

A RAND NOTE

CHILDREN'S ECONOMIC CONTRIBUTIONS
IN PENINSULAR MALAYSIA

Dennis DeTray

April 1983

N-1839-AID

Prepared for

The U.S. Agency for International Development

35th
Year



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PREFACE

This Note was prepared with the support of Grant No. OTR-G-1744 and Grant No. OTR-G-1822 from the U.S. Agency for International Development to The Rand Corporation. The second grant supports research in Rand's Family in Economic Development Center.

This research is part of a larger study of time use in Malaysia based on the Malaysian Family Life Survey. The study's aims are two-fold: first, to better understand time usage in a developing society, especially the productive activities of women and children; and, second, to provide a fuller picture than that given by market sector analyses of family contributions to the development process and the changes in those contributions as economies become more market-oriented. This Note focuses on the time use of unmarried children aged 5 to 19 who live with their parents.

SUMMARY

If we understood better the economic contributions that children make to parents, we might also understand better the course of demographic transition and economic development. Such information could prove instrumental in efforts to slow population growth and to increase income levels of future generations. This Note explores productive activities of Malaysian children who live with their parents to establish how these child-to-parent transfer patterns differ by household and child characteristics.

This research looks only at transfers from children to parents and ignores parent-to-child transfers and thus issues of children's net contribution to households. This strategy was adopted for both pragmatic and theoretical reasons. Although progress is being made, researchers are still not able to estimate either out-of-pocket or opportunity costs of children with acceptable accuracy. In part this is because we have no firm fix on the concept of children's costs. Even in developing societies some expenditures on children are discretionary in the sense that they have as much to do with parent consumption as they do with child maintenance. In the absence of a rule for sorting out discretionary and maintenance expenditures, we consider here only flows from children to parents.

The Malaysian Family Life Survey provided the empirical basis for this study. All unmarried children aged 5 to 19 living with their parents are taken to be the population at risk. Descriptive statistics are presented for five children's time-use categories--any work activity, labor force time as traditionally defined, time spent producing home products, time spent in housework, and time spent in school. A multivariate analysis explores patterns of time use among households for labor force participation, labor force hours conditional on participation, and parent demand for children's labor force hours. These results are contrasted to results for two other definitions of productive hours, the first of which adds home products hours to labor force hours, and the second of which sums all productive hours including

housework. Complete results for these alternate definitions are given in the appendix.

This study's findings show quite clearly that many Malaysian children make productive contributions to their family's wellbeing. These contributions take the form of both nonmarket work--housework and home products--and market work as traditionally defined. Whether or not these general results are surprising depends on one's preconceptions. However, a number of the Note's specific findings do contradict widely accepted beliefs. For example,

- One of the burdens of poverty in developing countries is often thought to fall on children who must begin work at an early age to help make ends meet. This research finds little evidence to support that picture. Children from poor families neither participate more in productive activities, nor work longer hours when they do participate, than children from more well-to-do families.
- Sex stereotyping is thought to be especially prevalent in traditional Third World countries with strong cultural heritages. Malaysian Chinese, Indians, and Malays all fit this characterization, and yet we find remarkably few labor-force-related differences between boys and girls. Girls and boys participate in labor force activities about equally frequently, for the most part work similar hours when they do participate, work for wages about equally frequently, and earn about the same wage when they receive a wage.
- Most studies of children's contributions to parents find that boys' contributions exceed girls' contributions and by substantial amounts. At least while children are unmarried and still living with their parents, Malaysian girls contribute more in terms of productive hours than boys. Boys work only a few more hours at labor force activities than girls, but girls spend considerably more time at other productive activities, especially housework.

- Other studies of economic activity in Malaysia have found substantial ethnic differences and narrowing these differences has been a chief concern of the Malaysian government. This study also found ethnic differences in productive activities among Malaysian children, with Chinese and Indian children generally working more frequently and longer hours than Malay children. However, these differences narrow as the definition of productive hours is broadened to include productive work within the home.
- One argument in support of high fertility in developing societies is that children provide parents with a form of insurance against unanticipated illnesses, disability in old age, and the like. This study demonstrates that children may provide insurance against other events as well. Widowed, divorced, or separated mothers in this sample receive greater transfers from their children in the form of labor force activities than do intact couples. These transfers quite clearly act to offset the loss of husband's time in market work.
- Family businesses are more popular sources of income in developing than developed societies. This analysis shows that this form of economic organization also has implications for transfers from children to parents: Couples who own farms or businesses use more of their children's time in labor force activities but pay them a cash wage less frequently than do other couples.

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I. INTRODUCTION

Economists look at fertility rates as partly a matter of parental choice. Couples are said to decide, perhaps implicitly, how many children they want on the basis of children's costs and benefits. This view is now several decades old, and yet we still cannot answer one of the most fundamental questions underlying it: Do children's economic contributions to parents influence fertility rates? This question is much debated,¹ but remains unresolved in part because we often have only vague notions of just what productive activities children do for parents.

In their 1975 Rand report, Butz and Greenberg highlight shortcomings of past efforts to measure the economic value of children. They also discuss why better information on children's contributions to parents would benefit policy makers, planners, and those interested in economic development. This Note take up where Butz and Greenberg left off although it does not reach their final goal: to estimate "the present discounted value of the stream of income and services each child provides to his parents during his parents' lifetime" (Butz and Greenberg, p. 8). It does, however, provide an empirical counterpart to much of their discussion, and thus a natural extension of their work.

Information on children's economic value to parents might provide answers to many puzzles in the developing world. Couples in developing nations, especially poor couples, often have a great many children. Does this result from ignorance and poor judgment, or does the explanation lie more with costs and returns of having and raising children? Is school attendance among some rural agricultural populations low because parents are unaware of the value of education, or because children in those environments have many important alternative uses for their time? Do children perform activities that free parents, especially mothers, to move into the marketplace? And, conversely, when mothers work away from their homes, do children take up the slack at home, perhaps at the expense of time in school?

¹ Cain and Mazumder (1980), Nag (1978), Nugent and Walther (1981) and Rosenzweig (1980) offer recent contributions to this debate.

This Note begins the process of answering these questions by exploring children's work patterns while they live with their parents. The body of the Note begins with a brief overview of past efforts in this area and a discussion of problems and issues encountered in estimating the economic value of children. Section III describes the country setting and data base for this study, Sec. IV discusses what we expect to find and why, and Sec. V presents results. The final section provides a summary and conclusion.

II. NET VERSUS GROSS CONTRIBUTIONS?

Butz and Greenberg discuss several of the major past efforts to estimate the economic contribution of children to parents, although only briefly. Espenshade's 1977 Population Bulletin on *The Value and Cost of Children* reviews more generally the literature on actual and perceived costs and benefits of child rearing. Both reviews reflect on the surprising lack of direct evidence on children's economic contributions or costs to parents, especially in light of anecdotal evidence on the importance of children in developing countries.

One factor slowing progress in this area has been a concern over the correct definition of children's net contributions to parents. For example, Espenshade (1977) criticizes Nag's (1972) estimates of children's economic value because they ignore costs associated with child rearing. But what is the "net" economic contribution of children, and how should we measure it?

Most economists who study U.S. fertility differentials look separately at costs of and returns to children. For example, recent models of U.S. fertility focus on differences in children's costs.¹ In doing so, they must assume either that only costs drive fertility decisions, or that costs are uncorrelated with benefit-related factors not included in their empirical specifications. The second of these assumptions may be justified in developed-country settings but it is surely not in most developing countries. In fact, some researchers (Caldwell, 1976, for example) argue that children's transfers to parents may be a principal factor influencing the timing and pace of demographic transition. As development proceeds, transfers decline. This works to lower birth rates, which moves a population into the later stages of demographic transition.

This study sidesteps these issues because it documents an important subset of flows from children to parents but ignores costs associated with child rearing. It does so for two reasons. The first has to do with the many unsolved problems associated with estimating the cost to a

¹ See, for example, Butz and Ward (1979).

couple of an additional child, and the second with how we define child costs.

There are both opportunity costs, especially of the wife's time, and direct costs of having an additional child. With respect to opportunity costs, although much work has been done on the subject, we still do not know by how much additional children affect the value of a wife's time or her time use.

We know even less about the direct costs of another child in the home. An additional child changes family behavior in ways which confound attempts to isolate costs directly attributable to that child. For example, if income is fixed another child may force a redistribution of family expenditures from adult clothing to food, but total expenditures will remain unchanged. In this situation, the difference in value to parents between their old and new non-children consumption bundles measures the cost of another child. This is a number not easily derived either by survey or estimation.

There is also a problem of joint production and consumption. Another child may not alter total expenditures on, say, housing, but each family member will pay for the new child's housing by consuming fewer housing services. Conceptually, the cost is clear--more crowded quarters, less privacy, and so forth--but measuring these costs is very difficult.

Even if we ignore these problems, estimating the cost of a child remains problematical. This is so because parents *choose* expenditure levels for many of the goods and services they provide children. When part of the cost of raising children is subject to parent choice, the concept of a child's net contribution to parent wellbeing becomes difficult to define. Parents may provide clothing of a certain style because they enjoy seeing their children dressed in that style. Should we consider the cost of that clothing a part of child rearing costs or a part of parent discretionary spending? In other words, how do we deal with differences in the quality of life that parents voluntarily inject into their child rearing?

The answer is that for the most part we do not deal with them. Research on the cost of children generally documents how parent

expenditure patterns change as more children enter the household.² This is useful information for parents who want to know how their life styles will change if they have more children. It does not, however, measure a child's net contribution to parent wellbeing. If we include discretionary expenditures in our child cost estimate, then we must include what these expenditures buy--consumption benefits that children provide parents--as part of child returns.

The problem in a nutshell is that expenditures on children generate two types of returns: measurable returns in the form of help around the house, labor input into family businesses, and market earnings transfers; and unobservable returns from the psychic pleasure that children give parents. If we exclude psychic returns but include costs associated with producing those returns from cost/benefit calculations, conclusions about the "net" value of children to parents will have little meaning.

