From: EVALUATING THE IMPACT OF NUTRITION AND HEALTH PROGRAMS
Edited by Robert E. Klein, et al.
(Plenum Publishing Corporation, 1979)

THE ECONOMIC THEORY OF THE HOUSEHOLD AND IMPACT MEASUREMENT OF NUTRITION AND RELATED HEALTH PROGRAMS

Dov Chernichovsky*
The World Bank
Washington, D. C.

INTRODUCTION

As a theory of choice, household economics offers a conceptual framework in which to investigate the family's responses to changes in its environment. This framework can be useful for policy-makers and planners in formulating hypotheses about the effects of intervention programs. Econometrics, the complementary statistical extension of economic theory, furnishes a versatile statistical framework for testing these hypotheses and quantifying the effects of such programs, as well as increasing our basic knowledge about the interactions between the program and their social environments.

This paper conveys, in broad terms, an economist's approach to the evaluation of nutrition and related health programs. It emphasizes the close link between economics as a behavioral science and the measurement of the impact of intervention programs. In the first section, the basic working assumptions and framework of household economics are introduced and related to the concept of an intervention program. This relationship serves to highlight the economist's conceptual point of departure in analyzing nutrition and health-related interventions and measuring their effects. In the second section, the househould's behavioral objectives that are used to specify and measure the outcomes of intervention programs are discussed. These objectives provide the conceptual framework for considering various properties of outcome variables and measurement problems in section three. Section four discusses the econometric approach to socio-economic studies in nutrition, and section five discusses the basic differences between an experi-

*Mailing adress: Medical, Economics, Health & Welfare Administration, Beersheva 84 120 P.O.B. 653, Israel

mental approach and an econometric approach in measuring program impact.

INTERVENTION PROGRAMS AND HOUSEHOLD ECONOMICS

Health-related environmental programs, like malaria eradication, and largely mandatory programs, like smallpox vaccination, apparently have been relatively successful in meeting their objectives (1), while many personal health and nutrition programs appear to be less successful. A common feature of the environmental programs and the mandatory programs is that their implementation does not require individuals or households to choose how to respond. The environmental programs do not deal directly with individuals or households, and mass vaccinations may leave little or no room for individual or household choice. Programs in health and nutrition, on the other hand, often require active decision-making and behavior change at the family and individual level. Measurement of success or failure of such programs becomes complicated due to several factors including lack of data, relevant statistical tools, or most importantly, the response of the target population to the program.

Malnutrition results largely from a combination of individual and household consumption behavior and hygienic decisions and practices. This fact limits the feasibility, economic and otherwise, of mandatory and effectively controlled nutrition programs; that is, these programs are most likely to leave to individuals and households the choices of whether to participate in a program and how to use resources that become available through it. The fact that families and individuals are required to make choices makes an economic theory of the household a useful evaluation tool.

The household, whether a nuclear or an extended family, is the basic socio-economic unit that makes most decisions about investment in human beings and about consumption. 1/ The significance of a household and an individual to the community is not limited to their role as components of a sum. An individual's education, and particularly his health, often affect the well-being of others in the community; communicable diseases exemplify the interdependence between an individual and his community. This interdependence and certain cultural norms concerning the distribution of well-being among households in the community provide much of the basic rationale for health-related intervention programs.

Economists usually view the household as a harmonious microcosm that makes deliberate and rational decisions. This is a

1/ It is important to realize, however, that in some traditional cultures, tribal or village governing entities might make important decisions about investment in human capital.

basic working assumption employed to identify the systematic part of human behavior by using conceptual parameters and measurable variables. This assumption is eventually "modified" in econometric analyses by taking into account unsystematic variations of behavior. The economic analysis of household behavior can be summarized as follows. 2/ Households and individuals engage in activities to produce "ends", or consumption commodities, that have utility. 3/ These ends compete for the household's scarce human and nonhuman resources because producing more of one commodity implies producing less of others. A change in the household situational environment can change (a) the household's income or wealth, which determines how much a household can produce, (b) the commodities' relative costs or prices, which determine the relative attractiveness of different commodities, and (c) the household's tastes and preference structure. Modifications in household behavior are derived from changes, which an intervention program can promote, in one or more of these. An economic conceptualization of the household's decision-making process is sketched in a simplified manner in Figure 1.

