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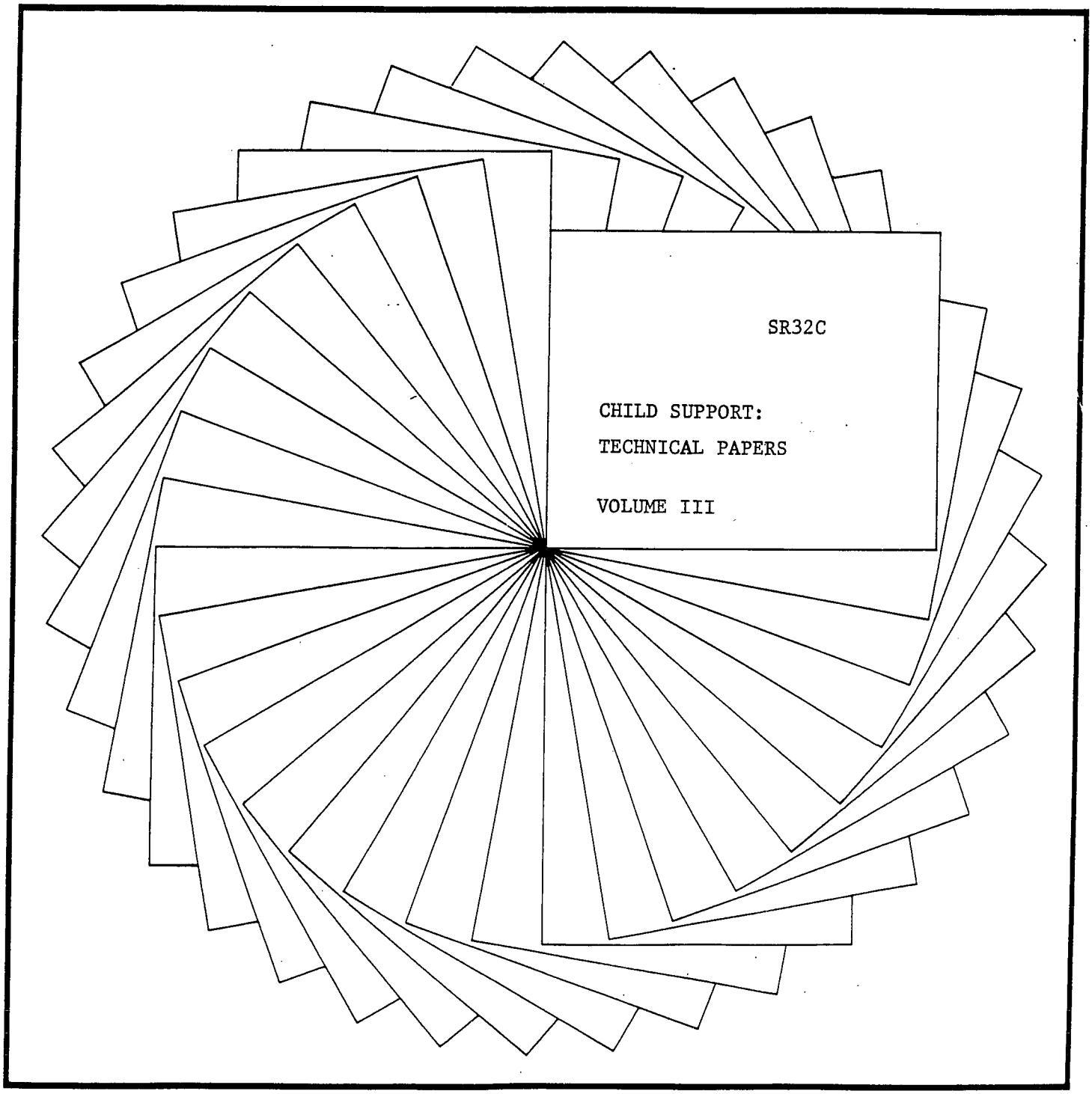

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On Measuring the Cost of Children

Jacques van der Gaag

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On Measuring the Cost of Children

1. Introduction

Every now and then the average newspaper reader is presented with an estimate of "the cost of a child." A recent estimate of the cost of raising a child from 0 to 18 years of age is some $85,000 (Espenshade, 1980). The discussions following the publication of such a number often suggest that it is accepted by the researchers dealing with this topic as a reasonable ball-park estimate. A closer look at the literature, however, shows a different picture. In order to produce an estimate of the cost of a child, many problems have to be solved, not the least of them the definition of this cost. Various solutions to these problems yield a large variety of cost estimates, showing a surprising lack of consensus about the "true" number.