Separating expenditures on children into child maintenance and "discretionary" expenditures would solve this problem. This is much more easily said than done, but it suggests the following line of argument. Child maintenance costs, almost by definition, will vary much less with socioeconomic status, income, and the like than discretionary expenditures on children.³ If this is the case, variations in net economic value of children will derive mainly from variations in children's economic returns and not from variations in exogenous costs of child maintenance. They would, therefore, approximate quite well the more basic notion of children's net economic returns.

Measuring gross economic flows from children to parents has its own share of problems. Psychological and economic literature on the value of children identifies several benefit flows from children to parents: pure consumption flows analogous in type, if not in degree, to the consumption flows that derive from consumer durables (radios, TVs, etc.); consumption flows unique to children, for example, continuation of the family line; and production flows from work that children perform.

² See, for example, Espenshade (1973).

³ There is disagreement in the literature even on this point. See, for example, Duesenberry (1960).

Children as both productive assets and sources of pleasure to parents raises the following question: How do parents, and, more broadly, how does society determine the division of goods between current parent and future child consumption?⁴ If parents invest in children to raise future parent incomes--a distinct possibility in most Third World settings--then only a lifetime view will accurately portray children-to-parents flows. Although we look here only at transfers from children aged 5 to 19 who live with their parents, such a view underlies this Note. Before we turn to those transfers, however, the following section reviews this study's country setting and data source.

⁴ The problem is most elegantly stated in Samuelson (1958); Willis, forthcoming, presents a clear and informative discussion of these and related issues.

III. COUNTRY SETTING AND DATA

COUNTRY SETTING

There is general agreement that children's economic value to parents declines as countries develop and incomes rise. The country setting for this study, Malaysia, is not a typical developing country, if there be such a place, and knowing something of Malaysia's past and current cultural and economic settings will help put the results given below in perspective.

Peninsular Malaysia's 10 million people¹ are rapidly becoming among the most thoroughly studied populations in the developing world. Reasons for scholarly interest in Malaysia are not hard to come by: Malaysia's past, current, and projected growth rates are among the highest in the developing world; and Malaysia's diverse racial and cultural makeup provides fertile ground for exploring hypotheses about people's responses to government policies, economic development in general, and the distribution of gains from economic growth.

By most standards, Malaysia is succeeding in its efforts to develop. Real GNP growth rates rose from an already enviable 6 percent per year in the 1960s to 8 percent in the 1970s.² Its \$1100 per capita GNP places Malaysia within a few dollars of such development success stories as South Korea and Taiwan on the World Bank's country rankings by per capita GNP. And, while population grew rapidly--around 2.7 percent per year--per capita GNP still grew at a respectable annual rate of 3.9 percent during the last two decades.

Malaysia's ethnic diversity--roughly one half of the population is Malay, one third Chinese, and one tenth Indian--provides an informative backdrop for efforts to understand the roles of individuals and families in the development process. Longstanding differences in tastes and values among the three groups produce unique natural experiments on cultural and ethnic responses to public programs and environmental conditions.

¹ Population estimate as of 1975.

² Statistics for this section were taken from Young et al. (1980), and the World Bank (1980).

Incomes, occupations, and geographic location vary greatly within ethnic groups; however, the following quotation from a recent World Bank publication summarizes the principal characteristics of each ethnic group:

Most Malays live in rural areas and engage in small holder agriculture and fishing; urban Malays generally work in the government bureaucracy, the armed forces and police, and the lower rungs of the manufacturing and service sectors. Most Chinese live in urban areas, where they dominate commerce; rural Chinese engage in tin mining and agriculture as small holders. Most Indians live in the rubber and palm oil estates; urban Indians are in the professions and services. (Young, et al., 1980, p. 10)

Government policies toward schools and school attendance impinge most directly on children's lives and are leading candidates to influence transfers from children to parents. Most children attend school through the primary grades--over 90 percent of eligible children--although, as we shall see, attendance rates differ importantly by ethnic group. Secondary school attendance is lower, around 40 percent of eligible children, but still high for a developing country.³

DATA

This study is based on data drawn from the 1976 Malaysian Family Life Survey (MFLS), a nationally representative sample of 1262 Malaysian households. Of the MFLS's 52 primary sampling units, 49 were selected by area probability methods, and three were purposively selected to give additional representation to Indian families and fishing communities.

Households within these primary sampling units were first screened to determine whether they contained at least one ever-married woman less than 50 years old. All such households were then pooled and a predetermined sample drawn at random. The MFLS's ten survey instruments were administered to each household over a one-year period. Several key

³ The 40% figure is given in Young, et al., 1980, p. 131, and refers to 1974. As we shall see, the Malaysian Family Life Survey on which this analysis rests produces somewhat higher attendance rates for both primary and secondary levels.

instruments were given at four-month intervals to update important event series, for example, fertility histories, and to capture seasonal variations in work and home activities.⁴

The MFLS records four types of transfer information: (1) children's time use while living with their parents; (2) money, goods and time transfers from primary respondents and their husbands (if present) to their parents, including housing in old age; (3) transfers from children not living in the respondent's household to the respondent and her husband; and (4) respondent expectations of support from children in the future. We focus here on the first of these categories although work is under way on several others.⁵

Appropriate methods for collecting time use data are much debated among surveyers and analysts. In any large-scale survey effort, "ideal" methods such as participant observation are usually not feasible. The MFLS collected time use data in two ways. First, husbands and wives were asked a series of questions on productive activities for each household member including young children. These questions parallel the standard questions asked in most labor force surveys but with no restriction on age of worker.⁶ Interviewers collected information on hours worked in the most recent seven days, and weeks worked in the past four months.

Second, ever-married women were asked about a set of prelisted housework activities including cooking, cleaning, and child care. Interviewers recorded total time spent at these activities during the last week they were performed, and number of weeks in which they were performed over the preceding four months. Interviewers then recorded the fraction of each activity performed by a given family member.

There are at least two drawbacks with the MFLS time-use data. First, they are recall rather than contemporaneous or participant observation data. They may, therefore, be subject to considerable reporting error. Second, reports of home time use may suffer from

⁴ Questionnaires are reproduced in Butz, et al. (1978). A description of the survey can be found in Butz and DaVanzo (1978).

⁵ See, especially, Butz and Stan (1982).

⁶ In fact, special probes were inserted in the questionnaires to insure that children's activities not overlooked.

double counting because a respondent may engage in more than one activity at the same time. Child care is an especially strong candidate for double counting.

Whether or not these time use data are worthy of analysis is a question of judgment rather than science. So long as reporting errors are not systematically associated with any particular socioeconomic group, we can learn much about children's time use even given the data's imperfections. One of this Note's goals is to place results from these data before a wider audience so that a more informed judgment about data quality can be obtained.

IV. SPECULATIONS

This Note develops no formal theory of transfers between parents and children. The following discussion draws from work now under way on that topic,¹ as well as from general economic considerations.

If children are, among many other roles, a form of productive asset for parents, what factors might influence "returns" that parents receive from children? Consider the following:

Income or wealth. Parent income may affect desired transfers in several ways. At comparable stages in their life cycles the poor usually consume a larger fraction of their income than the rich. This implies that the poor will invest less than the rich in all forms of productive assets. Increases in income or wealth should, therefore, increase investments in children.² If those investments take the form of additional schooling, child time may be drawn away from currently productive uses. This argument would also hold if parent demand for child schooling were income elastic and additional child schooling came only at the cost of current productive activities.

Wealthy parents may also "demand" fewer transfers from their children, allowing them increased leisure time. This is equivalent to arguing that child leisure, like parent leisure, is a normal economic good whose consumption rises with income.

Life cycle earnings patterns. Parents whose incomes drop off rapidly in old age may have to rely more heavily on their children's support than parents with incomes that extend well into old age. Labor earnings--that is, returns to human capital--will likely decline more sharply in later years than income from physical capital and land holdings. If so, both the timing and amount of children's transfers to parents should depend on the fractions of family income generated by human wealth and by nonhuman wealth. Parents with mostly labor earnings

¹ See, for example, the recent works of Caldwell (1976), Nugent and Walther (1981), and Willis, forthcoming.

² This and all other such statements are *ceteris paribus* unless otherwise indicated.

should invest more heavily in their children in peak earnings years than parents with other income sources.³

Demand for family labor. A family firm may alter the nature and types of skills parents invest in children. Family firms offer a natural avenue for on-the-job training and may induce parents to give their children less schooling and more job-related skills.

Sex roles. As elsewhere, Malaysian boys and girls are thought to play different roles both within the household and in the marketplace. The nature of child transfers to parents should, therefore, differ depending on the sex of children. Stereotypical male and female roles suggest that girls are more likely than boys to provide in-kind services such as cooking and cleaning, while boys are more likely to work for wages or as unpaid workers in family businesses. Parents may also expect different levels and types of old age support from sons and daughters.

Urbanization. Caldwell and others speculate that demographic transition brings about a breakdown of traditional parent-to-child and child-to-parent transfer patterns. In most developing countries urban areas lead the development process. If so, children-to-parent transfers should differ between urban and less urban areas. In particular, urban children ought to transfer less to their parents than otherwise similar nonurban and rural children.

A typical parent and child life cycle contains three stages: In the first stage children live with parents; in the second, parents and children maintain separate homes; and in the third, elderly parents may live with children. The following analysis documents principal time and money flows from children to parents for the first stage, and establishes both the quantitative importance of those flows, and how they vary by parent and child characteristics.

³ Note that this is a statement about the *makeup* of a couple's wealth or income, not the level of that income.

V. CHILDREN-TO-PARENTS TRANSFERS

It is a common perception that transfers occurring while children are young and living with their parents are mostly from parents to children. The figures and analysis given below do not dispute this perception directly--indeed, the discussion of Sec. II suggests that it may not be meaningful to do so--but they do show that in many households children participate in both household production and in income earning activities outside the home. These activities often do not begin in earnest until children are aged 10 or older, but they then grow rapidly in importance throughout the teenage years.