From the viewpoint of household economics, an intervention program has at least one inherent problem: such a program "disputes" the household's ability and even willingness to realize the social consequences of its choice and to meet some specified social objectives. This is equivalent in many instances to questioning the rationality and social adequacy of the household's decision-making process and objectives. There are two critical implications of this problem. First, an effective demand for, or utilization of, program services by the target population cannot be guaranteed; second, even when adequate demand exists, it may stem from private objectives that are not congruent with program or social objectives.

Therefore, a basic requirement for evaluating program impact is to identify the "nonprogram" parameters that determine the household's demand for program services. This identification should help to indicate how much a household will use the program, when it will do so, and what use it may make of the program's resources.

2/ The approach presented here, in broad terms, is based on traditional demand theory and some extensions of this theory by Becker (2) and Lancaster (3). Differences in approach, which bears on the conceptual framework, do (and should) not affect more practical measurement issues.

3/ Those commodities can be abstract as are, for example, "good health" and "services from children".

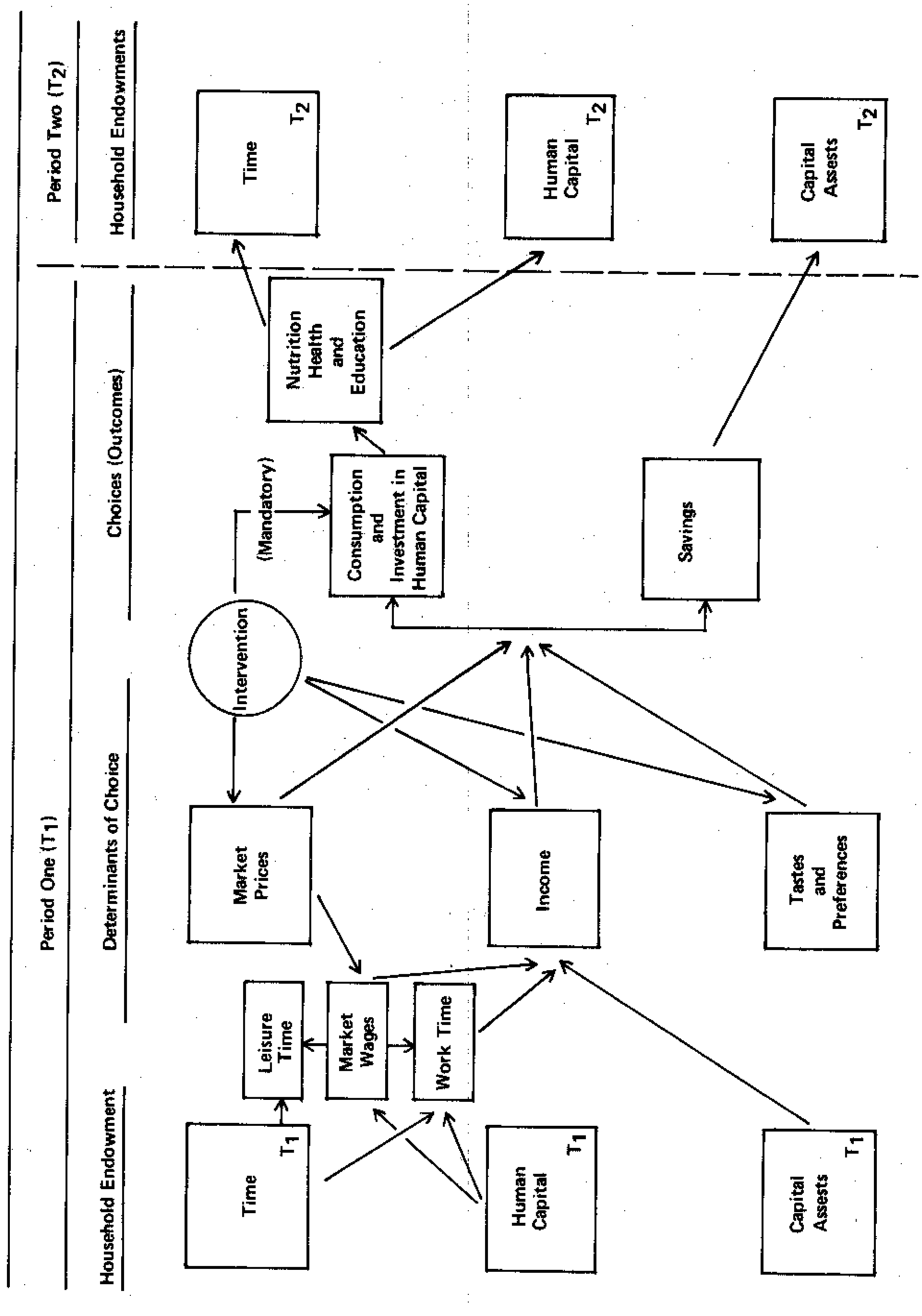

FIG. 1. An economic conceptualization of the household's decision-making process.

