 1.2 of the main report.

Several characteristics stand out in these results and their relevance to the hypotheses given above. First, the old-age-security value of children is seen as great in developing countries but not in developed countries. Second, in every country -- developed or developing alike -- the percentage of women giving old-age security as a very important reason for having a child is greater than that of men. The same is true of the old-age value of children as the "reason for wanting another child" in all countries except Taiwan (perhaps because of its rapid development in recent years).

As shown in Table 1.3 of the main report somewhat similar results were obtained from the question "would you expect your son(s) (daughters) to support you financially when you grow old?" Specifically, in each of the less developed countries at least 79 percent of the women and 76 percent of the men responded "Yes" as far as their sons were concerned. In the somewhat developed country (an entirely urban country), Singapore, these percentages were 39 percent and 31 percent respectively and in the United

States 12 percent in both cases. This table also supports a third proposition mentioned above, namely that male children are more important in this respect than female children.

An even more comprehensive survey is that of 173 "Knowledge, Attitude and Practice" surveys undertaken between 1950 and 1970 in various parts of the world. As reported by Mathew (1975, p. 103) the results revealed parents' "evaluation of children as the source of family strength and the economic anchor of the family and sons as the security against old age" to be the major motive for desiring children. See also Bulatao (1979).

Of course, this is not to say that it is the dominant motive or that people who mention the old-age security motive in interviews may not be attributing to this motive what are closely related but nevertheless distinct kinds of motives. By the same token, however, other motives mentioned in such interviews, such a "survival," "viability," the desire for survival of the family line," and "prestige," may well be proxies or guises for the old-age security motive. Hence, there is very considerable prima facie evidence for the relevance and importance of the old-age security motive for fertility in rural areas of LDCs.

IV. Traditional Modelling of Household Decisionmaking and Especially Fertility Behavior in the Light of the Descriptive Literature

Although there have been several recent suggestions that some household decisions could or should be modelled from the point of view of cooperative or non-cooperative games and other strategic forms of decision-making,²³ for the most part the applied economic literature and in particular empirical studies have increasingly viewed such decisions as being made within a simultaneous equation system wherein, e.g., fertility and/or marriage decisions, are depicted as being made simultaneously with those of labor force participation, education, savings and household formation.²⁴ This framework has many advantages in attempting to capture indirect influences and for analyzing the interdependencies which indeed exist among these variables in a relatively simple manner. The simultaneous equation framework, however, is justifiable only if (a) the various decisions related in the analysis are made at more or less the same period of time and hence with the same available information and values of the exogenous variables, and (b) the various decisions are made by the same decision-maker so that the same objectives or utility functions and resource constraints would apply in all cases. How realistic are these assumptions?

While the lack of realism of assumption (a) has been generally acknowledged, the failure to realize the important degree to which the realism of assumption (b) is violated is rather astonishing. This failure would seem attributable to the extremely casual regard that has been given to the precise identification of the appropriate decision-makers in household deci-

²³See for example Brown and McElroy and Horney (), Pollak (1982).

²⁴See, e.g., Rosenzweig and Evenson (1977).

sions. The result has been considerable ambiguity and inconsistency from one analyst to another about the identity of the relevant decision-maker e.g., the household head, the wife, the married couple, or the household. Quite frequently, the decision-making unit is chosen quite arbitrarily, seemingly for convenience according to how the data comes or can be most easily collected.

Next we turn to the modelling of individual household decisions. First with respect to marriage decisions, following Becker's influence, marriage models, even those for LDCs, have treated them as if they are made by independent individuals who invest in the search for a suitable marriage partner until the likelihood that they would find a more suitable partner by further search is not sufficiently high to justify the extra investment in search. Likewise, fertility decisions are frequently modelled as if they are taken by married couples or even by entire households. Fertility models in developing countries, moreover, often devote considerable attention to the effect of female labor force participation to the relationship between fertility and infant mortality and the various possible lags between decreased infant mortality and reductions in fertility, and to the effect of the exogenously determined structure of the household.²⁵ Where the interests of different agents are considered, potential points of conflict among decision-makers are conveniently resolved by the introduction of altruism in the utility functions of the respective agents.

Since as mentioned above the effects of any old-age security system on fertility could be expected to materialize in large part only indirectly through changes in household structure, resource allocation (including labor force participation, savings and investment), age-at-marriage, and

²⁵Some recent exceptions are those of Yotopoulos (1982), Rosenzweig and Wolpin (1981, 1982), Entwisle (1982), Parsons (1983).

infant mortality, Chapter II of the main study provides a brief survey of the descriptive literature -- from case studies, attitudinal surveys, village studies and cultural ethnographies on each of these issues. This survey is then used in order to derive the following implications for judging the adequacy of the aforementioned conventional economic modelling approach and for suggesting better methods for modelling such phenomena.

First, because not all household decisions are made by the same decision-maker, it underscores the importance of correctly identifying the appropriate decision-maker and the appropriate unit of analysis in specific cultural environments for each particular decision under consideration.

Notably, the identification of the appropriate unit of analysis for some decisions in certain rural areas of some developing countries (LDCs) would appear to be different than that in urban areas of LDCs, in developed countries (DCs) and as conventionally modelled. For example, marriage decisions seem to be largely household decisions (i.e., marriages are arranged) in rural areas of LDCs whereas they are usually considered to be individual decisions in DCs and hence have typically been modelled as such. The same may also be true for educational decisions. On the other hand, because of (a) the importance of the distinction between the couple and the household (given the possible presence of several married couples and of those of different generations within the same extended household), (b) the greater interest of the wife in old-age security and (c) evidence that women are explicitly or implicitly allowed to play an especially important role in fertility decisions, it would seem especially important to give the wife-mother a role in determining fertility and infant mortality outcomes in rural LDCs even if no such distinction between the household and the wife is important and therefore conventional in DCs. Hence, the choice of the appropriate unit of analysis, an issue which has been ignored by most

social scientists in their quest for convenience and expedience in research design, cannot be ignored in the rural LDC context.