SAMPLE DEFINITION AND BACKGROUND

Children living with one or more of their parents define the population at risk for this analysis. This definition poses two problems. First, in some households even unmarried children will set up separate decision making units within a parent household and children's production may not be part of the general pool of resources available to parents. To keep this problem to a minimum, the working sample excludes children aged 20 and older.

Second, children may, for a variety of reasons, leave their parents' households at different ages. The timing of their leaving may be associated with parent and transfer characteristics that enter this analysis. Since we look here only at transfers that occur during early phases of parents' lifetimes, we risk biases that may arise because of these correlations.

Table 1 provides an overview of the working sample. Proportions and averages given in the table differ slightly from national figures because of the oversampling of Indians and households whose principal source of livelihood is fishing. Note that even with oversampling, there are relatively few Indians in the sample, a fact that should be kept in mind in the ethnic comparisons that follow.

Table 1
SAMPLE CHARACTERISTICS

(Household Averages)

Proportion of working sample:		
Malay	0.48	
Chinese	0.39	
Indian	0.13	
With father in household	0.89	
Living in		
Kuala Lumpur	0.07	
Other urban	0.34	
Rural	0.59	
With income from:		
farming	0.21	
own business	0.28	
Mother's education (s.d.)	2.8 (3.0)	
Father's education (s.d.)	4.2 (3.4)	
Fraction of all unmarried children living at home:	Boys	Girls
Ages 5-9	0.98	0.97
Ages 10-14	0.95	0.95
Ages 15-19	0.83	0.83
Sample sizes		
Households	783	
Children 5-9	870	
Children 10-14	786	
Children 15-19	507	

Analyzing a sample of children, several of whom may come from the same family, raises now-familiar statistical problems. Unmeasured environmental and genetic factors may make children from a given family more alike than unrelated children. When this is the case, children from the same family will not provide independent information and special statistical models may be needed. As Table 1 indicates, so long as we work with separate age groups, this problem is not likely to be serious. This is important because some of the techniques used in this

section do not lend themselves to the usual solutions to this problem--variance-components or fixed-effects modeling.¹

The second to the last panel of the table indicates fractions of all unmarried children in each age category who were living at home at the time of the MFLS. Almost all unmarried children less than age 15 lived with their parents. Even for the oldest of the three age groups, only 17 percent were not living with their parents, so problems associated with selective child leaving should not be severe.

CHILDREN'S TIME USE: OVERVIEW

Children, especially young children, are likely to provide transfers to their parents mainly through time spent in productive activities. The MFLS records time use in income-generating activities and at housework in 14 categories: (1) paid employee--full time; (2) paid employee--part time; (3) self-employed; (4) worker in family business; (5) employer; (6) home products/services for sale; (7) home products/service for own use; (8) schooling/training; (9) washing and ironing clothes; (10) shopping; (11) food preparation; (12) cleaning house; (13) care for children; and (14) other household activities.

This analysis combines the first five of these categories into a measure of "market work;" we also look separately at time spent producing home products, whether those products are for sale or home use (categories 6 and 7), and at time spent in housework as traditionally defined--categories 9 through 14. Table 2 gives an overview of annual participation rates and average weekly hours conditional on participation by sex of child, ethnicity, and four age groups. The table also includes school participation rates and school weekly hours to round out the time allocation picture for children.²

The table illustrates several points.³ First, participation in productive activities and conditional weekly hours of participation rise

¹ Several experiments were carried out comparing variance-components and OLS results. In no case did these two techniques yield appreciable differences.

² A parallel investigation of school attendance and school attainment is also under way based on the MFLS; see De Tray, forthcoming.

³ These comments will be kept brief because the multivariate analysis to follow gives a clearer and more statistically precise picture than do Table 2's cross-tabulations.

Table 2
PARTICIPATION RATES AND CONDITIONAL HOURS: UNMARRIED CHILDREN AGES 5-19

	GIRLS					BOYS				
	5-6	7-9	10-14	15-19		5-6	7-9	10-14	15-19	
Malays										
Fraction participating during survey year in:										
Any work activity	.31	.56	.88	.99		.17	.48	.80	.92	
Market work	.01	.05	.20	.47		.03	.03	.18	.52	
Home products	.13	.25	.44	.57		.10	.20	.47	.49	
Housework	.24	.50	.84	.97		.08	.36	.68	.73	
School	.65	.97	.92	.60		.48	1.0	.93	.57	
Average weekly hours:										
Any work activity	3.4	4.7	12.1	28.0		2.8	2.7	6.9	21.7	
Market work	(a)	4.5	8.6	24.6		(a)	4.1	11.0	30.4	
Home products	1.6	1.7	2.9	4.2		3.1	2.4	3.0	4.7	
Housework	2.6	4.0	9.3	14.1		1.1	1.9	3.0	2.3	
School	16.1	24.4	24.4	23.2		17.7	24.3	25.3	27.7	
Sample size	85	131	233	144		115	143	201	131	
Children	82	120	186	124		113	129	168	112	
Households										
Chinese										
Fraction participating during survey year in:										
Any work activity	.25	.66	.92	1.00		.10	.37	.70	.83	
Market work	.01	.14	.41	.75		.03	.10	.30	.74	
Home products	.04	.14	.36	.37		.02	.08	.23	.15	
Housework	.25	.63	.91	.97		.06	.31	.54	.78	
School	.52	.98	.84	.46		.66	.99	.93	.52	
Average weekly hours(b):										
Any work activity	3.2	6.8	15.4	31.7		3.2	3.1	11.4	35.9	
Market work	(a)	5.6	13.2	30.0		(a)	2.9	18.5	39.0	
Home products	(a)	1.2	2.8	2.5		(a)	2.4	1.9	1.3	
Housework	2.7	5.6	8.6	8.8		1.7	2.6	3.7	2.0	
School	16.3	24.1	24.6	18.8		15.5	23.9	25.0	19.3	
Sample size	84	113	185	120		102	144	196	117	
Children	82	110	135	94		98	130	149	96	
Households										
Indians										
Fraction participating during survey year in:										
Any work activity	.24	.50	.85	.98		.11	.28	.63	.77	
Market work	0	.05	.19	.69		.03	.03	.18	.62	
Home products	0	.05	.16	.19		.03	.08	.18	.12	
Housework	.24	.45	.81	.90		.08	.20	.55	.55	
School	.64	.79	.68	.23		.57	.88	.81	.32	
Average weekly hours(b):										
Any work activity	4.4	8.2	12.6	36.3		2.5	3.3	7.0	28.9	
Market work	(a)	(a)	14.7	32.8		1.2	(a)	15.9	32.5	
Home products	(a)	(a)	1.5	2.6		2.3	(a)	2.5	1.7	
Housework	4.4	8.8	9.5	12.2		2.1	0.9	2.0	2.5	
School	16.4	23.7	25.2	16.4		17.3	23.6	24.5	20.8	
Sample size	25	38	68	48		37	40	68	60	
Children	24	31	53	38		33	38	51	47	
Households										

(a) Less than 5 cases
(b) Average weekly hours are shown for participation in each activity.

sharply with children's ages. However, significant proportions of even young children engage in at least one productive activity. More than one-half of all girls and over one-third of boys in the 7 to 9 age group participate in some form of productive activity. Girls' participation exceeds boys' mainly because of their higher activity levels in home products and housework. However, boys do participate in these traditionally female activities, and in some cases at significant levels.

School attendance shows similar participation and hours patterns for boys and girls, indicating that girls do not offset higher productive hours with fewer school hours. The one exception may be Indian girls, who attend school less frequently than either Indian boys or Chinese or Malay girls.

If we exclude home products from our market work definition, then few children under age 10 work in the labor force as traditionally defined. Of the three ethnic groups, Chinese children are most often found at market work. However, even for this group less than 15 percent of girls and 10 percent of boys under age 10 engage in market work. By ages 10 to 14, this picture changes, and quite dramatically for Chinese children. Malay and Indian boys and girls participate in market activities as defined here about 20 percent of the time. In contrast, more than one third of all Chinese children in this age group participate in market activities, with girl participation rates substantially higher than boy rates (41 versus 30 percent).

Ethnic differences in participation rates are evident in many time allocation categories. Malay girls participate less in market work, but work more frequently in producing home products than do Chinese or Indian girls. A similar pattern holds for boy participation rates. Malay boys also perform housework more frequently than do Chinese or Indian boys.

Many of these differences are magnified by differences in conditional hours among the three ethnic groups. Chinese boys who work at market activities spend 7 to 9 hours a week more at those activities than do Malay boys. Chinese girls work 5 to 6 hours more at market activities more than Malay girls.

School attendance in Malaysia is the subject of a parallel analysis (De Tray, forthcoming), so only a brief discussion of school participation or school hours will be given here. The numbers in Table 2 do, however, support several observations. First, Malay girls and boys have remarkably similar school attendance patterns. In contrast, Chinese families appear to provide boys with somewhat more schooling than girls (based on participation comparisons), and Indian families' schooling decisions clearly favor boys over girls. Second, Malay children attend school somewhat more frequently and for slightly longer hours than Chinese, and considerably more frequently than Indian children. And third, schooling enrollment is admirably high for a developing country.

Table 2's overview of children's time use in Malaysia says little about underlying correlates. Are the ethnic differences discussed above "pure," or do they arise from differences in location, income, education, occupation, etc. among groups? Which household characteristics influence children's time use, and by how much? Are "working" children restricted to low-income families? Do rural couples make greater demands on their children's time than urban families? The results presented in the next section answer these and related questions.

MULTIVARIATE ANALYSIS

We will be tempted as we discuss the multivariate analysis to infer causation to many of the estimated coefficients, and, indeed, many of them will reflect underlying behavioral relationships. However, the statistical models used here were not chosen for their ability to sort out the complex causal flows that make up family and household behavior. We must, therefore, exercise reasonable care as we interpret these coefficients.