This paper sketches the development of the topic in the economic literature. Consequently the paper has the character of survey, but I do not claim completeness. I focus on a number of papers that I consider to have contributed significantly to the development of a clear definition of the cost of a child. This definition is presented, and a selection of estimates based on it are discussed. I also briefly discuss some efforts that do not fit the general framework.

The economic literature on the cost of children is embodied in the literature on the demand for consumption goods. A clear historical development can be observed from the seminal work of Engel at the end of the nineteenth century via Sydenstricker and King (1921) and Barten

(1964) to Muellbauer's (1974) work on household equivalence scales, on which most of the recent work in this area is based.

In the next section I shall discuss this development in some detail, and derive a formal definition of the cost of a child. The rest of the paper will focus on the consequences of this definition for the actual measurement of the cost of children.

Section 3 will review the various approaches to the measurement problems found in the literature on household equivalence scales. In section 4 I shall try to construct estimates of the cost of a child, based on the estimates found in the literature, my subjective evaluation of these estimates and our own empirical work in this area.

In section 5 I digress a little to discuss some basic methodological problems that have been pervasive in the literature throughout the century-long development of the topic.

Section 6 discusses some approaches that do not fit this framework.

In section 7 I shall summarize this paper by specifying a set of questions that should be addressed in order to obtain reliable, well-defined estimates of the cost of a child.

2. Household Equivalence Scales and the Definition of the Cost of a Child.

The literature that considers the determination of scales to adjust income (or consumption) levels of families of different composition in order to make them "equally well off," goes back to the work of E. Engel (1895).

Engel postulated an expenditure function of the following form as an appropriate method of incorporating household composition effects into the analyses of consumer demand:

$$\frac{q_i}{m} = q_i \left(\frac{C}{m}\right), \tag{1}$$

where q_i is expenditures on good i by a given household,

C is income (equal to total consumption expenditures),

m is a measure of household equivalence.

In the simplest case, m equals family size, and equation (1) says that the per capita expenditures on good i by a given household are a function of per capita household income.

Engel suggested that a more realistic estimate of m could be obtained from physical standards of a person's need. In principle, an estimate of m can be derived simply from the comparison of expenditure patterns across households of different composition.

As early as 1921, Sydenstricker and King criticized the approach represented in equation (1) as too restrictive, because each good consumed is rescaled by the same amount m (and consequently income is rescaled by m). In 1955, Prais and Houthakker rediscovered this objection to the original Engel approach. They reformulated equation (1) as:

$$\frac{q_i}{m_i} = q_i\left(\frac{C}{m}\right) \tag{2}$$

where m_i is a commodity-specific weighting factor and m is a weighted sum of the m_i's. In this formulation, it is possible to allow for large economies of scale for, say, housing and hardly any for, say, clothing.

Barten (1964) showed how this approach can be incorporated in a utility framework, thus giving a formal base to the notion of "household

equivalence." Two households are considered to be equally well off if both have the same level of utility (economic well-being). This level of utility can be inferred from differences in consumption patterns between households of different composition. Muellbauer (1974) showed how this approach can yield household equivalence scales, the formal definition of which will be the base of our definition of the cost of a child.

Following these developments, most of the literature on household equivalence scales now starts with the familiar assumption in economics, that households maximize a utility function under a budget constraint. More specifically, a utility function U is postulated with arguments q_1, q_2, ..., q_K, the quantities of goods 1, 2, ..., K.

Households are assumed to choose that bundle of consumption goods that maximizes their utility, given their total income.

Thus households face the following problem of choice:

$$\text{maximize } U = U(q_1, q_2, \ldots, q_K), \tag{3}$$

$$\text{under } \sum_{i}^{K} p_i q_i = C, \text{ the budget constraint,} \tag{4}$$

with q_i, quantities consumed of good i,

p_i, price of good i,

C, "income" (= total consumption expenditures).