Second, even though many different kinds of "household" behavior are closely interrelated, because they are made by different individuals or subgroups within the household, it is most obviously incorrect to specify them as being determined within a single simultaneous equation system.

Third, in contrast to the seemingly insatiable propensity of economists to generalize with respect to both time and space, the survey presented in the main report makes it clear that many of the relevant forms of behavior can be understood only in terms of the underlying institutional circumstances. These may well vary substantially from one time and place to another. Chief among the important institutional circumstances which may vary are those in regard to inheritance and property rights, the markets for child and female labor, and the degree of development of capital and insurance markets.

Last, but certainly not least, since all household decisions are in fact made by or within households, and yet since there is much greater variation in household size and structure among households in rural areas of LDCs than there is elsewhere, the structure of the household can be of potential importance in explaining virtually all forms of household behavior in rural areas of LDCs. In the long run, the structure of the household can be affected by a number of influences both endogenous and exogenous to the household. In order for the long run effects of various influences, especially those concerning long run goals like the satisfaction of old-age security, to be fully sorted out and measured, the indirect effects by way of changes in household structure must be included within the analysis. Both marriage and fertility are in themselves important vehicles for

changing the structure of the household, and yet each of these can be affected by household structure. Hence, since the determination of household structure has not been given much attention by economists, and since the evidence from case studies and village surveys concerning their effects seems to belie the stereotyped assumptions that are usually made about them by economists, the explicit treatment of both the determinants and effects of household structure would seem to be an important addition to economic models of household behavior.

V. Methods Used in the Present Study

The purpose of this section is to outline the methods used in Chapters III-VIII of the main report. First, a theoretical model is constructed of household behavior that makes explicit the manner in which the old-age security motive affects household formation and partition, marriage and fertility, choice of technology, resource accumulation and allocation in rural areas of less developed countries. The model is designed so as to be suitable for analyzing both the direct and indirect effects of introducing a formal social security system on these various forms of behavior and to be sufficiently flexible so as to allow for various cultural differences that may well exist between different countries or even regions within a single country.

The model postulates that all household decisions are made rationally, in the sense that they are motivated by a desire to achieve given objectives, subject to environmental, economic and institutional constraints and a set of initial conditions. Within the context of the model, decisions are assumed to be made either by the household as a whole or by individual members of the household, implying both that many of the decisions may be closely interrelated and that any or all such decisions may well be affected by the size and structure of the household. In order to allow for differentiation in the identity of the decision-maker(s) and for variations in the timing of the various household decisions from one such decision to another but also the interdependence of household decisions, different household decisions are depicted as being determined in separate but inter-related modules. This approach contrasts with the approach frequently taken in which interdependencies are represented by a system of simultan-

eous equations which can be traced back to one decision-maker and one set of constraints.

The model consists of five distinct modules. The first module focuses on the structure of the household; the second module deals with the marriage decision for both males and females; the third module concerns the fertility decision; the fourth module is designed to explain the distribution of wealth and its composition across households, and demonstrates how these various components of wealth could be updated over time by short-run production and expenditure decisions. The fifth module determines expectations about future states of the world, including those concerning the relative importance of various different sources of old-age support.

The decision-making unit varies from one module to the other. The first or household structure module adopts the male head-of-household and his son(s) as the decision-makers; the fertility module adopts the wife as the decision-maker; the marriage and resource distribution and allocation modules adopt the household as the unit of analysis. Finally, the expectations module treats both the husband and wife as separate expectation formers. The time frame also varies by module. The household structure module incorporates an infinite horizon in an intergenerational model; the marriage module adopts the lifetime of the "household" or the parents of the potential marriage partners as the time frame; the fertility module adopts the lifetime of the wife as the time frame; the resource allocation module uses a three year or short-run time horizon with constraints on end-year capital stocks, and the expectations module considers a relatively long time horizon broken down into two periods, namely, those of adulthood and old-age dependence.

In the household structure model, the individual married male attempts to maximize utility over his lifetime, which consists of two periods, adulthood and old age, subject to his resource constraints. Utility is a function of the real consumption streams attained in each of these periods and the degree of extension of the household. To reflect the condition of imperfect capital markets, the resource constraints are expressed as separate ones (with neither carry-over nor borrowing capabilities). He chooses the optimal degree of household extension (and the optimal consumption flows) which satisfy his constrained optimization problem in an overlapping generation context in which father is like son. Various hypotheses are suggested by the model, including that the degree of household extension should be greater in (a) wealthier households than less wealthy ones, (b) communities with less well developed financial markets, (c) households with less educated sons but more educated fathers, (d) households in which the son has fewer children and (e) households and communities in which pensions and other sources of old-age support are less available.

The marriage model is one in which the household attempts to maximize its utility defined in terms of market goods and marriage services, subject to its resource constraints consisting of both time and income. Both market goods and marriage services are functions of the time allocations of the husband and wife and in the case of market goods the time of other individuals as well. The marriage transaction consists of an exchange between two households of the value of husband-time for that of wife-time and a net monetary transfer (the dowry or bride price) to equate the values transacted between the two households. The dowry function, which identifies the factors which affect the size and direction of the side transfer, plays a large role in the model. This model, too, suggests a number of

testable hypotheses such as (a) households with more land will have their sons marry younger and get younger wives for them as well, (b) households with relatively few adult females will have their sons marry younger in order to import a wife earlier and (c) households with other reliable sources of old-age support will marry their sons at older ages and have somewhat older wives for them as well.