Explanatory Variables

Table 3 defines explanatory variables used in the multivariate analysis. These fall into three classes: (1) children characteristics--age and sex; (2) parent characteristics--education levels and age; and (3) household characteristics--ethnicity, income sources, location, household composition, and family income. A brief review of their expected effects on children's work follows.

One of the clearest findings of the earlier analysis is that children's activity levels rise with age. In the multivariate analysis, child age enters as a series of four linear segments ("splines"). This formulation allows age effects to vary among segments--that is, each segment has its own slope--but constrains segments to meet at end points. Also, much of the analysis is performed on age-defined subsamples of the data so that effects of other household and parent characteristics may differ by child age.

The tabular analysis above also supports preconceptions about differential roles played by boys and girls within the household, although not always strongly. Girls perform traditional housekeeping activities more frequently and for longer average hours than boys, but activity status and hours often differ little for other categories. The multivariate analysis that follows allows a more precise test of role differences between boys and girls in Malaysia.

Parents' education levels may influence child time use through several avenues. Recent economic theories of fertility and family formation argue that parent schooling affects both family size and child characteristics. These theories predict, and data confirm, that better educated parents usually have better educated children. Does this additional schooling come at the cost of child-to-parent transfers, or at the cost of child leisure?

For lack of direct measures, schooling often serves as a proxy for the value of parents' time.⁴ If formal schooling increases time value in the marketplace more than at home, higher education levels will push

⁴ In many studies male schooling serves as a proxy for income; however, these regressions include a highly refined income measure, so schooling's wage interpretation seems reasonable.

Table 3
VARIABLE DEFINITIONS

<u>Variable Name</u>	<u>Definition</u>
Children's	
Sex	=1 if child is a boy
Age 5 to 6	spline variable: = age if $4 < \text{age} < 7$ = 6 if $\text{age} > 6$
Age 7 to 9	spline variable: = 0 if $\text{age} < 7$ = (age-6) if $6 < \text{age} < 10$ = 3 if $\text{age} > 9$
Age 10 to 14	spline variable: = 0 if $\text{age} < 10$ = (age-9) if $9 < \text{age} < 15$ = 5 if $\text{age} > 14$
Age 15 to 19	spline variable: = 0 if $\text{age} < 15$ = (age-14) if $\text{age} > 14$
Mother's	
Education	Highest level of schooling completed
Age relative to husband	(husband's age) \div (wife's age)
Marital status	= 1 if mother is widowed, divorced, or separated from husband
MS* child's sex	(marital status)* sex of child
Husband's	
Education	Highest level of schooling completed in years
Age	Parent age at survey date
Age squared	Square of parent age

Table 3 (continued)

<u>Variable Name</u>	<u>Definition</u>
Household Characteristics	
Chinese	= 1 if household Chinese
Indian	= 1 if household Indian
[Malays are comparison group for ethnic variables in regressions]	
Farm	= 1 if household had income from farming in previous year
Family business	= 1 if household had income from family business in previous year
In Kuala Lumpur	= 1 if household located in Kuala Lumpur
In Ipoh	= 1 if household located in Ipoh
In Penang	= 1 if household located in Penang
In other urban	= 1 if household located in other urban areas
[Rural residents are comparison group for location variables in regressions]	
Children < age 10	Number of children less than age 10 in household
Children 10 to 14	Number of children ages 10 to 14 in household
Children 15 to 19	Number of children ages 15 to 19 in household
Family income	Household income (see text for discussion)

parents into market activities at the expense of home activities. Thus, controlling for other household characteristics, better educated parents may "demand" more home time from their children, perhaps offsetting the child schooling effect of the preceding paragraph.

Parent desires for child transfers ought to depend not only on children's ages, but on parent ages as well. If parents use children to smooth out parent earning patterns, then, other things the same, parent desires for transfers ought to be relatively high for young parents, low when parents are in their peak productivity/earnings ages, and high as parent productivity falls in old age. As we shall see, many other factors confound this relationship, but it is one important test of the role of children as productive assets.

Of characteristics common to households, ethnic differences in child time use were most evident in the tabular analysis. The multivariate techniques used here will remove from these cross-tabular comparisons the effects of socioeconomic characteristics correlated with ethnicity, thus providing a clearer picture of underlying race differences.

Couples who earn part or all of their income from a family business may place different demands on children's time than other couples. They may have a greater demand for productive time in general. And they may find it more economical to provide that time from within the household rather than from the marketplace. They may also find on-the-job training a more attractive investment than formal schooling if they expect their children eventually to take over the family business. Child working hours should therefore be higher for families with own-business income, holding constant income levels.

The shifting roles of women, children, and families as a country becomes more urban is part of the folklore of development. The regressions given below identify households located in Malaysia's major cities and in other urban areas, and compare their child time use with rural households. If traditional patterns hold, rural children ought to spend more time in productive activities than urban children.

Both members and ages of family members affect parents', especially mothers', time allocation. Previous studies have also documented the substitution of older children's time for parent time in home activities. It follows, then, that family composition may affect the demand for child time. The equations presented below include three family composition variables--numbers of children aged less than 10, 10 to 14, and 15 and over--designed to measure both changes in overall level of child time use, and to isolate substitution among children in time use.

Family income completes the list of household variables. This measure, described in detail in Kusnic and DaVanzo (1980), sums the following income components for each household: wage, business, capital and interest income; transfer income; value of housing services; in-kind income; cottage-industry income; value of housework, cooking and child care. Only income from "adults" (those aged 16 and over) enters these calculations. This measure approximates aspects of the "full income" concept popular in the New Home Economics literature and avoids many of the compositional problems inherent in traditional money income measures. The preceding discussion suggests that children in relatively well-to-do homes will spend less time in current productive activities if those children attend school more frequently or if child leisure is a normal good.⁵

As with adult market time allocation, children's time allocation, whether in or outside the home, has several important dimensions.⁶ We want to know which households use children's time and for what purpose; we want to know which factors govern how much a child works given that he or she works at all; and, we want to explore parent demand functions for child time. For simplicity, this last measure is denoted "desired" children's hours in the discussions that follow.

⁵ It is noteworthy, however, that the relationship between wealth or income and leisure has been neither consistent nor strong even for adults. See, for example, DaVanzo, et al. (1973), and references therein.

⁶ The three MFLS rounds took place at four-month intervals to capture seasonal variation in time use and income flows. Seasonal variations in child time use is being considered in work currently in progress.

Each of these dimensions requires its own statistical model: Probit or logit for the participation decision; OLS for the conditional hours analysis; and Tobit for the desired hours analysis.⁷ Four dependent variables times two or more age groups times three equation types times 20 odd explanatory variables produces more coefficients than we might reasonably digest in one sitting. So, in general, the discussion that follows considers only results of special interest from either a policy or analytical perspective.

Children's labor force activities are the one exception to this rule. These have always been of special interest to scholars and policy makers. For this reason, and to illustrate fully the nature of the analysis performed, Tables 4 and 5 present regression results for the two labor force age groups (ages 5 to 14, and 15 to 19) and three equation types. While we discuss only the highlights of more comprehensive hours measures, the appendix does contain complete regressions results for all dependent variables, age groups, and regression types.⁸

Labor Force Results.

Tables 4 and 5 present labor force results for children aged 5 to 14 and 15 to 19, respectively. In the early stages of this analysis, separate regressions were estimated for each age group in Tables 2--5 to 6; 7 to 9; 10 to 14; and 15 to 19. However, regressions for the 5 to 6 and 7 to 9 groups were seldom statistically significant, so these groups were pooled with 10-to-14-year-olds.

In theory the Tobit results in Tables 4 and 5 summarize parents' underlying demands for children's time by capturing both participation and conditional hours effects. However, the Tobit methodology is

⁷ If parent decisions govern children's time use, then maximum likelihood estimates of the Tobit index function provide estimates of parameters the underlying parent demand functions for child time.

⁸ Total productive hours might seem the logical choice for this comprehensive discussion. However, two factors argue for labor force hours: (1) total hours disguise important variations among hours types; and (2) there is less than complete agreement on what a measure of total productive hours should and should not include.

Table 4

LABOR FORCE EQUATIONS, AGE GROUP 5 TO 14(a)

	PARTICIPATION (Probit)		CONDITIONAL HOURS (OLS)		"DESIRED" HOURS (Tobit)	
	Coefficient	t-ratio	Probability(b)	Coefficient	t-ratio	Asymptotic Elasticity(c) of E(y)
<u>Children's</u>						
Sex (boy = 1)	-.127	-1.56	-.019	2.459	1.44	-0.78
Age 5 to 6	.360	1.18	.054	5.078	0.45	1.24
Age 7 to 9	.286	4.45	.043	-0.390	-0.21	3.85
Age 10 to 14	.268	9.45	.040	2.990	5.01	10.82
<u>Mother's</u>						
Education	-.058	-3.09	-.0087	-0.163	-0.40	-3.11
Age rel. to husband	.293	0.77	.044	0.476	0.05	0.64
Marital status	.578	2.17	.862	-5.842	-0.99	1.84
<u>Husband's</u>						
Education	.00371	0.22	.00552	0.039	0.11	0.35
Age	.00772	0.22	.00115	2.022	2.06	1.09
Age Squared	-.000119	-0.33	-.0000177	-0.020	-1.93	-1.07
<u>Household Characteristics</u>						
Chinese	.611	6.07	.0912	4.451	1.97	12.942
Indian	.071	0.49	.0105	4.852	1.47	2.823
Farm	-.211	-1.73	-.0314	-2.132	-0.79	-4.548
Family business	.329	3.39	.0491	1.745	0.87	7.059
In Kuala Lumpur	-.140	-0.79	-.0210	5.418	1.46	-0.983
In Ipoh	-.233	-1.01	-.0347	-4.103	-0.82	-6.209
In Penang	.123	0.77	.0184	3.918	1.25	3.873
In other urban	-.230	-2.11	-.0343	0.956	0.40	-3.901
Children < age 10	.085	2.86	.0127	0.667	1.09	1.901
Children, 10 to 14	-.114	-2.45	-.0171	-0.646	-0.60	-2.291
Children, 15 to 19	-.0811	-2.65	-.0121	-0.449	-0.68	-1.701
Family income (1000)	-.000859	-0.17	-.000128	0.020	0.19	-0.018
R Squared				0.22		
Log likelihood	-609.621					-1576.71
N	1942			276		1942
Mean dep. variable	0.1421			12.17		

NOTES: (a) Included in regressions but not reported here: Missing value designators for mother's and husband's education, family income, and husband's age; a variable indicating whether or not the husband was living in the household; an intercept term.
 (b) Derivative of probability function evaluated at variable means.
 (c) Elasticity of the expected value locus.