Program utilization is a function of (a) the degree the program serves the household's objectives; (b) the degree it draws on household resources; and (c) the relative attractiveness of subjectively conceived substitutes for program services that meet the household's objectives. These points can be illustrated by common examples. Preventive medical care programs, particularly nutrition programs, are often hard to implement because the target populations may not recognize their usefulness. In many situations, health services may compete with traditional practices that households perceive as substitutes. Program services may not be used, even when people recognize their usefulness, because of the relatively lower costs, or higher benefits, of presumed or proven substitutes, and because of the burden the program may impose on a household's immediate welfare, as when people cannot afford the time and transportation costs to go to a "free" clinic.

Program utilization need not be dependent, however, on program objectives. A target household has the capacity to reallocate program resources to reach its own rather than the program's objectives. For example, a mother may feed a particular child less than she feeds other family members because that child participates in a school feeding program. Thus, the mother may attenuate and offset the program's specific objectives and may "spread" its impact. Further, through the effect on one aspect of household life, say child mortality, the program may have an impact on other aspects, say fertility behavior. Although these other aspects may not be among the original objectives of a particular program, nonetheless, one should consider them as possible benefits or costs of the intervention.

By relating program services to household resources and objectives, the economic analysis of the household can help to identify (a) the potential uses of program services; (b) program substitutes; (c) the relative attractiveness of the program; and (d) the extent the program draws on household resources. One can thereby hypothesize who program users will be, how they may utilize the program, and subsequently, what the program's impact may be. The formulation of testable hypotheses about program impact aids in identifying variables and relationships that may measure program impact.

AN ECONOMIC FORMULATION OF HEALTH RELATED OUTCOMES

Program "impact" or "outcome" variables must be identified and discussed in conjunction with households' objectives or ends. This section deals with the household's behavioral objectives, around which we can model family responses to health intervention programs, and on the basis of which we can identify and discuss appropriate outcome measures.

Economists have long sought to establish adequate measures of welfare, which is taken as the ultimate goal of man's economic activity. In the absence of better measures, monetary income has been used as a measure of welfare. Income, which flows from labor and accumulated stocks of assets or capital, serves as a proxy for welfare because higher levels of income mean higher levels of production and, thus, more commodities that possess utility. Measured incomes, however, ignore many utilitarian non-market household activities such as leisure. Furthermore, higher levels of income do not necessarily correlate with greater life-time well-being when all dimensions of human welfare are considered; the health and nutrition problems of affluent societies are evidence of this last point (4).

Health status is itself a key element as well as a good proxy measure of other aspects of human welfare; it can be considered both a consumption item and an investment item (5, 6). Good health is "consumption" because it is an end in itself, accounting for a considerable part of that human welfare not measured by income. Health is also an "investment" because it is a key component of human capital that determines the level and duration of one's market and nonmarket activities. As such, it can be linked to some measurable components of earning and nonmonetary income.

This discussion focuses on the investment aspect of health because this sets the lower limit of potential benefits from health programs. 4/ The discussion is structured around the concept of expected lifetime earnings. In a simplified way, one can define for an individual of age A the present value of his lifetime expected earnings for N years henceforth by

$$E = \sum_{1}^{N} P_i^S \cdot P_i^H \cdot W_i \quad (1 + r)^{-(i)} \quad ,$$

where $\left[P_i^S \cdot P_i^H \cdot W_i \quad (1 + r)^{-(i)}\right]$ states the present value of the earning an individual "expects" at period i. It is given by his (conditional) probability to survive to that period, P_i^S ; by the probability of his being physically able to work that year, P_i^H ; and by his average anticipated productivity -- or returns, psychic

4/ A rate of return on a health program as an investment will always understate the actual return by excluding the unmeasurable (consumption) utility derived from good health.

and other, from his time -- during that year, W_i. Given a particular time discount rate r, each time-specific expected earnings component is discounted by $(1 + r)^{-i}$, which is the present value of a unit of earning at a particular future period. 5/ Each term P_i^S, P_i^H, or W_i can be regarded as a health outcome; together they encompass the "investment" dimensions in health. 6/ P_i^S is based on age-specific mortality rates, P_i^H is based on age-specific morbidity rates measurable by lost working days, and W_i can be measured by one's average daily wage rate.