In the fertility model the wife-mother chooses between child services (defined in terms of both the number of children and the quality of children) and other goods so as to maximize her utility subject to the constraint in terms of time and income which the household allows her. The quality of children (education) is assumed to be largely determined by the household as a whole and the household head in particular, not by the wife alone. Therefore, it might be the case that greater expectations of education of children might increase fertility, rather than decreasing it as suggested by more standard models. Other implications of the fertility model are that, (a) other things being equal, the older the age-at-marriage of the wife, the higher the rate of fertility during her productive years that would be expected, (b) the higher the level of education of the wife, the lower would be her fertility, and (c) in the rural extended household context at least, one would not expect fertility to be lowered by labor force participation, (d) older women living in extended households (i.e., with married sons in the household) may stop having children sooner and thus have lower fertility rates than those living in nuclear households).

The resource allocation and expectations formation models are sufficiently detailed and of lesser interest in themselves (their role is mainly to provide an appropriate framework for conducting the empirical analysis) to make it impractical to summarize them here.

Since the variables to be explained in the household structure and expectations modules, namely the dummy variable for living in a nuclear household, and the likelihood-of-support during old age from specified sources are variables which take on only discrete (as opposed to continuous) values, these models were estimated with maximum likelihood techniques, logit in the former case and two-stage probit in the latter case. The marriage model, since it involves three decisions which could be made simultaneously, was estimated first by three stage least squares. After some preliminary testing, however, which revealed the system to be recursive, the system was reestimated by ordinary least squares. Since the fertility model is basically a single equation model with a regular (continuous) dependent variable, it was estimated by ordinary least squares. The resource allocation model, because it involves, at least in principle, a number of variables to be determined simultaneously, was estimated with two-stage least squares.

As mentioned above, the models or at least portions of the models, are estimated with two relatively large-sample micro-data sets, the Additional Rural Income Survey (ARIS) from rural India and the Malaysia Family Life Survey (MFLS) from peninsular Malaysia. Although neither of the data sets was developed with the specific focus of this study in mind, the data sets are nevertheless quite advantageous for testing a number of hypotheses relevant to estimation of the direct and indirect effects of the introduction of an old-age pension system.

Naturally, because the two settings are about as different as can be found in developing countries, Malaysia being characterized by relatively high incomes and extremely rapid growth and rural India by desperate poverty and virtual stagnation, considerable differences in findings could be expected.

VI. The Empirical Findings

With respect to the innovations in modelling suggested and implemented in the study, the results in general provide ample demonstration of a number of hypotheses.

1. General Modeling Features

First, they provide substantial support for the existence of various interdependencies among the modules. The fertility variables, for example, have effects on current household structure and yet current and/or expected future household structure, in turn, has significant effects on age-at-marriage of both marriage partners, on female labor force participation and on a variety of expectations with respect to sources of old-age support. Likewise, age-at-marriage of the wife affects both fertility and female labor force participation. Such interdependencies demonstrate the validity of the view advocated in this study that the appropriate policy implications concerning the effects on fertility of institutional changes, like the introduction of an old-age pension and disability system, cannot be derived without fully taking into account the various indirect effects acting through household structure, resource accumulation, marriage age, and expectations formation. The results demonstrate also that most of these indirect effects are quite important.

Second, considerable evidence has been presented in support of the hypothesized differences in the identities of the various decision-makers from one decision to another. In particular, certain individual-specific variables like education, years married and the number of own-children significantly affect the household structure variables. Likewise, the significance of the many household variables in determining age-at-marriage

of the marriage partners provides considerable support for the view that marriage decisions are, at least to a large extent, household decisions even in a relatively highly developed and rapidly modernizing developing country like Malaysia. Hence, our results strongly support the view that traditional models of marriage decisions in which decisions are made on the basis of individual preferences and search mechanisms need to be substantially modified before they can be applied to rural areas of developing countries. Also, the Malaysian data provide evidence suggesting that the wife's "demand for", or desired number of, children has a stronger influence on actual fertility than that of the husband, thereby supporting our view that the wife plays a large role in fertility "decisions." The importance of the wife-mother's age in the determination of actual relative to potential fertility that is revealed in the results for India also support this view.

2. Household Structure

With respect to the household structure model, it was found that both the probability of being a household head and that of living in a nuclear household rise with (a) the number of years married (but at a decreasing rate), (b) the number of one's own children, and (c) the presence of financial institutions in the village. As hypothesized, greater educational attainment on the part of the son raises these probabilities whereas in the case of the father, greater education lowers these probabilities.

Substantial evidence was also presented from the Malaysian data for the existence of intergenerational continuity in household structure. For example, both current transfers to parents (MONFOODH) and expectations of extended household living arrangements during old age (OAHS) were found to be significantly negatively related to the probability of living in a

nuclear household. As hypothesized, the effects of the level-of-wealth variables on household structure vary according to the form in which wealth is held. In general, as hypothesized, when wealth takes the form of land, greater wealth increases the degree of household extension. On the other hand, more machinery and other forms of wealth tend to reduce it.

The effects of participation in or expectations of support from the Provident Fund on household structure seem to vary from sample to sample. For example, the Indian results show that Provident Fund participation reduces household extension only for non-cultivating rural households.

Finally, the results for both India and Malaysia indicate that, even after accounting for differences in educational attainment, wealth, education, occupation, age and even crop from one location or ethnic group to another, the regional and ethnicity variables turn out to be highly significant. This indicates the need to consider ethnic and regional differences in all such analyses.