Table 5

LABOR FORCE EQUATIONS, AGE GROUP 15 TO 19(a)

	PARTICIPATION (Probit) Asymptotic		CONDITIONAL HOURS (OLS)		"DESIRED" HOURS (Tobit) Asymptotic		Elasticity(c) of E(Y)
	Coefficient	t-ratio	Probability(b)	Coefficient	t-ratio	Coefficient	
<u>Children's</u>							
Sex (boy = 1)	.0688	0.56	.025	6.198	3.19	5.738	2.32
Age 15 to 19	.258	5.46	.094	3.000	4.19	6.581	7.04
<u>Mother's</u>							
Education	-.0737	-2.42	-.027	-.0.842	-1.62	-2.080	-3.26
Age rel. to husband	.903	1.40	.33	20.815	1.87	33.446	2.45
Marital status	1.156	2.89	.42	-13.272	-1.92	11.407	1.39
<u>Husband's</u>							
Education	-.137	-4.88	-.050	0.018	0.04	-2.315	-4.18
Age	.0348	0.61	.013	-.0.635	-0.43	0.286	0.22
Age Squared	-.000649	-1.20	-.00024	0.01		-0.013	-1.01
<u>Household Characteristics</u>							
Chinese	1.257	7.84	.46	5.928	2.25	26.034	8.16
Indian	.675	3.48	.25	4.306	1.31	15.920	3.95
Farm	.212	1.33	.077	-1.519	-0.60	3.440	1.07
Family business	.218	1.48	.079	-2.800	-1.18	2.067	0.70
In Kuala Lumpur	-.00848	-0.035	-.0030	6.065	1.46	3.982	0.78
In Ipoh	-.169	-0.49	-.062	3.786	0.69	-0.164	-0.02
In Penang	-.302	-1.14	-.11	0.442	0.11	-5.191	-1.01
In other urban	-.536	-3.41	-.19	5.106	1.84	-5.464	-1.68
Children < age 10	.0568	1.15	.021	0.377	0.49	1.418	1.43
Children, 10 to 14	.101	1.51	.037	-1.999	-1.85	0.292	0.21
Children, 15 to 19	-.0813	-1.70	-.030	1.435	1.80	-0.224	-0.23
Family income (1000)	-.000191	-0.023	-.000069	0.050	0.32	0.022	0.12
R Squared				0.19			
Log likelihood	-295.41					-1839.38	
N	565			359		565	
Mean dep. variable	0.635			31.61			

NOTES: (a) Included in regressions but not reported here: Missing value designators for mother's and husband's education, family income, and husband's age; a variable indicating whether or not the husband was living in the household; an intercept term.
 (b) Derivative of probability function evaluated at variable means.
 (c) Elasticity of the expected value locus.

sensitive to several assumptions that are not always well met by these data, so a degree of caution is in order.⁹

The Tobit estimates do give a good overall summary of the combined effects of participation and conditional hours effects. This joint effect is represented by the last column under the Tobit results, which gives elasticities of the expected value locus $[E(y)]$ evaluated at variable means. These values closely approximate values that would result from adding participation elasticities to conditional hours elasticities.¹⁰ For the most part, discussion begins with Tobit equations, and turns to probit and conditional hours equations only when they add to the story.

Among the more interesting comparisons in this study are those between boys' and girls' labor force behavior. For neither of the two age groups is there evidence that boys participate in labor market activities more frequently than girls. However, older boys do appear to work more weekly hours than girls when they work. It is noteworthy that similar regressions estimated for each ethnic group show little variation in this participation pattern by race. This is a truly remarkable finding given the very different cultural and religious backgrounds of Malaysian Chinese, Malays, and Indians.

⁹ Tobit estimation rests on assumptions that (1) underlying disturbances are normal and (2) the same process governs both participation and conditional hours decisions. An unsystematic look at the distribution of labor force hours for children aged 5 to 14 suggests that the normality assumption likely holds quite well for that sample, but the hours distribution for older children shows heaping at more than one value. I have tested the sensitivity of estimates to the heaping that occurs at low hours levels (more than zero but less 5 hours per week) and found the results to be unaffected. Adherence to the second assumption is more problematical. The Tobit model assumes that both the explanatory variables and the β s are the same for participation and conditional hours decisions; this is quite clearly not the case in several instances. However, short of "custom" maximum likelihood methods, the Tobit results give as accurate a picture as we are likely to get of combined participation and conditional hours effects.

¹⁰ The only exceptions to this statement occur when both participation and conditional hours effects are small and insignificant. This always leads to small and insignificant Tobit coefficients, but in such cases the sums of participation and conditional hours elasticities do not always add up to the Tobit expected value elasticities.

These results take on added significance when we look at regressions on the expanded hours measure reported in the appendix. Broadening the definition of productive hours increases girls' participation and conditional hours more than boys'. Under the broadest definition of productive hours (labor force + home products + housework), young Malaysian girls provide greater transfers to parents during their early years at home than do boys at least when transfers are measured in hours.¹¹ Boys and girls work about equal amounts of labor force hours, but girls work substantially more "nonmarket" hours.

Even for very young children, desired labor market hours rise rapidly with children's age--for example, desired weekly hours for 7-to-9-year-olds rise by 5 hours per year of age. Participation rates rather than conditional hours drive this effect for young children. For the older children participation and conditional hours effects combine to raise desired hours. By the time children reach mid-to-late teens, desired weekly hours rise 7 hours, or almost a full working day, per year of age.

The effect of parent education on children's time use varies both by children's age and by definition of productive hours. Husband's schooling changes neither young children's participation rates nor their conditional hours for any hours measure. However, older children with better educated fathers participate less in all forms of productive activities than do similar children with less educated fathers. In contrast, increased levels of mother's education always reduces desired productive hours, with the driving force behind this reduction shifting from participation rates to conditional hours as the definition of productive hours broadens.

Before we turn to the effects of parent age on child work, a characteristic of the underlying sample needs reemphasizing. The research design behind the MFLS focused on fertility-related questions. Only ever-married women less than 50 years of age were selected as primary respondents. This design prohibits us from observing the

¹¹ The wage analysis following this section shows that Malaysian girls and boys who work actually earn about the same wages, which suggests that the qualifying statement at the end of this sentence may not be necessary.

working habits of children who live with mothers over age 50. It also means that we cannot explore child time use among divorced and separated husbands and widowers.

These design considerations may partly explain the poor showing of the parent age variables. Given the form in which these variables enter the regression (husband's age and age squared and wife's age relative to husband's age), husband's age captures overall effects on children's time use of parent aging. The Tobit results show no systematic effect of husband's age on children's time use. No U-shaped pattern emerges for either age group or for any of the component hours measures; in fact, inverted U patterns outnumber U-shaped patterns but partial derivatives are seldom significant at mean husband's age.¹²

Mothers who are widowed, divorced, or separated from their husbands (single mothers) will likely make different demands on their children's time than currently married mothers. Results in Tables 4 and 5 show that children of single mothers participate in labor market activities much more frequently than children of currently married mothers (about 9 points for 5-to-14-year-olds, and over 40 points for 15-to-19-year-olds). Marital status does not affect conditional hours for young children, but children aged 15 to 19 work significantly fewer hours if they live with a single mother.

Comparing the results of Tables 4 and 5 with those given in the Appendix for broader measures of productive hours suggests that marital status's effect on the time use of older children is mainly distributional--total productive hours change very little with marital status but what children do changes quite significantly. Older children female-headed households participate more frequently in labor force activities than do other children but work fewer hours when they do participate. I interpret this as a "spreading" of children's time over a wider set of activities as mothers use older children to substitute both for their own and for their former husband's time. Finally, in results not reported here, an interaction between marital status and children's sex was insignificant at conventional levels, suggesting that these findings hold equally for boy and girl children.

The fact that children of widowed, divorced, or separated mothers

¹² All have t-ratios no greater than one.

participate in market activities more frequently than other children is one direct piece of evidence on the role that children play as parent insurance policies. Mothers who, for whatever reason, have lost their husbands turn to their children for help. This help comes mainly in the form of an increase in labor force activities at the cost of participation and hours spent in nonmarket activities.

One of the strongest findings in Tables 4 and 5 is that Chinese children work more frequently at labor force activities and for longer hours than do Malay children. Tobit results show that the underlying demand for work from children aged 5 to 14 by Chinese parents exceeds that for Malay parents by some 13 hours per week. Differences are even more startling when we consider the demand for 15-to-19-year-olds' working hours: Chinese parents desire some 26 hours more per week from that age group than do Malay parents.

Several possible explanations could account for these substantial differences. One is that Malays work as much as Chinese but at different tasks. For example, Table 2 shows that Malays produce home products more frequently than Chinese or Indians, and the definition of labor force time used in Tables 4 and 5 excludes that time.

The appendix tables allow us to explore this possibility. As the definition of productive time broadens, participation differences between 5-to-14-year-old Chinese and Malay children reduce to insignificant levels. However, there remains a 2-to-3 hour difference in conditional weekly hours. For Indian children participation rates actually decline below Malays' as the definition of work broadens.