The productivity measure or wage rate, W_i , may warrant more attention because, unlike the other terms, it is not usually assumed a direct outcome of nutrition and health. In a given economic setting, defined by the available technology, land, and capital, an individual's wage rate can be taken as a function of his innate physical and mental abilities, and of his physical and mental capacities acquired through education and work experience (7). Since educational achievement and work experience are outcomes of a process that depends partially on health and nutrition, man's productivity, or W_i, can be viewed as a function of his health and nutrition, at least in situations of severe malnutrition.

Once expected earnings, as specified, are regarded as an individual's or a family's objective, the economic analysis can derive certain predictions about the household's behavior. The common approach is a maximization procedure by which the household is assumed to enhance P_i^S , P_i^H, W_i , and other utilitarian ends, subject to various constraints. This procedure sets the trade-offs among different ends, defines behavioral optima for each, and thereby provides the analytical framework to deal systematically with the relevant aspects of household behavior and to generate a set of refutable hypotheses. 7/

5/ W_i can be regarded as a term net of investment in health and education that affects the levels of all three terms.

6/ For simplicity, we ignore the interdependence among the three terms.

7/ Anthropological insights into, as well as prior evidence about, the household's view of the underlying investment process are essential for adequate modeling. That is, for example, particular household members may get substantially better diets and "health investment" than others because their (lifetime) earnings are important from the household's viewpoint. Some discrimination in feeding among household members to protect the actual or potential breadwinner is apparent in subsistence settings.

IMPACT MEASURES: BASIC PROBLEMS AND SOLUTIONS

The specification of the ultimate outcome variable -- expected lifetime earnings -- and its components is also important for discussing some key statistical issues that relate to impact measurement and to some basic properties of impact measures.

Time lags are critical in measuring program impact and present a key statistical problem inherent in intervention programs. The longer the time between the intervention and the measurement of its outcome, the harder it is to link the program to its hypothesized impact, because one must also account for environmental, biological, and behavioral changes that may also affect the outcome. This issue, which is discussed in more detail in the next section, is frustrating because the impacts of health and nutrition programs take time to manifest and are often spread over individuals' lifetimes.

This problem of time lags warrants both a conceptual and a practical distinction between two types of programs. The first type is a program aimed at enhancing the stock of human capital by an intervention during some critical period of human physical and mental development. Programs involving mothers and children are of this type. The second type is a program aimed at increasing the efficiency of a flow of services from an existing stock of human capital. Programs involving adult workers are of this type (8).

The first type of program has long-run outcomes that are often not practical to measure because of the long time lag. Consequently, one must resort to proxies for measurements. The second type has shorter-run objectives, primarily increasing productivity and reducing absenteeism, that are immediately observable for adult workers. Termination of a program of the second type should end its effect and thereby provide another means of testing impact. Thus, selecting appropriate outcome measures is more problematic for the first, and more common, type of program. Consequently, this discussion focuses on outcome measures for the more general type of program with long-run impact.

In evaluating a potential outcome variable one should consider these questions:

a. How does the variable relate conceptually to the ultimate outcome, or any component thereof, and to the program under study?

b. How does it relate statistically to the ultimate outcome variable, or any component thereof, and to the program under study?

c. How reliably can it be measured?

d. What complementary data are needed?

e. What are the costs of obtaining and using those data?

The first question is important because it relates an observed variable to the conceptual framework and to the specific hypotheses to be tested. The other questions bear largely on the statistical aspects of potential data for testing program impact. When all these questions are considered, trade-offs among particular types, or categories, of variables may appear.