3. Age-at-Marriage

With respect to the model of marriage services, the results for India showed that age-at-marriage of both marriage partners tends to be reduced by wealth in forms that may be considered complementary to marriage services including children (child labor), such as land, irrigation, and livestock. Wealth in a form which substitutes for marriage services (and labor in general), such as agricultural machinery and tractors, tends to raise age-at-marriage of the wife. The age-at-marriage of both marriage partners is higher in households with higher percentages of the total household membership in the forms of adult women and of children, thereby being consistent with the hypothesis that, when the existing portfolio of household members is skewed in the direction of those members such as women and chil-

dren the number of whom can be added to by marriage, the incentive for early marriage of one's sons is reduced. The results for the Malaysian sample indicate that both the index of household extension during the husband's youth and that at marriage tend to reduce age-at-marriage of the male. Likewise, the wife's index of extension during her youth raises her educational attainment level and reduces her age-at-marriage.

The Malaysian results also reveal that the higher the educational attainment levels of both the husband and his parents, the higher his age-at-marriage would be. Likewise, the higher his educational attainment and the education of his wife's parents, the higher would be the wife's educational attainment level, at least among non-cultivating households. Finally, the higher are the levels of education of herself and her parents, the higher is the wife's age-at-marriage.

Participation in or expectations of support from the Provident Fund tends to raise age-at-marriage of the male in both samples and that of the female in the Malaysian sample. In the case of the Malaysian results several of the wealth-Provident Fund interaction terms are significant, making it more difficult to generalize and to interpret the net direction of such effects.

Finally, the Malaysian results show that, even after allowing for many differences in personal, household and community characteristics between the different ethnic groups in Malaysia, (1) Chinese and Indian men tend to get married later than others, (2) Chinese and Indian men are more likely than Malay men to choose wives who are less educated, and (3) Chinese but not Indian women tend to get married later than Malays.

4. Fertility

Of greatest relevance and importance to the purposes of the study are the results of the Fertility or Child Services Module. Both the Indian and Malaysian results tend to show that, the longer is the effective duration of marriage, the larger is the number of surviving children, and the greater are the expectations concerning the educational attainment of such children, but the lower is the ratio of actual to natural fertility.

Not surprisingly, both husbands' and wives' education tend to raise expectations of educational attainment of the children. The effect of educational attainment of the wife in reducing fertility is stronger in nuclear households and in Malaysia among Chinese than in other women.

The effects of female labor force participation rates both before and after marriage on the quantity and quality of child services are much weaker than generally supposed. This finding suggests either the lack of female-time intensity in child bearing and rearing in the developing country context or that there are numerous close substitutes for the wife's time in such activities. Consistent with the hypothesis stated above, the Malaysian results show that greater expectations of educational attainment of children have a relatively strong positive effect on the fertility variables. Such a finding, however, can be explained by the fact that, from the wife's perspective, and in a situation in which the educational attainment of her children is the responsibility of other parties (such as her husband, the extended household, or the government), increased expectations of educational attainment would enhance the value of any given quantity of children and hence induce her to want more surviving children. As such, in contrast to the implications of the Becker-Lewis quantity-quality model, there would be no trade-off between quantity and quality. Rather than being substitutes for one another, they would be seen by the wife-mother as complements.

Consistent with the assertion of lower sex preference in favor of male children among Malays than among Chinese or Indians in Malaysia, the Malaysian results show that the effect of the dummy variable for the first two children being females is insignificantly different than zero for Malays but significantly positive for Chinese and Indians.

As already mentioned, an important finding is that the wife's preference for number of children has a larger and more significant effect on the fertility variables than that of her husband. This finding provides empirical support, both for the separation of the Fertility Module from the Marriage and Resource Allocation Modules and for designing the Fertility Module equations as if they are decisions of the wife.

Data on the expectations of old-age support variables are available only in the MFLS data. The Malaysian results for this module allow us to state the following propositions of relevance to the primary focus of this study:

(1) The processes of expectations formation concerning the likelihood of different sources of old-age support are similar between men and women.

(2) There are, however, distinct differences in such expectations from one ethnic group and location to another, reflecting the importance of both cultural and environmental conditions in the determination of expectations of various sources of old-age support. For example, Indians, rubber workers and professional workers are more likely to have higher expectations of old-age support from pensions than are others. On the other hand, old-age support from the work of oneself or one's spouse tends to be more expected by agricultural workers and by Malays than by others. Savings as a source of old-age support is considered more likely among wealthier, more highly educated persons living in smaller households. Finally, old-age support from children is deemed more likely by Chinese parents and

by those living in relatively poor households that are currently practicing some forms of household extension and/or which expect to do so in the future.

(3) Instead of all sources of old age being substitutes for one another, given the initial conditions of contemporary Malaysian households, in reality some sources are complementary to others. In particular, when the likelihood of old-age support from pensions rises, that with respect to savings falls but that from work rises. The net (overall) effects of one such source of old-age support on another can be very different than the direct or gross effects. For example, while the direct effect of the expectation of a pension on the expectation of support from children is positive, this may be more than offset by the negative effects operating indirectly through the effects of the former on expectations of support from work and savings.

(4) With respect to the determinants of the desired number of children, there is less similarity between men and women. While the effects of the variables measuring prices are quite similar between women and men, the effects of income-like variables and expectations concerning the various sources of old-age support are remarkably different. While the demand for children on the part of women is positively affected by expectations of support from children, that of men is negatively affected by the husband's expectations of support from children. Likewise, whereas the wife's desired number of children is significantly raised by an increase in her expectations of old-age support from work and savings, this is not the case with respect to the husband's desired number of children.