For 15-to-19-year-olds, broadening the productive work definition reduces participation differences among races but increases conditional hours differences. Under the narrow definition of labor force activity, Chinese children work about 6 more hours per week and Indian children about 4 more hours per week than Malay children conditional on working at all. Broadening the definition of productive work about doubles Chinese/Malay and Indian/Malay differentials. The net effect is a decline in the difference between Chinese and Malay desired hours from 13 to 2.5 for young children and from 26 to 12 for older children.

These results suggest that a part of the ethnic differences in work activities are due to types of activities Malays perform. However, even under the most inclusive definition of productive work, Malay children who work do so for fewer hours than Chinese or Indian children.

Children in farm households show little systematic difference in labor force behavior compared to nonfarm children. For the younger child age group, Tobit results indicate that farm children may actually have lower desired children's work hours than other families, a very counterintuitive finding. Although one can only speculate at this juncture, farm families may report child work activities in ways that differ from nonfarm families. Broadening the definition of productive work does move all farm coefficients to statistical insignificance, but the puzzle remains.

Child time use comparisons for households with business income produces more readily interpretable results: Tobit results indicate that family-business labor-demands raise desired weekly work hours for young children substantially--by some 7 hours--but have little effect on older children's desired hours. Whether family businesses actually increase children's value to parents is a far more difficult question, but these results demonstrate clearly that family businesses affect young children's time use patterns.

Household location in Malaysia--rural, urban, or capital city--has no consistent effect on child work. Location coefficients occasionally reach statistical significance, but orders of magnitude and signs change with even small changes in the definition of working hours.¹³

Family composition--numbers and age of children--usually affects mother's time allocation. Table 4 shows that it also influences child time use but mainly for young children. In general, more young children in the household increase work participation for 5-to-14-year-olds while more older children lower participation. These results are all the more striking because we are concerned in Tables 4 and 5 with labor market

¹³ This results partly from the inclusion of individual and household characteristics in the regression--zero order correlations between location variables and time use are often statistically significant.

participation and not housework. Including housework in the definition of productive work increases the importance of family composition relationships markedly but, again, mainly for 5-to-14-year-olds (see Appendix Table A.2).

The regressions in Tables 4 and 5 were also estimated with the number of non-nuclear family members as an explanatory variable. Those results (not presented here) suggest that adult time and young children's time substitute for each other even in labor force activities. When the number of non-nuclear household members increases, young children's participation and hours worked decline--participation by only 2 points, but weekly hours by nearly 5. In contrast, time use for children aged 15 to 19 was not much affected by the presence of non-nuclear family members.

As with the first variable in Tables 4 and 5 (child's sex), the last variable, family income, is interesting because of its apparent lack of effect on child work time. The common story of poor families putting children to work in order to make ends meet appears not to hold for Malaysia: Family income affects neither child labor force participation nor work hours for either age group.¹⁴ This finding holds over a variety of alternative functional forms for income--log, quadratic, and spline--and over all time use types. A related study using these data (De Tray, forthcoming) finds significant income effects on both school participation and hours spent in school, which suggests that these findings are not the result of a poorly-measured income variable.

This section shows quite clearly that children often contribute to family wellbeing by working at productive activities. But how should children's contributions be valued? The next section explores the feasibility of one approach: valuing children's time according to actual or potential market wages.

¹⁴ As indicated above, earnings of all household members over the age of 15 enter the income estimate, so these results do not rule out the possibility that income affects older children's labor force activities. If we were to exclude "own earnings" from the income measure, the negative income coefficient in the final Tobit regression could become significant, but the effect would likely remain small.

CHILDREN'S WAGE RATES

One standard method for valuing nonmarket contributions is to "price" nonmarket time at actual or imputed market wages. In trying to move from wage data for some children to a time value for all children, we encounter many of the same problems that researchers who want to value women's nonmarket time face,¹⁵ plus a few. Most children in Malaysia do not work for wages. Those who do are not selected randomly from the population of all children. So, we have few observations on which to estimate a wage-imputing equation, and a high likelihood of selectivity problems with the sample that we do have.

Further, most children who work will be learning on the job. If those children are paid partly in training and partly in wages, we have a very imperfect measure of market time value even for those who work. This may be especially true for children who work in family businesses. This section explores children's wage data from the MFLS in an attempt to assess whether these data would support a more thorough and statistically demanding analysis.

Table 6 says much of what there is to say about the MFLS children's wage data. Less than 10 percent of the 2616 children in the base sample received wages. Almost no children under age 15 report wage earnings. Wage earners are not especially abundant even among 15-to-19-year-olds. Fewer than one-fifth of Malay and one-third of Indian children aged 15 to 19 living at home earn wages. In keeping with their greater labor force participation, Chinese children also receive wages more frequently than other children.

Children in the sample who earn a wage receive an average of M\$0.62 per hour (a little over US \$0.25). To better isolate ethnic differences in child wages, a simple regression was estimated with the natural logarithm of children's wage as the dependent variable. As Table 7 shows, Chinese children's wages are nearly 30 percent above Malay children's wages.¹⁶ Indian child wages also exceed Malay wages with

¹⁵ Kusnic and DaVanzo (1980, Appendixes A, C, and E) discuss these problems.

¹⁶ These and other statements in this section ignore the fact that the coefficients in Table 7 are not exact measures of percentage differences.

Table 6
CHILDREN'S WAGES

Group	Number	Percent With Positive Wages	Mean Wage for Those With Wage > 0
All children	2616	8.8	0.62
Malays			
5-14	902	1.4	0.45
15-19	266	18.8	0.56
Chinese			
5-14	843	3.3	0.58
15-19	232	43.1	0.60
Indians			
5-14	266	2.2	0.26
15-19	103	33.0	0.94

most of the difference coming at older ages (see Table 6).

The wage regression also contains several other interesting findings. Children in households with family businesses earn lower wages than other children. This lower wage may offset greater on-the-job training, expectations of higher earnings in the future through eventual business ownership, or both. It demonstrates effectively some of the problems that arise in analyzing children's wages.

Children who live in Kuala Lumpur also earn higher than average wages, and by substantial amounts (nearly 50 percent).¹⁷ The main force driving wage differences is, however, children's age. While there appears to be no relationship between age and wages for children under age 15, every year beyond 15 is worth a 21 percent wage premium.

The lack of difference in labor force behavior for Malaysian boys and girls is one of this study's more unexpected findings. Table 7's results are no exception. Wages earned by boys and girls show a remarkable similarity. The coefficient on child's sex is not

¹⁷ It should be noted that wages were not adjusted for any cost-of-living differences which may exist between urban and rural areas.

Table 7

CHILDREN'S WAGE REGRESSIONS:
DEPENDENT VARIABLE = LOG_e (HOURLY WAGE)

Variable	Coefficient	(t-ratio)
Sex (boy = 1)	0.08	(0.7)
Age 7 to 9	-1.19	(-1.2)
Age 10 to 14	-0.07	(-0.9)
Age 15 to 19	0.21	(5.5)
Chinese	0.28	(2.0)
Indian	0.38	(2.1)
Farm	0.07	(0.5)
Family Business	-0.25	(-1.9)
Kuala Lumpur	0.46	(1.8)
Other Urban	0.06	(0.4)
Intercept	2.2	
R^2		0.20
F		5.5
N		231

significantly different from zero, and its magnitude is relatively small.

As a final check of the MFLS children's wage data, Table 8 presents a Probit regression whose dependent variable is the probability of participation in a wage earning activity.¹⁸ This regression's sample is all children in the labor force as defined above (employee, self employed, worker in a family business, employer, but not producer of home products).

Many of the coefficients come as no surprise. Chinese and Indian children are more likely than Malay children to earn wages. Older children, especially those in the 15-to-19 age range, earn wages more

¹⁸ That is, the dependent variable equals one for all children with a positive wage, zero otherwise.

Table 8

PROBIT POSITIVE-WAGE REGRESSIONS(a)

Dependent Variable = 1 if child wage > 0
= 0 otherwise

Variable	Coefficient	(t-ratio)	Probability(b)
Children's			
Sex (boy = 1	0.77	(0.76)	0.023
Age 5 to 6	-1.10	(-0.17)	-0.33
Age 7 to 9	0.71	(0.61)	0.21
Age 10 to 14	0.39	(4.85)	0.12
Age 15 to 19	0.25	(5.99)	0.073
Mother's			
Education	0.010	(0.57)	0.0031
Age	-0.27	(-1.45)	-0.078
Age Squared	0.0031	(1.39)	0.00093
Father's			
Education	-0.011	(-0.71)	-0.0033
Age	0.037	(0.43)	0.011
Age Squared	-0.00020	(-0.24)	-0.00006
Household Characteristics			
Chinese	0.70	(4.49)	0.21
Indian	0.28	(1.48)	0.083
Farm	-0.40	(-2.35)	-0.12
Family business	-0.22	(-1.60)	-0.064
In Kuala Lumpur	0.14	(0.54)	0.042
In other urban	0.11	(0.79)	0.034
Children < age 10	0.17	(3.85)	0.049
Children ages 10 to 14	0.014	(0.21)	0.0042
Children ages 15 to 19	0.026	(0.59)	0.0079
Family income (\div 1000)	-0.023	(-2.47)	0.0067
-2(Log likelihood ratio)(c)	207.0		
N	678		
Mean dependent variable	0.31		

(a) Other variables included but not reported: intercept; identifiers for missing husband's and mother's education; variable identifying husband's presence in household.

(b) Derivative of probability function evaluated at independent variable means.

(c) Tests the joint hypothesis that all coefficients except the intercept are zero.

frequently than younger children. And children who live in other urban areas have positive wages more often than rural children.

Among the less intuitive, and therefore more interesting, results are those concerning family farms and businesses. Children who live in farm and own-business families are less likely to be paid a wage than other children. So, children who live in families with their own businesses work more often (see Tables 4 and 5), but receive a wage less often than other children. The transfer implications are obvious.