We can classify outcome variables by three categories: inputs, intermediate outcomes, and ultimate outcomes. The use of program inputs as proxy measures of program impact is common. For example, the impact of a school feeding program is estimated by the amount of calories and protein the program delivers to the target population. This approach has the merit of being directly related to the program, and also is probably least costly since it is integrated with the program. However, it also tends to be the most presumptive since it may depend on hypotheses yet to be tested about relationships between inputs and eventual impact, and it may ignore program-induced behavioral changes beyond program control. This last issue depends critically on the delivery method; an income transfer to the household is easier for the household to divert from program objectives than, say, a directly administered vaccine.

Intermediate outcomes can be measured by a variety of variables: child morbidity, intellectual development, school achievement, and anthropometric measures including birthweight. These measures apply largely to children because theory and evidence suggest that they predict, and thus approximate, eventual health outcomes (9). Although they are not ultimate outcomes, such intermediate variables are "outputs" and in most cases they approximate ultimate outcomes better than program inputs do. Birthweight, for example, predicts relatively well a child's physical growth, at least during the first years and can be used as an outcome measure for maternal care programs (10). A child's physical growth and morbidity at an early age may indicate his future morbidity, survival probability, and productivity. A child's intellectual development, which to a degree may be nutritionally determined, is believed to be manifest eventually in his productivity and wages, primarily through mental development and school achievement (11-13).

These intermediate outcome variables raise the problem of lagged program impact since basically they are manifest over time.

Hence, linking the intermediate outcomes to the program inputs is even more complicated than using inputs as proxies for outcomes. Complementary data on non-program variables that affect the outcome may become critical for identifying the impact of the program. Consequently, collecting data that relate to the intermediate outcome variables requires more elaborate data collection instruments and statistical tools than when program inputs serve to measure outcomes.

Ultimate outcome variables involve issues similar to those of the intermediate outcomes, but they are more difficult since they pertain to full lifetimes. Outcomes and related variables can be measured on the basis of individuals, households, and communities. The choice of the measurement unit depends on the specific measurement objectives. Policy-makers and program administrators are eventually interested in variables that summarize their efforts on a community level. Students of household behavior are also interested in understanding and explaining the distribution of outcomes in the household or the community. Or, they may seek to understand why identical program inputs have a varying impact across individuals and households of different characteristics.

While critical for identifying the circumstances under which programs are beneficial, differences in impact may be concealed when we aggregate or, at times, disaggregate data. This possibility must be recognized when we define the unit of measurement. One cannot always distinguish household variables from variables pertaining to individuals. At times a variable can be based on a particular household member; at other times, it can be based on a few members. The definition of a household variable based on more than one household member may be complicated because of the low incidence of health-related events at the household level. Identification of the target population is a key criterion for the selection and definition of a household variable. If the target group consists of, say, mothers or potential mothers and we are interested in their nutritional status, then the observation is the mother -- an individual, as well as the household because in most societies we observe one mother per household. This household then can be described by other common household variables such as religion, income, size, or location, etc. The same reasoning applies when the target group consists of children of given age and sex.

A problem usually arises when one must aggregate within households or other units that share the same socio-economic endowments. This problem appears particularly acute in measuring some intermediate nutritional outcomes. For example, when the nutritional status of all school-age children in a household is of interest, one needs to define a summary variable summarizing the nutritional status of these children in that household. The problem is that the number of children as well as age and sex distributions vary across households. This problem can be handled in various ways; however, while aggregating within the household, one must consider the possibility that not all children are treated equally in a given household.

The same problem applies to other household variables. For example, two mothers or two family units may live in one household and share a common income. Splitting such a group's income between the two family units, and subsequently treating them as separate units for statistical purposes, may be erroneous if behavioral patterns in extended households differ from the patterns in nuclear households. In most cases, when data are treated by averages, a few critical behavioral issues are assumed: that individuals are not discriminated against, and that the behavior of aggregated social units is the sum of the behavior of some other individual units. Before aggregating or disaggregating data, even at the household level, one must see whether these assumptions lead to different predictions.