The Indian results, especially those for the Resource Allocation model, have provided sharper results with respect to effects of household structure. Of particular interest and relevance to the main focus of the

study is the finding that nuclear households tend to be much more sensitive to price and price-like variables and also to the presence or absence of institutions like banks, schools, extension agents and affiliation with the Provident Fund than extended households. Evidence was also provided suggesting that extended households are either more efficient or have lower transactions costs than nuclear households. On the other hand, the results showed that larger households, and those with higher percentages of women and children in the household, tend to have lower savings rates. Since the Malaysian data contain households with a greater variety of ethnic and occupational characteristics, the Malaysian results have (in a rather complementary way) shown that, even in similar locations and types of households, behavioral patterns and responses to policy changes can vary considerably from one ethnic or occupational group to another. The results of the Expectations Module go even further in suggesting that even within the same households, both the determinants and the effects of expectational variables and in particular the effects on the desired number of children, may vary considerably between husbands and wives.

From these complementary findings, therefore, emerges the conclusion that the effects of policy changes are likely to vary not only between different types of households but even within households. This calls attention to the need for more serious investigation into the way in which different individuals in the household relate to one another and to the decisions made in and by households and to the interdependencies among institutions, expectations formation, household composition and behavior.

In Chapter IX of the main report, the results are presented of a simple attempt to quantify the direct and indirect effects on fertility of a hypothetical increase in expectations of old-age support from pensions and the Provident Fund (PPI). The experiment utilizes the results for Malaysia

only since for the fertility and associated variables the Malaysian data are somewhat better suited than the Indian data. More specifically and for convenience of calculation, especially with respect to the indirect effects, these are calculated with the results of the total number of own children variable (OWNCHILD) given in Table 8.8 of the main report.

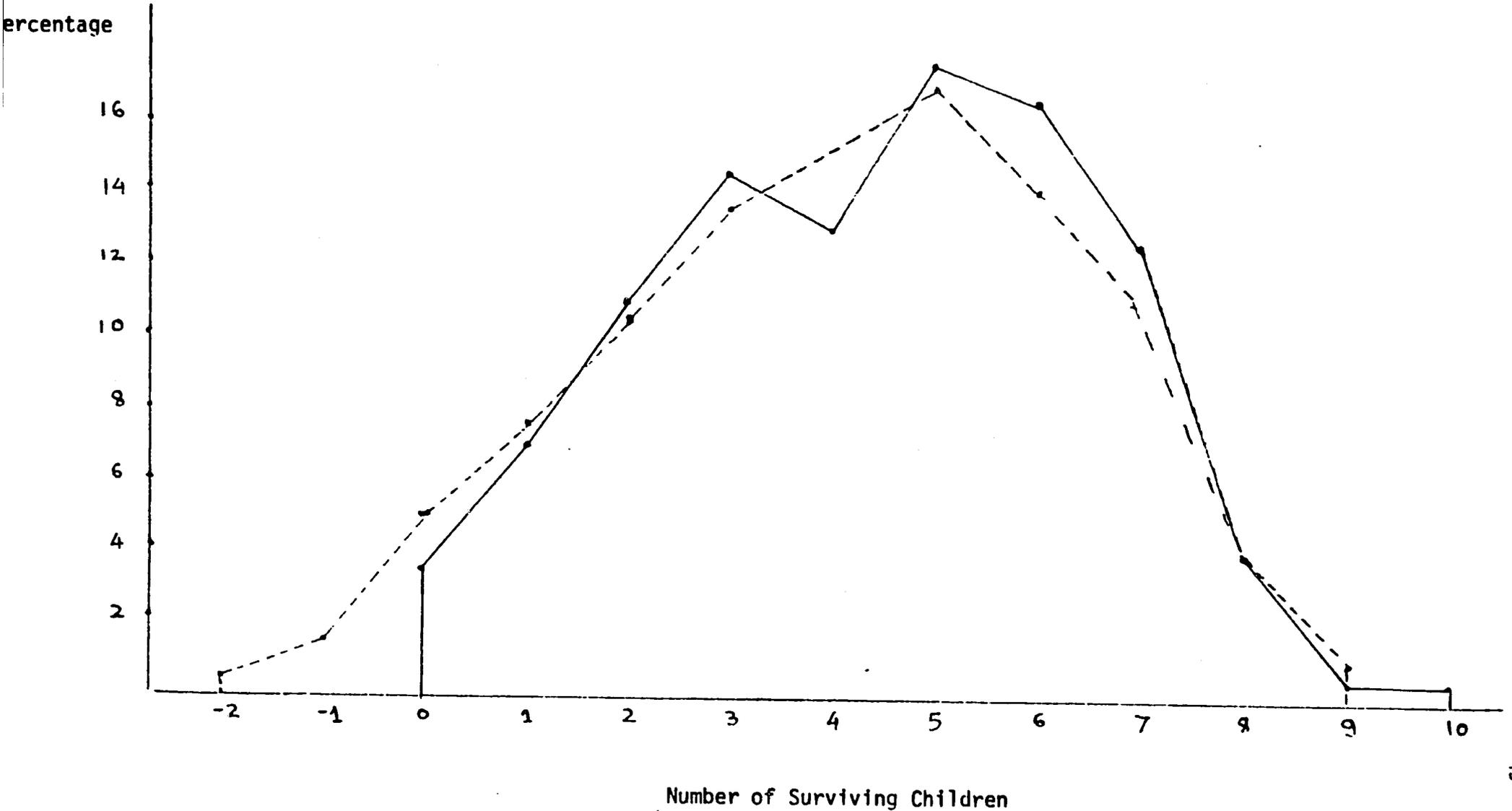
The sample mean of the wife's expectations with respect to the index of old-age support from pensions (PPI) was about two on a five point scale. The mean value was somewhat higher among non-cultivating households than among cultivating households and among Chinese than among Malays. PPI was quite a bit higher (3.118), on average, among Indians. The hypothetical experiment is to give all women in the sample a value of PPI of 3.0. Naturally, while this means raising the value of PPI for the majority of women in the sample, for some women, especially ethnic Indians in Malaysia, this involves reductions in the observation-specific values of PPI. The effects of the change in PPI were then simulated by comparing the predicted values of OWNCCHILD from the regression equation given in Table 8.8 among members of the sample in two different situations: one, in which all right-hand side variables take on their actual or observed values, and, the other, in which the same actual or observed values are used for all right-hand side variables except PPI, in which case each observation (member of the sample) is given a value of 3.0 for PPI.