This constraint maximization results in a set of demand equations of the form:

$$q_i = q_i(p_1, \ldots, p_K, C) \quad i = 1, \ldots, K. \tag{5}$$

Thus the demand for good i is a function of all prices, and income.

Since it is likely that large households are worse off with a given bundle of consumption goods than small households, a more realistic representation of the utility function is:

$$U = U(q_1, \ldots, q_K; h), \tag{6}$$

i.e., the utility level reached with a given bundle of goods is conditional upon household composition h. The corresponding set of demand equations now reads:

$$q_i = q_i(p_1, \ldots p_K, C; h) \quad i = 1, \ldots, K, \tag{7}$$

saying that the demand for good is a function of all prices and income, given household composition. Note that equations (1) and (2) are examples of this, assuming that prices are constant across households.

For our present purposes it is useful to restate the maximization problem: instead of asking for the maximum utility level that can be reached with a given income, given household composition and prices, we can ask for the minimum expenditure level (income) needed to reach a given utility level, given household characteristics and prices.

More formally, the problem can be restated

$$\underset{q_1, \ldots, q_K}{\text{maximize}}\ U = U(q_1, \ldots q_K; h) \text{ subject to } \sum_{i=1}^{K} p_i q_i = C^\circ$$

with C° a prespecified income level,

as

$$\underset{q_1, \ldots, q_K}{\text{minimize}}\ C = \sum_{i=1}^{K} p_i q_i \text{ subject to } U(q_1, \ldots q_K; h) = U^\circ$$

with U° a prespecified utility level.

Both approaches are equivalent and yield a set of demand equations as given in (7).

The outcome of the second optimization problem, the minimum income, C_{min}, needed to reach U°, is obviously a function of prices, the utility level chosen, and household characteristics, so

$$C_{min} = C(p_1, \ldots p_K, U^\circ, h) \tag{8}$$

The function $C(\cdot)$ is the cost function.

This cost function allows us to calculate "household equivalence scales." These scales tell us the factor by which a given income level of a family with characteristics h_2 should be multiplied to become "equivalent to" (i.e., to yield the same utility level, to give the same level of economic well-being as) the income of a family with characteristics h_1.

Let U° be a given level of utility for the reference family, h_1, and let $C_1 = C(p_1, \ldots, p_K, U^\circ, h_1)$ be the minimum cost to reach that level. and C_2 be similarly defined for a household with characteristics h_2.

Then,

$$\frac{C_2}{C_1} = \frac{C(p_1, \ldots, p_K, U^\circ, h_2)}{C(p_1, \ldots, p_K, U^\circ, h_1)} \tag{9}$$

is the ratio with which to calculate the income of the first household (h_1) to get the equivalent income for the second household (h_2). We will now adopt the concept of the cost function to define the cost of a child.

Let h_1 represent a couple without children, and h_2 a couple with one child. The cost of one child is defined as:

$$C_2 - C_1 = C(p_1, \ldots, p_K, U^\circ, h_2) - C(p_1, \ldots, p_K, U^\circ, h_1) \quad (10)$$

i.e., the cost of one child is equal to the difference in the incomes of a one-child household and a childless household ($C_2 - C_1$), that is needed to reach the same given level of economic well-being (U°).

Since the analysis of the cost of a child is usually based on cross-sectional data, for which it is assumed that all households face the same prices, equation (10) can be rewritten as:

$$C_2 - C_1 = C(U^\circ, h_2) - C(U^\circ, h_1). \quad (11)$$

This definition of the cost of a child, or, more generally, of the difference in cost[1] of reaching the level of economic well-being (U°) between a household with characteristics h_2 and one with characteristics h_1, has two important consequences.

First, from (11) it is clear that the cost of a child is a relative concept, i.e., it depends on prior choice of the utility level U°. Thus "the cost of one child" will generally be different for "the rich" (with a high income-utility level) than for "the poor;" this is intuitively plausible. It does imply, however, that we cannot specify the cost of a child if we do not first specify the utility level (income level) to which this cost refers.

Second, the cost of a child depends on "the difference" between h_2 and h_1. It is not known, a priori, how this difference should be measured. In our example, h_2 was a couple with one child, h_1 a childless couple. But in general we have to address the following questions: does

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[1] In economic jargon: the compensating variation.

the sex of the child matter, does the age of the child matter, is the cost of a second child the same as the cost of a first child, do age and sex differences between the first two children matter, and what about subsequent children? Are other household characteristics relevant, like the employment status of the spouse?