AN ECONOMETRIC APPROACH

We turn now, before discussing program measurement, to outline some basic features of econometrics that draw on mathematics, statistics, and economic theory to delineate economic relationships empirically. The development of econometrics has been largely influenced by economists' traditional use of non-experimental data to test hypotheses and to verify economic relationships. 8/

Economic theory attempts to describe the nature of particular causal relationships, or "structures", by identifying the parameters encompassed by them, and by indicating the particular functional relationships among those parameters. As indicated previously, these relationships attempt to account only for what is believed to be the systematic part of man's economic behavior. In reality this behavior also has random elements and may be determined by parameters that we fail either to identify and observe, or to measure accurately. Consequently, the econometric equivalent of

8/ The term "econometric approach" used here is substantially the same as the "structural equations approach" (14). That is, it is a general application of mathematical statistics not necessarily restricted to "economic" variables. The reader familiar with this approach may bypass this section.

TABLE 1. REGRESSION COEFFICIENTS, CARBOHYDRATES, AND VITAMIN A AS DEPENDENT VARIABLES

(t statistics in parentheses)

Independent Variables	Dependent Variables (Nutrient)	
	Vitamin A * I. U.	Carbohydrates * g.
Family Income*	0.1542 (6.9459)	0.0085 (0.6250)
Family Size*	0.5130 (4.1073)	0.9135 (11.8791)
North: Urban Elementary School (Intercept)	10.7470	7.8833
Region (South)**	-0.1310 (-4.6454)	0.0579 (3.3276)
Urbanization		
Non-Farm**	0.0229 (0.5313)	0.2657 (9.9887)
Rural-Farm**	-0.0030 (-0.0864)	0.1489 (6.9906)
Education		
High School**	0.1852 (4.4095)	0.0486 (1.5837)
College**	0.1279 (3.7289)	0.0308 (1.4597)
Adjusted R^2	0.743	0.920

* The logarithms of the variable values were introduced in the estimated equation.

** Denotes the use of a "dummy" variable which takes the value of 1 when an event occurs and the value of 0 otherwise.

the relationships suggested by theory include a "disturbance" or error term added to the "systematic" part of a particular relationship. This term summarizes the random, omitted, and unidentified or inaccurately measured elements of man's behavior. For example, if a particular simple economic relationship is characterized by

$$Y = f(X),$$

its econometric equivalent is

$$Y_i = f(X_i) + v_i \quad (i = 1.....n \text{ observations})$$

where v_i is the disturbance or error term.

Thus, econometric relationships also are *causal* relationships and are stated with one or more equations, depending on the underlying structure, each having a single dependent, or "outcome", variable and one or more independent variables (15); also see Annex, Sections A and B. Estimating such equations involves obtaining, usually by means of "statistical control", at least unbiased estimates of the particular effect on the outcome variable of each independent variable. 9/ Such estimates are possible when there is no, or only a "small", correlation between the error term and any of the right-hand variables, and between any two of these variables.

Given a particular economic model, at least three considerations are pertinent in specifying and interpreting econometric relationships: (a) choosing explicit functional relationships; (b) controlling for variables not suggested by theory; and (c) dealing with different and, therefore, competing hypotheses consistent with a particular estimate. The specification of a particular functional relationship can be based on common sense, theoretical and empirical knowledge, and experimentation. For example, we expect caloric consumption normally to level off as income rises, because of saturation and also because of substitution away from calories and carbohydrates to more "luxurious" proteins. Hence, the specifications of a functional relationship between caloric consumption and income should allow for a nonlinear relationship.

The two estimated equations shown in Table I are a simple example of econometric equations; the effects of certain household variables on household consumption of vitamin A and carbohydrates

9/ The common estimation procedure is regression analysis, which is also a useful descriptive tool. For biological applications of regression analysis, see for example (16).

are estimated. 10/ These estimates are based on a relationship like that shown in the Annex, Section B. This relationship allows for the expected nonlinear effect on consumption of nutrients by employing the logarithms of intakes of carbohydrates and vitamin A, and the logarithm of household income. This functional relationship was also chosen because it allows for a comparison between the sensitivity of the intakes of carbohydrates to income, and the intakes of vitamin A to income, regardless of the different units by which the two nutrients are measured, grams or international units. Such a relationship may impose various restrictions on the estimates; for example, the relationship specified presumes no consumption when the household has no current income. Nevertheless, such an unrealistic presumption and other restrictions do not outweigh the advantages of using this particular relationship. Another example of choosing functional relationships involves measurement of child growth by weight and height. Again, nonlinearity concerning age is appropriate here. The estimates shown in Tables 2 and 3 use a quadratic functional relationship that allows for this nonlinearity. These examples show how particular functional relationships are chosen on the basis of prior knowledge as well as practical considerations.