The highly significant coefficient on numbers of children less than 10 is also noteworthy. It suggests that young children in a household push working-age children into wage earning activities to augment family cash income. And, what has now become an expected rather than unexpected result, girls and boys are equally likely to earn a wage.

The probability of a working child receiving a wage is also related to family incomes: Children from high-income families who work earn a wage less frequently than children from low-income families. Why this is so is not obvious, but it may reflect different investment strategies among families. Low-income families may choose to take their children's earnings in the form of cash while high-income families use those earnings to pay for on-the-job training.

This analysis was designed less to value child time than to weigh the prospects for doing so through market wage data. The prognosis is not good. Few Malaysian children work for wages. Evidence suggests that those who do take their wages in different forms--some part in training and some part in direct payment. This adds up to an unstable foundation for further analysis.

VI. CONCLUSIONS

This study demonstrates that many Malaysian children make productive contributions to their family's wellbeing. These contributions take the form both of nonmarket work--housework and home products--and market work as traditionally defined. Whether or not these general results are surprising depends on one's preconceptions. However, a number of the paper's specific findings do contradict widely accepted beliefs. For example,

- The burden of poverty in developing countries is often thought to fall most heavily on children who must begin work at an early age to help make ends meet. This research finds no evidence to support that picture. Malaysian children from poor families neither participate in productive activities nor work longer hours when they do participate than children from more well-to-do families.
- Sex stereotyping is thought to be especially prevalent in traditional Third World countries with strong cultural heritages. Malaysian Chinese, Indians, and Malays all fit this mold and yet we find remarkably few labor-force-related differentials between boys and girls. Girls and boys participate in labor force activities about equally frequently, for the most part work similar hours when they do participate, work for wages about equally frequently, and earn about equal wages when they receive wages.
- Most studies of children's transfers to parents find that boys' contributions usually exceed girls' contributions and by substantial amounts. At least while children are unmarried and still living with their parents, girls in Malaysia contribute more in terms of productive hours than boys. Girls and boys work about equal hours at labor force activities, but girls spend considerably more time at other productive activities, especially housework.

- Other studies of economic activity in Malaysia have found substantial ethnic differences, and narrowing these differences has been a chief concern of the Malaysian government. This study also finds ethnic differences in productive activities among Malaysian children, with Chinese and Indian children generally working more frequently and longer hours than Malay children. However, these differences narrow considerably when the definition of productive hours is broadened to include productive work within the home.
- One argument in support of high fertility in developing societies is that children provide parents with a form of insurance against unanticipated illnesses, disability in old age, and the like. This study demonstrates that children may provide insurance against other events as well. Widowed, divorced, or separated mothers in this sample quite clearly turn to their children to offset the loss of husband's time both in market work and in household activities.
- Family businesses are more popular as sources of income in developing than developed societies. This analysis shows that this form of economic organization also has implications for transfers from children to parents: Couples who own farms or businesses use more of their children's time in labor force activities but pay them a cash wage less frequently than do other couples.

This Note leaves a fundamental question unanswered: Do couples who expect large transfers from their children have higher fertility than other couples? It does, however, suggest that even in a relatively advanced developing country such as Malaysia, children's time transfers to parents are more than sufficient to make this question worth asking.

APPENDIX:
PARTICIPATION, CONDITIONAL HOURS,
AND TOBIT RESULTS FOR ALTERNATIVE HOURS MEASURES

Table A.1
LABOR FORCE AND HOME PRODUCTS EQUATIONS, AGES 5 TO 14(a)

PARTICIPATION (Probit) Asymptotic				CONDITIONAL HOURS (OLS)		"DESIRED" HOURS (Tobit) Asymptotic	
Coefficient	t-ratio	Probability(b)	Coefficient	t-ratio	Coefficient	t-ratio	Elasticity(c) of E(Y)
Children's							
Sex (boy = 1)	-2.47	-.052	1.170	1.27	-1.145	-1.35	-0.073
Age 5 to 6	1.99	.11	0.428	0.11	4.609	1.88	3.330
Age 7 to 9	6.46	.090	0.192	-0.25	3.069	5.19	0.751
Age 10 to 14	9.62	.075	-2.060	6.53	3.672	11.97	0.580
Mother's							
Education	-2.46	-.012	-0.354	-1.64	-0.662	-3.35	-0.135
Age rel. to husband	1.400	.13	-1.798	-0.43	3.224	0.84	0.419
Marital status	-0.0036	-.00025	1.176	0.40	1.274	0.46	0.007
Husband's							
Education	-0.080	-.00036	0.089	0.46	0.080	0.44	0.040
Age	-0.41	-.0038	0.584	1.76	0.341	0.98	1.599
Age Squared	0.061	.0000059	-0.006	-1.67	-0.004	-1.16	-0.855
Household Characteristics							
Chinese	0.076	.0019	3.990	3.56	2.223	2.18	0.116
Indian	-4.017	-.15	2.300	1.31	-3.840	-2.55	-0.065
Farm	-0.018	-.00053	-0.989	-0.80	-0.636	-0.54	-0.014
Family business	0.40	.010	2.713	2.46	2.124	2.06	0.078
In Kuala Lumpur	-2.77	-.13	3.548	1.59	-2.657	-1.38	-0.022
In Ipoh	-1.90	-.12	-2.574	-0.84	-5.463	-2.06	-0.027
In Penang	-0.32	-.14	3.445	1.83	1.747	1.00	0.015
In other urban	-2.82	-.078	-0.402	-0.32	-2.580	-2.28	-0.075
Children < age 10	1.69	.013	0.351	1.01	0.743	2.35	0.239
Children, 10 to 14	-2.59	-.031	-0.417	-0.75	-1.301	-2.69	-0.261
Children, 15 to 19	-4.51	-.038	-0.189	-0.48	-1.482	-4.36	-0.631
Family income (1000)	-0.90	-.0012	0.052	0.78	-0.037	-0.68	-0.044
R Squared			0.191				
Log likelihood	-952.29				-2821.39		
N	1942		578		1942		
Mean dep. variable	0.298		7.68				

NOTES: (a) Included in regressions but not reported here: Missing value designators for mother's and husband's education, family income, and husband's age; a variable indicating whether or not the husband was living in the household; an intercept term.
(b) Derivative of probability function evaluated at variable means.
(c) Elasticity of the expected value locus.

Table A.2

TOTAL PRODUCTIVE HOURS EQUATIONS, AGES 5 TO 14(a)

	PARTICIPATION (Probit)		CONDITIONAL HOURS (OLS)		"DESIRED" HOURS (Tobit)		Asymptotic Elasticity(c) of E(Y)
	Coefficient	t-ratio	Probability(b)	Coefficient	t-ratio	Coefficient	
<u>Children's</u>							
Sex (boy = 1)	-.647	-9.40	-.25	-4.065	-6.63	-6.575	-11.29
Age 5 to 6	.498	3.61	.19	-0.179	-0.08	4.516	3.11
Age 7 to 9	.427	10.63	.17	0.717	1.56	3.377	8.90
Age 10 to 14	.303	10.47	.12	2.824	13.08	3.695	16.89
<u>Mother's</u>							
Education	-.0238	-1.58	-.00	-0.468	-3.33	-0.481	-3.66
Age rel. to husband	.655	2.18	.25	-0.556	-0.20	3.202	1.25
Marital status	-.426	-1.92	-.17	0.557	0.28	-1.767	-0.93
<u>Husband's</u>							
Education	-.00694	-0.49	-.0027	0.051	0.39	0.020	0.17
Age	.00145	0.048	.00056	0.410	1.66	0.306	1.323
Age Squared	-.000136	-0.43	-.000053	-0.005	-1.82	-0.004	-0.794
<u>Household Characteristics</u>							
Chinese	.0350	0.43	.014	2.810	3.84	2.476	3.57
Indian	-.186	-1.69	-.072	1.143	1.12	-0.022	-0.02
Farm	.116	1.23	.045	0.030	0.04	0.450	0.57
Family business	.0952	1.15	.037	1.522	2.06	1.698	2.42
In Kuala Lumpur	-.310	-2.16	-.12	-1.246	-0.92	-2.616	-2.08
In Ipoh	-.223	-1.19	-.086	-2.200	-1.19	-2.649	-1.59
In Penang	-.134	-0.94	-.052	0.956	0.75	0.317	0.26
In other urban	-.190	-2.18	-.073	-0.402	-0.50	-1.193	-1.60
Children < age 10	.0931	3.67	.036	1.402	6.31	1.567	7.37
Children, 10 to 14	-.216	-5.79	-.084	-0.354	-1.00	-1.563	-4.85
Children, 15 to 19	-.157	-6.16	-.061	-1.099	-4.56	-1.670	-7.48
Family income (1000)	-.00281	-0.73	-.0011	0.032	0.83	-0.000	-0.01
R Squared				0.26			
Log likelihood	-915.09					-4622.57	
N	1942			1111		1942	
Mean dep. variable	0.572			9.00			

NOTES: (a) Included in regressions but not reported here: Missing value designators for mother's and husband's education, family income, and husband's age; a variable indicating whether or not the husband was living in the household; an intercept term.
 (b) Derivative of probability function evaluated at variable means.
 (c) Elasticity of the expected value locus.