Before adressing these questions, we will answer the question of how to measure levels of economic well-being in the next section.

3. METHODS OF MEASURING ECONOMIC WELL-BEING AND THEIR RELATION TO HOUSEHOLD EQUIVALENCE SCALES

3.1 Indirect Measures of Economic Well-Being

As we have seen in the previous section, the theory starts with the concept of a utility function to be maximized under a budget constraint. The result is a set of demand equations, explaining the consumption of goods and services as a function of prices[1], income, and household characteristics.

In applied work, we work the other way around. We observe the consumption of different market bundles by households with different incomes and of different family composition. From this consumption behavior we infer differences in economic well-being (utility).

One of the best-known examples of this approach again goes back to the work of Engel. One of Engel's observations was that the proportion of income spent on food declines as income rises ("Engel's law"). A simi-

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[1]Since in all that follows I assume prices to be constant across households, I shall ignore price differences from now on.

lar observation was made with respect to family size: large households spend a larger proportion of their income on food than small households.

This suggests that the food share can be used as a measure of well-being. It is often assumed that two households are equally well off if they spend the same proportion of their income on food. Once this measure of well-offness is accepted, the measurement of the cost of a child is straightforward, as in the following example:

Assume we observe two households. One is childless, has an income of $10,000 and spends 25% of that income on food. The other has one child, the same income, and spends 30% on food. According to our food-based definition of economic well-being, the childless couple is "richer." The question is: How much additional income is needed to make the second household equally well off. We can answer this question by observing one-child families at different income levels. Suppose we find that the average one-child family spends 25% of its income on food an income level of $12,000. We conclude that the cost of a child is $2,000. (Alternatively, say that $12,000 is the equivalent income for a one-child household, as compared to a childless couple with $10,000. Equivalent scales based on this principle are widely used--BLS worker budgets (see U.S. Department of Health, Education and Welfare, 1977), Espenshade (1973), Dubnoff (1979b) and I shall discuss them later.

The advantages of using the food share as a measure of economic well-being are clear. It is a relatively easy measure, and the amount of information needed is limited. It is based on some intuitive notion of basic needs: large families "need" more food than small families. Finally, it is based on Engel's early observations of household consump-

tion behavior, and "Engel's laws," based on a small nineteenth-century survey among blue-collar workers in Belgium, has been repeatedly confirmed in later work.

The problems with this measure are equally clear. Food is an obvious necessity, and for poor households, it is plausible to assume that they first spend part of their income on food, before deciding how to spend the rest on other commodities. But an equally plausible assumption can be made with respect to housing and, maybe to a somewhat lesser extent, clothing. Especially in a rich society, in which basic food needs can virtually always be met, the focus on food seems somewhat arbitrary, and is too restrictive. Furthermore, the observation that food shares decline as income rises, and go up if family size increases, does not imply that equal food shares represent equal welfare levels (Friedman, 1952).

As Watts (1977) has shown, the food share approach can easily be extended to include other commodities. The "iso-prop" index he developed is based on the assumption that households spending equal proportions of their income on "basic necessities" (food, housing, clothing, and transportation) are equally well off. The measurement of the cost of a child based on this definition of economic well-being is the same as in the previous case (see Seneca and Taussig, 1971).

Though Watts's approach is an obvious improvement over the measure based on food alone, a number of problems remain. The choice of the goods to be called "basic necessities" is again somewhat arbitrary. Moreover, the intuitive appeal (households first have to spend part of their income on basic necessities; the more they have left thereafter,

the better-off they are) becomes less convincing in a rich society[1] where the concept of "necessities" is less anchored in a notion of physical needs than in some notion of socially acceptable minimum living conditions (which might include such "unnecessities" as a color TV, theater tickets and, say, one two-week vacation per year).

Pushing the idea that housholds first spend part of their income to satisfy some "basic needs" to their limit, it seems reasonable to assume that households first spend part of their income on some specific minimum level of each good distinguished, before they decide how to spend the remainder of their income. Thus, we do not have to specify in advance which goods or services belong in the category "basic necessities".

The main advantage of this approach, however, is that it has a base in economic theory, as I shall show below.