Controlling for variables not originally suggested by theory may be a useful means for improving the precision of the estimates, standardization, and adding information. 11/ An economic model of behavior may ignore biological factors by assuming them constant. For example, a model that deals with parents' choices of their children's diets and, therefore, child growth (18) might assume that the analysis is confined to a hypothetical age and sex group and, therefore, disregard the age and sex variables in explaining variations in child growth. However, for an econometric analysis based on a relatively small sample of children of both sexes and across age groups, one should control for age and sex as illustrated

---

10/ This table is drawn from (17) where an attempt is made to use economic theory and econometrics to predict and measure the effects of household characteristics on its diet. The coefficients on the logarithmic variables show the percentage change in household consumption of the particular nutrient due to a given percentage change in these variables. The coefficients on the dummy variables show the same but compared with variables which were "left out", or included in the intercept term. These estimates and others are used here for illustrative purposes only.

11/ Note that inclusion of omitted variables, which are not perfectly correlated with other independent variables, will increase the multiple correlation coefficient, or "explained variance" of the dependent variable. This increase should not be a goal by itself.

in Table 2, Equation 2. Otherwise, the relationship between child weight and age will be entirely approximated by the correlation between diet and weight across children of different age groups. 12/ This means of control is an alternative to various standardization procedures, like weight for age, used by nutritionists. It is also informative because it depicts growth curves directly across age and sex groups -- controlling for other effects -- and can be based on relatively small samples.

The problem of dealing with competing hypotheses is major. The first and basic issue to address is whether the line of causality implied by a particular relationship is correct. For example, in Table 2, Equations 2 and 3, the effect on children's weight of caloric intakes is estimated. However, the case can be made that the causality also operates the other way: heavier children consume more calories *ceteris paribus*. In a case like this it is reasonable to assume a structure where child weight and caloric consumption are codetermined. Therefore, one must use appropriate estimation techniques to allow for this codetermination or simultaneity. The estimates reported in these equations exemplify a case like this. The estimated effect of caloric consumption on weight in the third equation is based on a procedure that accounts also for the effect of weight on caloric consumption. This estimated effect differs from the estimate in the second equation where the estimation procedure does not account for simultaneity. 13/

The second issue is to ascertain that the variables indeed measure (or approximate) what they are meant to measure. In the context of nutrition interventions, a good example is the behavioral change in food consumption of families under observation due to presence of an interviewer. Thus, the variable that was supposed to measure the effect of program inputs measures instead another

---

12/ This procedure can be elaborated to account for interaction between the age or sex variables and other variables; that is, when, for example, a given diet has a different effect on children of different age and sex.

13/ Two or more variables are simultaneously determined when they are outcomes or endogenous variables belonging to a structure where one of these variables affects the other in some relationships and viceversa in others. Failing to account for this codetermination while estimating one particular structural relationship may result in a "simultaneity bias" which means that the estimated effect of one endogenous variable on the other may be under- or overstated. On how to deal statistically with such cases, see (15); for specific application in a nutrition study from which this table is drawn, see (19).

TABLE 2. REGRESSION COEFFICIENTS, CHILD'S WEIGHT IN KG AS A DEPENDENT VARIABLE, ORDINARY LEAST SQUARES (OLS) AND TWO-STAGE LEAST SQUARES (TSLS) ESTIMATES

(t statistics in parentheses)

			"Biological" Variables				
Equation No.	Type of Estimation	Intercept	Age	Age^2	Sex Male*	Age Sex	$(Age\ Sex)^2$
1	(OLS)	-0.63771	0.609 (6.628)	-0.008 (-4.736)	7.533 (5.526)	-0.563 (-4.280)	0.011 (3.708)
2	(OLS)	3.173	0.245 (3.559)	-0.019 (-1.261)	0.708 (2.994)		
3	(TSLS)	1.788	0.112 (1.246)	-0.0001 (-0.077)	0.169 (0.272)		

	Economic Variables				
	Occupation			Diet	
(Equations continued from above)	Land Owner*	Agri. Labor*	Civil Servant*	Calories	R^2
1	0.860 (2.559)	0.038 (0.110)	0.745 (1.851)		0.61
2				0.001 (4.125)	0.55
3				0.004 (3.235)	

* Dummy Variables