Table A.3

LABOR FORCE AND HOME PRODUCTS EQUATIONS, AGES 15 TO 19(a)

	PARTICIPATION (Probit) Asymptotic		CONDITIONAL HOURS (OLS)		"DESIRED" HOURS (Tobit) Asymptotic		Elasticity(c) of E(Y)
	Coefficient	t-ratio	Probability(b)	Coefficient	t-ratio	Coefficient	
<u>Children's</u>							
Sex (boy = 1)	-.117	-0.91	-.033	5.872	3.18	3.907	1.85
Age 15 to 19	.164	3.33	.046	4.039	5.90	5.367	6.69
<u>Mother's</u>							
Education	-.0183	-0.58	-.0051	-1.538	-3.17	-1.586	-2.92
Age rel. to husband	1.214	1.75	.34	16.416	1.57	29.728	2.57
Marital status	.891	2.20	.25	-4.440	-0.70	7.715	1.11
<u>Husband's</u>							
Education	-.129	-4.45	-.036	-0.632	-1.50	-1.924	-4.10
Age	-.196	-1.51	-.055	-0.221	-0.28	-0.358	-0.38
Age Squared	.00194	1.44	.000	-0.005	-0.68	-0.004	-0.49
<u>Household Characteristics</u>							
Chinese	.828	4.96	.23	10.589	4.47	18.081	6.71
Indian	.151	0.76	.042	9.470	3.07	8.634	2.51
Farm	.256	1.49	.071	-0.944	-0.40	2.811	1.04
Family business	.0848	0.56	.024	-0.477	-0.21	1.009	0.40
In Kuala Lumpur	-.211	-0.85	-.059	6.619	1.66	1.134	0.26
In Ipoh	-.0877	-0.24	-.024	2.610	0.49	-0.293	-0.05
In Penang	-.480	-1.76	-.13	-1.535	-0.40	-5.594	-1.27
In other urban	-.512	-3.17	-.14	1.742	0.70	-5.005	-1.82
Children < age 10	-.000526	-0.010	-.00015	0.980	1.31	0.794	0.93
Children, 10 to 14	.133	1.87	.037	-1.876	-1.85	0.004	0.00
Children, 15 to 19	-.0726	-1.49	-.020	0.568	0.76	-0.255	-0.31
Family income (1000)	-.00451	-0.53	-.0013	0.123	0.83	0.042	0.28
R Squared				0.23			
Log likelihood	-264.94					-2088.60	
N	565			430		565	
Mean dep. variable	0.761			28.10			

NOTES: (a) Included in regressions but not reported here: Missing value designators for mother's and husband's education, family income, and husband's age; a variable indicating whether or not the husband was living in the household; an intercept term.
 (b) Derivative of probability function evaluated at variable means.
 (c) Elasticity of the expected value locus.

Table A.4

TOTAL PRODUCTIVE HOURS EQUATIONS, AGES 15 TO 19(a)

	PARTICIPATION (Probit) Asymptotic		CONDITIONAL HOURS (OLS)		"DESIRED" HOURS (Tobit) Asymptotic		Elasticity(c) of E(Y)	
	Coefficient	t-ratio	Probability(b)	Coefficient	t-ratio	Coefficient		t-ratio
Children's								
Sex (boy = 1)	-1.483	-4.86	-.066	-2.305	-1.27	-7.053	-3.80	-0.097
Age 15 to 19	.162	2.00	.072	4.348	6.44	4.861	6.86	0.341
Mother's								
Education	.00886	0.19	.00040	-1.372	-2.93	-1.279	-2.70	-0.062
Age rel. to husband	-.207	-0.18	-.0093	24.537	2.48	22.124	2.19	0.639
Marital status	.362	0.66	.016	5.409	0.89	5.869	0.96	0.174
Husband's								
Education	-.131	-2.94	-.0059	-1.049	-2.65	-1.430	-3.53	-0.142
Age	-.0513	-0.23	-.0023	-0.609	-0.75	-0.463	-0.55	-0.548
Age Squared	.000692	0.30	.000031	-0.002	-0.30	-0.003	-0.35	-0.158
Household Characteristics								
Chinese	.239	0.93	.011	11.637	5.14	12.021	5.13	0.134
Indian	-.260	-0.91	-.012	9.044	3.03	6.349	2.11	0.030
Farm	.184	0.64	.0082	0.983	0.42	1.651	0.69	0.010
Family business	-.0124	-0.054	-.00056	1.109	0.51	1.393	0.63	0.012
In Kuala Lumpur	-.771	-2.24	-.034	2.822	0.71	-2.272	-0.59	-0.005
In Ipoh	-.415	-0.83	-.019	-0.654	-0.12	-3.085	-0.59	-0.003
In Penang	-.287	-0.74	-.013	-3.700	-0.98	-4.298	-1.11	-0.009
In other urban	-.249	-0.96	-.011	-3.571	-1.53	-4.226	-1.77	-0.029
Children < age 10	.0510	0.61	.0023	1.368	1.89	1.602	2.14	0.068
Children, 10 to 14	.0414	0.35	.0018	-0.803	-0.80	-0.496	-0.49	-0.022
Children, 15 to 19	-.152	-2.057	-.0068	-0.306	-0.43	-0.757	-1.04	-0.101
Family income (1000)	.0324	1.69	.0014	0.063	0.50	0.104	0.81	0.029
R Squared				0.19				
Log likelihood	-105.42					-2394.92		
N	565			525		565		
Mean dep. variable	0.929			29.92		27.80		

NOTES: (a) Included in regressions but not reported here: Missing value designators for mother's and husband's education, family income, and husband's age; a variable indicating whether or not the husband was living in the household; an intercept term.
 (b) Derivative of probability function evaluated at variable means.
 (c) Elasticity of the expected value locus.

BIBLIOGRAPHY

- Butz, William P., and Julie DaVanzo, *The Malaysian Family Life Survey: Summary Report*, The Rand Corporation, R-2351-AID, March 1978.
- Butz, William P., and David H. Greenberg, *An Economic Methodology for Measuring the Benefits from Children*, The Rand Corporation, R-1792-RF, October 1975.
- Butz, William P., and Peter J. E. Stan, *Household Composition and Interhousehold Exchange in Malaysia*, The Rand Corporation, N-1812-AID, July 1982.
- Butz, William P., Julie DaVanzo, Dorothy Z. Fernandez, Robert Jones, and Nyle Spoelstra, *The Malaysian Family Life Survey, Appendix A, Questionnaires and Interviewer Instructions*, The Rand Corporation, R-2351/1-AID, March 1978.
- Butz, William P., and Michael P. Ward, "Is U.S. Fertility Temporarily Low?: Evidence on the Timing Component of Period Fertility Rates," *Population and Development Review*, 1979.
- Cain, Mead, and A.B.M. Khorshed Alam Mozumder, "Labor Market Structure, Child Employment, and Reproductive Behavior in Rural South Asia," Working Paper No. 56, Center for Policy Studies, The Population Council, New York, 1980.
- Caldwell, J. C., "Toward a Restatement of Demographic Transition Theory," *Population and Development Review*, Vol. 2, No. 3-4, 1976, pp. 321-366.
- Chan, Paul, "The Forgotten Little People: A Study of Urban Child Labor in a Developing Economy," presented at the Sixth Malaysian Economic Convention, Malaysia in the 1980's, Persatuan Ekonimic Malaysia (Malaysian Economic Association), Penang, May 8-10, 1980.
- DaVanzo, Julie, Dennis De Tray and David H. Greenberg, *Estimating Labor Supply Response: A Sensitivity Analysis*, The Rand Corporation, R-1372-OEO, December 1973.
- De Tray, Dennis, *Schooling in Malaysia: Historical Trends and Recent Enrollment*, The Rand Corporation, forthcoming.
- Duesenberry, James, "Comment on 'An Economic Analysis of Fertility,' by Gary S. Becker," in *Demographic and Economic Change in Developed Countries*, Universities-National Bureau Conference Series, No. 11, Princeton University Press, Princeton, N.J., 1960.

- Espenshade, Thomas J., "The Value and Cost of Children," *Population Bulletin*, Vol. 32, No. 1, Population Reference Bureau, Inc., Washington, D.C., April 1977.
- Espenshade, Thomas J., *The Cost of Children in Urban United States*, Population Monograph Series 14, Institute of International Studies, University of California, Berkeley, 1973.
- Kusnic, Michael, and Julie DaVanzo, *Income Inequality and the Definition of Income: The Case of Malaysia*, The Rand Corporation, R-2416-AID, June 1980.
- Nag, Moni, "Economic Value of Children in Agricultural Societies: Evaluation of Existing Knowledge and an Anthropological Approach," in James T. Fawcett, ed., *The Satisfaction and Costs of Children: Theories, Concepts, Methods*, East-West Population Institute, East-West Center, Honolulu, 1972.
- Nag, Moni, "Economic Value of Children in Relation to Human Fertility," Working Paper, Center for Policy Studies, The Population Council, New York, 1978.
- Nugent, Jeffrey B., and Robin J. Walther, "A Model of Household Structure, Marriage, and Fertility in Rural Areas of Developing Countries with Special Emphasis on the Effects of Old Age Pensions," University of Southern California, 1981.
- Rodgers, Gerry, and Guy Standing, "Economic Roles of Children in Low-Income Countries," *International Labour Review*, Vol. 120, No. 1, January-February 1981.
- Rosenzweig, Mark R., "Household and Non-Household Activities of Youths: Issues of Modelling, Data and Estimation Strategies," paper prepared for the ILO Informal Workshop on Children and Employment, Geneva, October 10-13, 1979.
- Samuelson, Paul A., "An Exact Consumption-Loan Model With or Without The Social Contrivance of Money," *Journal of Political Economy*, Vol. 66, pp. 467-82, December 1958.
- Simon, Julian L., ed., *Research in Population Economics: An Annual Compilation of Research*, Vol. 1, JAI Press, Inc., Greenwich, Conn., 1978.
- The World Bank, *World Development Report 1980*, Oxford University Press, New York, 1980.
- Ward, Michael P., and William P. Butz, "Completed Fertility and Its Timing," *Journal of Political Economy*, Vol. 88, No. 5, October 1980.

Willis, Robert J., "On the Social and Private Benefits of Population Growth," State University of New York and NORC (forthcoming).

Young, Kevin, Willem C. F. Bussink, and Parvez Hasan, *Malaysia: Growth and Equity in a Multiracial Society*, Johns Hopkins University Press, 1980.