Probably the best known utility function is the Stone-Geary function, which has the following form:[2]

$$U = \sum_{i=1}^{K} \beta_i \ln(q_i - \gamma_i), \tag{12}$$

where β_i and γ_i are parameters, $\Sigma\beta_i = 1$ and $\gamma_i < q_i$, $i = 1, K$. Thus the utility level derived is a weighted sum of the logarithm of the goods consumed, insofar as the quantity of each good consumed exceeds some minimum level γ_i. The β_i's are the relative weights.

The maximization of this utility function under the budget constraint yields the following set of demand equations:

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[1]Watts developed his measure explicitly to refer to a poverty line concept similar to the so-called Orshansky poverty line.

[2]Ignoring houshold characteristics for the moment.

$$q_i = \gamma_i + \beta_i(C - \sum_{j=1}^{K} \gamma_j) \qquad i=1, \ldots, K \tag{13}$$

That is, households first buy the quantities γ_i for each commodity, then they spend the rest of their income, $(C - \sum_{i=1}^{K} \gamma_i)$, in the proportions β_i.

Thus the proportion of income spent on the minimum levels γ_i for all K commodities can be adopted as a measure of economic well-being: the smaller this proportion, the "richer" you are.[1] If we can specify the minimum levels γ_i for households of different composition, we can again obtain a measure of the cost of a child in a straightforward way.[2]

As stated in Section 2, Barten (1964) has shown how household characteristics can be incorporated in a utility-maximizing framework. Following his approach, (10) is rewritten as

$$U = \sum_{i=1}^{K} \beta_i \ln \left(\frac{q_i}{m_i} - \gamma_i\right), \tag{14}$$

with m_i a commodity-specific weighting factor. This factor is a function of household characteristics

$$m_i = 1 + \delta_i' h \qquad i=1, \ldots, K \tag{15}$$

with h a vector of household characteristics.

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[1]The minimum levels γ_i are sometimes referred to as "subsistence levels," again giving the impression that those levels have some base in physical needs. A more recent label is "committed consumption." However, this interpretation is not necessary, and, in fact, breaks down if one or more of the γ's appear to be negative. We nevertheless adopt this interpretation for expositional convenience.

[2]Goldberger (1967) has shown that the proportion of income spent on "committed consumption" is directly related to Frisch's formal measure of economic well-being, "money flexibility" (the income elasticity of the marginal utility of income).

The demand equations resulting from the maximization of (14) are:

$$q_i = \lambda_i m_i + \beta_i \left(C - \Sigma_j \gamma_j m_j\right) \qquad i=1, \ldots, K. \tag{16}$$

thus households first buy the quantity $\gamma_i m_i$ of each commodity i, and then spend the rest of their income $(C - \sum_{i=1}^{K} \gamma_i m_i)$ in proportions β_i.

Let us take as our base household a childless couple, setting the weights m_i for this couple equal to 1.0. If h represents the number of children, the weights for a couple with one child are equal to $m_i = 1 + \delta_i$, $i = 1, \ldots, K$. Thus, if the childless couple spends $\Sigma\gamma_i$ on "committed consumption," the one-child household spends $\Sigma\gamma_i m_i = \Sigma\gamma_i + \Sigma\gamma_i\delta_i$. The difference, $\Sigma\gamma_i\delta_i$, equals the cost of one child, as defined in section 2. Note that this cost is based on the income level needed just to buy the minimum levels γ_i. We cannot say anything yet about the cost of a child at higher income levels.[1]

In order to be able to do that, the cost-function as introduced in section 2, can be employed, as Muellbauer (1974) has shown,

The cost function corresponding to the Stone-Geary utility function reads:

$$C(U^\circ, h_1) = \Sigma\gamma_i m_i^1 + \exp[U^\circ - \Sigma\beta_i \log\beta_i + \Sigma\beta_i \log m_i^1], \tag{17}$$

where m_i^1, $i = 1, \ldots, K$, is the commodity-specific weight for a household

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[1]In this framework we will never be able to say anything about households with incomes <u>below</u> $\Sigma\gamma_i$, since in that case $q_i < \gamma_i$ for at least one good, and the utility function is not defined. In fact the utility level is not defined for $C = \Sigma\gamma_i$ either, but the interpretation of the γ_i's as committed consumption does make the interpretation of $\Sigma\gamma_i\delta_i$ as the cost of a child at this income level plausible. Alternatively one might think of it as the approximation of the cost of a child for an income level slightly above $C = \Sigma\gamma_i$.

with characteristics h_1. So, again, if h_1 is the childless couple and h_2 is the couple with one child, the cost of one child, at utility level U°, equals $C(U^\circ, h_2) - C(U^\circ, h_1)$, where $C(\cdot)$ is specified as in (17).