The result of this simple experiment is shown in Figure 9.1. This figure summarizes the frequency distributions on the number of surviving children in the sample of Malaysian ever-married women in each of these two situations. The solid lines join the points representing the approximate percentages of the women actually having the numbers of surviving children indicated on the horizontal axis when all women in the sample and their households are assigned their actual values for all right-hand side vari-

Figure 9.1

Actual and Simulated Fertility Distributions (Number of Surviving Children) in MFLS Women:
Simulation based on Giving All Women a Value of the PPI Expectations Index of 3,
i.e., a Likelihood of Old-Age Support from Pension, Provident Fund and Insurance
of "It Depends" (neither likely nor unlikely)

Code: ——— Actual Distribution
----- Simulated Distribution



ables. Similarly, the dotted line is used to approximate the corresponding frequency distribution in the case in which all other variables except PPI take on their actual values and all members of the sample are assigned a value of 3.0 for PPI.

Although (a) this experiment captures only the direct effect of the changes in PPI and (b) the magnitude of the simulated policy change is rather modest, the simulated effects are quite apparent. Note in particular that the distribution is cutoff at the upper end, nine being the highest number of surviving children to be attained in any significant numbers in the "simulated" distribution instead of ten as in the "actual" distribution. The frequencies of five, six and seven surviving children are also reduced somewhat. At the other end of the scale, note that the frequencies of those with one, zero and even "-1" and "-2"²⁶ children are increased significantly. The emphasis on changes at the bottom end of the distribution arises primarily from the fact that, for women with no wealth, who are typically also the youngest women and those with the fewest children, the total direct effect is limited to that represented by the significantly negative coefficient on PPI of -0.184 shown in the "All Women" column in the regression results for the OWNCHILD equation in Table 8.8 of the main report. For women from households with various kinds of assets this negative effect would be partially, or perhaps even more than, offset by the positive effects of the increased PPI operating through the wealth-PPI interaction terms. Hence, the results would seem to suggest that it would be primarily the poorest women whose numbers of surviving children would be most sharply reduced by the spreading of a pension system. Whether a pension system would tend to spread to the poorest people is, of course,

²⁶Negative numbers of children are, of course, an impossibility. These values should be thought of as zero.

another matter. As has been mentioned repeatedly, and experience in various countries has suggested, typically old-age pension systems are confined to relatively well-off households with the political clout to "demand" such systems.

As noted above, this simulation captures only the direct influence of PPI on the number of surviving children. Additional indirect influences would come by way of the influences of PPI on the expectations of other sources of old-age support and their effects on the desired number of children of the wife and husband, which in turn could affect the actual number of children. Likewise, other indirect influences would come by way of the effects of the Provident Fund participation or expectation variable on marriage ages of the marriage partners and hence on the number of years married, educational attainment expectations of parents for their children. In Table 9.1 of the main report (reproduced here) the sum total of the direct and indirect effects is estimated to be 0.272, of which -0.088 are the indirect effects. These estimates are subject to some important limitations (stated in the main report) and hence should be considered primarily illustrative in nature.

Table 9.1

The Effects of a Unit Increase in PPI(H)
on the Number of Surviving Children

<u>Type of Effect</u>	<u>Change in Variable</u>		<u>Coefficient of the Variable in the OWNCHILD Equation</u>	<u>Magnitude</u>
Direct Effect				-0.184
Indirect Effects				
via NSTAR	-0.190	•	0.102	-0.019
via NSTARH	-0.100	•	0.052	-0.005
via HOUST1	-0.014	•	0.097	-0.001
via YEARSM	-0.238	•	0.253	-0.060
via EDUCF	0.014	•	-0.082	-0.001
via EDIND	-0.002	•	0.316	-0.001
Total Indirect				-0.088
Total Effect				-0.272

Source: Tables 8.1, 8.4-8.8, and 8.10-8.15.

See Text.

VII. Unsolved Issues

Although some attention has been given to the explanation for actual fertility and indeed actual fertility relative to potential fertility, the emphasis in the study has been on the demand for fertility. A more balanced and complete treatment would require that considerably more attention be devoted both to "supply" factors, such as the ability to conceive, health and the opportunity for sexual intercourse, and to factors intermedating between supply and demand, such as the availability of information on birth control, the access to and price of birth control techniques and the practice of birth control.

Likewise, while considerable attention has been given to the total number of surviving children over a period and to the average rate of such fertility, i.e., the total number of surviving children relative to the potential number (calculated from the number of years married), virtually no attention has been given to the timing or sequencing of the various direct and indirect effects on fertility of the introduction of old-age pensions. Timing is, of course, rather important for several quite distinct reasons. First, especially when the time required for all the effects to be worked out is long, the timing of effects, i.e., of the various benefits and costs, is of crucial importance in calculating the present value of the net benefits (and hence of the desirability) of the policy under consideration. Second, given the complexity of the indirect effects involved, these effects cannot be completely understood or therefore satisfactorily modelled unless the exact sequencing of effects, the degree of adjustment of each variable and the signaling mechanisms are identified and measured. Much more would also have to be known about the

effects of the introduction of old-age pension systems on the spacing of children and on infant and child mortality since, as has been emphasized in much of the simulation literature,²⁷ the actual number of births required to satisfy certain target desires for old-age support can be greatly affected by the way in which children are spaced. Spacing, in turn, may affect infant and child mortality.

In view of the fact that the study has provided considerable evidence of both (a) rapidly changing environmental and institutional conditions both over space (i.e., from one region or country to another or even from one ethnic or caste group to another within a particular region) and over time, and (b) the sensitivity of various kinds of behavior to environmental and especially institutional differences, considerably more research of a similar nature would have to be undertaken for samples of people facing different environmental conditions, and for the same samples at different points in time in order to distinguish more sharply and adequately between the effects of changes in environmental conditions over time, and those of both the life cycle of individuals and households and differences between one household and another.

As noted in the main report and in the simulation experiment reported above, neither the rural Indian nor the Malaysian samples would seem to indicate that either the direct or indirect effects of the introduction of old-age pensions would seem to have been very large. Given the strong prima facie evidence in terms of what people say about their motives for fertility and living in extended households, namely that the old-age security motive is extremely strong, the empirical findings in this study of relatively weak effects are somewhat surprising.

²⁷See especially Enke and Brown (1972) and O'Hara and Brown (1973) which contrast with the earlier results of Heer and Smith (1968, 1969).

The relatively small size of the effects observed to date from the experience with old-age pensions in the rural Indian and Malaysian samples could be explained in a number of ways. First, it could be that, despite participation in Provident Fund program, individuals do not seriously consider the old-age benefits, either because they lack confidence in the ability of government programs to live up to their promise or because the programs themselves are sufficiently lenient with respect to permitting withdrawals and loans from accumulated funds to be made that participants even in well-managed funds cannot, in fact, count on much for old age or disability.²⁸ Second, and somewhat related to the first explanation, is the possibility that other features of the Provident Fund program, such as childcare services and medical insurance covering pregnancies could be sufficiently pro-fertility so as to offset the anti-natal effects of the old-age pensions themselves. Third, the relatively slight observed fertility and other responses to participation in the Provident Fund of rural India and Malaysia could be attributable to the fact that these programs are not sufficiently directed to women, the persons for whom the old-age security motive may be most important. Fourth, the reason could be that, despite the rather substantial efforts made in this study to distinguish between Provident Fund participation and wealth, occupation, education etc., the number of participants in the programs, especially those in rural areas is sufficiently small, and sufficiently biased in the direction of specific occupations, educational levels and wealth, that what are in reality the effects of Provident Fund participation are at present being attributed to

²⁸Since in the case of the Malaysian data the measure of old-age pension program participation is not simply affiliation with the program but rather the expectation of such support in old age, the fact that the effects turned out to be relatively weak also for Malaysia undermines the plausibility of this particular explanation.

these other related factors. Fifth, the explanation could be attributed to the relative importance of counteracting influences, such as that of goal-recognition identified in the study. Finally, it could be that, because of the multiplicity of factors identified in Section I above making children better sources of old-age security than the available alternatives, the satisfaction of one of these factors, such as making an alternative available, is insufficient for reducing the dependence on children. For example, even with sizeable pension payments coming in, old people may be dependent on their children for support if the goods and services they need cannot be purchased in the market. Naturally, since the policy and other implications to be derived from the relatively low observed response to Provident Fund participation vary tremendously depending on which explanation for the observed low-response is the correct one, more research is needed to permit the proper explanation to be derived before policy implications can be derived with any degree of confidence.

Among the indirect effects, the least well explored in this study is that indirect effect on fertility by way of savings and the accumulation of wealth. Because of the absence of savings, expenditure and income data from the Malaysian sample, it was not possible to study the effect on savings in this sample. While the effect could be measured with the rural Indian data, the time interval covered was unfortunately only three years, thereby limiting the usefulness of the results obtained from this data. Moreover, the dating of the capital stock measures, generally that at the time of the survey, but in one case at the time of marriage, was such that these measures of past savings accumulation on fertility and other behavior were by no means very good measures of wealth at times relevant to the fertility decisions. Another shortcoming of the wealth measures employed in

the surveys used was that since the measures pertained to that of the household as a whole, they were not necessarily relevant to the couple or to the ever-married woman whose fertility was measured.

Another area of deficient knowledge has to do with the type of old-age pension and disability insurance program that would be most desirable. Would men and women respond in fertility and other related behavior more to a pay-as-you-go system than to an accumulation-type system? Would the women respond more if it was they who were taxed (at least in part) instead of their husbands? Would they respond more or less to their husbands disability insurance than to widowhood benefits? What would be the effect of variations in the magnitude of the benefits involved? What would be the effect of differences in the form of payment of the benefits, e.g., lump-sum versus monthly payment? All of these questions are of practical importance and hence are deserving of further research.

VIII. Policy and Other Implications

In the light of the various unresolved issues identified in the previous section, the links in the chain between old-age pensions and fertility are still insufficiently clear to allow the appropriate policy implications to be derived with any degree of confidence. For this reason the most important implication of this study is the importance of further study. While policy analysts might well tend to be disappointed in such a negative finding, such an outcome should not be surprising in this case. This is because as noted in the introduction, prior to this study the old-age pension motive for fertility was without question the least studied and understood determinant of fertility by a wide margin. Indeed, while there has virtually been an entire generation of studies focusing on the opportunity cost of children and hence their current benefits and costs, this is essentially the first systematic study of the old-age pension motive.

Two kinds of studies would seem desirable and complementary to each other. One type of study that is needed is a special-purpose survey which, unlike the ARIS and MFLS surveys, would be specifically designed to get at the effects of Provident Fund or social security-type old-age pension systems in rural areas of developing countries. The survey should be undertaken in a country where there are more rural people involved in social security than in India and should have a larger sample than the number of households surveyed in rural Malaysia. Candidate countries might include Argentina, Brazil, Costa Rica, and Mexico in Latin America; Tunisia in North Africa and Sri Lanka in South Asia. The data collected should be of the panel data variety to allow the time path of the various effects to be estimated and the dynamic interactions and changing exogenous conditions to

be distinguished from various individual, household and community characteristics.

A second type of study which is badly needed is one which takes advantage of some social experiments, along the lines of those conducted relative to the no-birth bonus scheme on Indian tea plantations, reported by Ridker (1980) and summarized in Section II above. Social experiments would seem rather essential for distinguishing between the effects of different types of tax, payment arrangements and for comparing the effects of invalidity insurance, life insurance and old-age pensions.

Fortunately, however, even in the absence of more studies several policy implications may be derived from the present study. These implications may be divided into two groups: one group dealing with factors which would increase the effectiveness of old-age pensions, disability and life insurance programs and the other dealing with policy measures relating to old age and other sources of insecurity which might be advocated in the absence of formal insurance and pension programs.

1. Suggestions for Improving the Effectiveness of
Old-Age, Invalidity and Life Insurance Programs
for Rural Areas of Developing Countries

1. All features of such programs should be thoroughly evaluated so as to assure that they do not possess features, such as child care and the subsidization of maternity care, that would encourage fertility, no matter whether intentional or not, unless such features are specifically justified in social cost-benefit terms on other grounds.

2. The different components of such programs, such as invalidity insurance, life insurance and health centers, should be financed in distinct ways so that the benefits and costs of each of these programs can be

evaluated clearly and distinctly. Especially in Latin America, there would appear to be an undesirable tendency to saddle the financially viable portions of such programs, namely old age and disability, with the budget deficits of the less viable ones such as health care in the absence of a satisfactory user fee system. In the long run such practices are almost sure to make such systems non-viable.

3. Invalidity insurance, life insurance and retirement programs should be financed on the pay-before-you-use or fund accumulation principle more like the Provident Fund programs instead of on the pay-as-you-go principle that characterizes the social security systems of the United States and most Latin American countries. Otherwise, such programs may have a distinct savings-reduction bias and may become financially vulnerable to the aging of the population and rectangularization of the age pyramid that are bound to occur in developing countries in the foreseeable future.

4. Great care must be taken to insure that social security, Provident Fund and other pension funds are managed in the most efficient way so as to assure that the funds accumulated earn the highest possible rate of return and yet avoid losses due to unjustified risks or corruption. If as a result of improper management these programs should prove to be financially non-viable, the public's confidence in such programs is likely to be destroyed permanently.

5. The fact that most pension and old-age insurance type programs are financed out of wage income has the effect of distorting relative factor prices, thereby encouraging the use of capital-intensive techniques. If these tax rates should have to be raised over time to come to grips with the aforementioned unfavorable but inevitable demographic changes, these employment-reducing relative factor price distortions would grow over time.

To avoid unwanted effects of this sort on employment, other sources of finance, such as land, value added or consumption taxes, should be seriously considered.

6. Given the likelihood that the old-age security motive for fertility is greater in women than in men, and considering the evidence provided in this study that women tend to play an especially important role in fertility, the fertility-reducing effects of insurance and pension programs could be made more effective by reorienting these programs more toward women and particularly widows, thereby correcting the strong pro-male bias in most existing programs.

7. The efficiency of old-age insurance and pension programs could also be increased by concentrating such programs in areas in which the economy has already been largely monetized and hence where it would be easier to substitute pension support for that from children than in communities in which few of the services required by elderly people can be purchased in the market.

8. Old-age pension programs should be designed in such a way as to avoid the disincentives to the performance of useful work that have been built into social security programs in the United States and Western Europe. Since at present elderly people tend to do a great deal of useful work in agricultural settings, the effects of any such bias in old-age pension programs in rural areas, if they were to be enforced, would very likely be extremely expensive to administer and enforce and have very undesirable effects in the labor supply of the elderly.

9. To the extent that recommendation 2 above is not adhered to and hence disability and life insurance programs are administered by the same agency that manages the health programs, in order to preserve the financial

viability of such programs an adequate system of appropriate user fees for health programs should be introduced.

10. In view of the limited ability to manage complicated programs in public sector organizations in developing countries and the extremely high costs of monitoring and enforcing restrictive provisions in such programs in rural areas of developing countries, such as the payment of disability insurance only if sick, retirement payments only if retired, such programs should avoid such regulations wherever and whenever possible either by restricting such programs to life insurance or allowing persons to withdraw their funds automatically once they reach a specified age, e.g., 70 years of age.

2. Other Policy Suggestions

As noted above, formal programs face many problems, e.g., free rider problems, adverse selection, moral hazard, mismanagement and corruption problems, which are either not encountered at all or found only on a much smaller scale when these insurance and other needs are supplied within the traditional system of intergenerational transfers within extended households.

Given that in the present study extended households have been found not to have the pro-fertility, savings-reduction and other harmful effects that have frequently been attributed to them by casual observers, and given that extended households may have many other desirable features, such as the risk-reducing effects emphasized by Cain (1983) and others highlighted in this study, efforts should be made to preserve the insurance and other benefits of extended households. The preservation of extended households would in such circumstances constitute an extremely efficient and inexpen-

sive way relative to the formal programs for satisfying a number of the very real security concerns of rural households. Both in that connection and independently, efforts should be taken to avoid the premature monetization of the economy.

If premature monetization can be avoided and the household-disintegration, savings-reduction, breakdown of child discipline and other effects that have seemingly been associated with old-age pension and other related programs in the United States and other developed countries can be avoided, developing countries will have gone a long way toward learning from the errors of the past, a widely noted but seldom achieved advantage of latecomers to development.