Thus, we have observed a rather straightforward development from measuring economic well-being on the basis of the proportion of income spent on food, through Watts's iso-prop index, which is based on necessities, and finally to the total expenditures for minimum consumption levels of all goods. All three measures (food share, necessity share, committed consumption on all goods) depend on the size of the household, which gives us the information needed to obtain an estimate of the cost of a child.

The third measure (committed consumption) gives us the tie with the economic theory of utility maximization discussed in the previous section, if we adopt a specific form of the utility function (the Stone-Geary function). And, as shown in section 2, this utility-maximizing framework gives us a formal definition of the cost of a child, by employing the cost function. In principle the parameters of this cost function can be estimated from the parameters in the demand equations. Thus, in all cases discussed so far, observed household consumption patterns provide the information needed to obtain estimates of the cost of a child.

A slight modification of this approach is due to Henderson (1950a, 1950b). So far I have implicitly assumed that the household is the decision-making unit, and have concentrated on the "utility level of the household." Henderson concentrates on the welfare of the parents only, and obtains the cost of a child by observing the consumption of the adults. Since breaking up household consumption data between children's

consumption and adult consumption is hard (if not impossible) for most consumer goods, Henderson concentrates on alcoholic beverages, tobacco, and adult clothing. Two pairs of adults are considered to be equally well off if they consume equal shares of their income on these "adult consumption" items. Thus, by observing adult consumption differences among households of different composition, the cost of children can be calculated along the lines previously sketched for the food proportion and the other indirect techniques.

In the next subsection I shall discuss an alternative approach to estimating the cost of a child. Instead of indirectly obtaining the parameters of the cost function from observed consumption differences between households of different composition, a method is proposed to measure the cost function directly.

3.2 Direct Measures of Economic Well-Being

From the definition of the cost of a child it is clear that all that is needed is a dollar amount that equates the welfare level of a couple with a child to a prespecified welfare level of a childless couple. Thus, in general, we try to answer the question of how much it takes, under various circumstances, to reach a given welfare level.

One straightforward way of obtaining an answer to this question is to conduct a survey in which this question is included.

The best-known example of this approach can be found in the Gallup polls: respondents are asked to specify the minimum amount of money required by a family of four to "get along." Clearly the answer to this question gives the "cost" of reaching a prespecified welfare level, "to get along," for a household of given composition. If the same question

were to be asked for different household sizes, the cost of children could be directly estimated by analyzing the systematic differences in the answers obtained. Rainwater (1974) presents such an analysis based on the Boston Social Standards Survey.

One obvious shortcoming of this approach is that respondents are asked to judge the economic well-being of a hypothetical household. The respondents' own current situation may differ both in economic well-being and in household composition.

Goedhart et al. (1977) asked the following question: Living where you do now, and meeting expenses you consider necessary, what would be the very smallest income you (and your household) would need to make ends meet? This way of posing a question that has to do with welfare levels refers directly to the respondent's own circumstances. Not surprisingly, the answer one gets varies systematically with those circumstances.

More specifically, Goedhart et al. show that the answer to this question is a function of the income level of the respondent and his family size. Thus it contains all the information we need to calculate the cost of a child.[1]

Goedhart's analysis is part of a larger body of literature on the individual welfare function of income, developed by Van Praag (1968, 1971). Instead of asking for a level of income that corresponds with only one welfare level ("get along," "make ends meet") respondents are asked to give the income level they associate with six or seven welfare levels, ranging from feeling "terrible" to feeling "delighted."

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[1]Goedhart et al. use this question to obtain a poverty line for households of different size.

The answers are transformed into a so called individual welfare function of income (WFI), which gives a utility level (on a 0-1 scale) associated with each income level. Two typical WFI's are given in Figure 1.

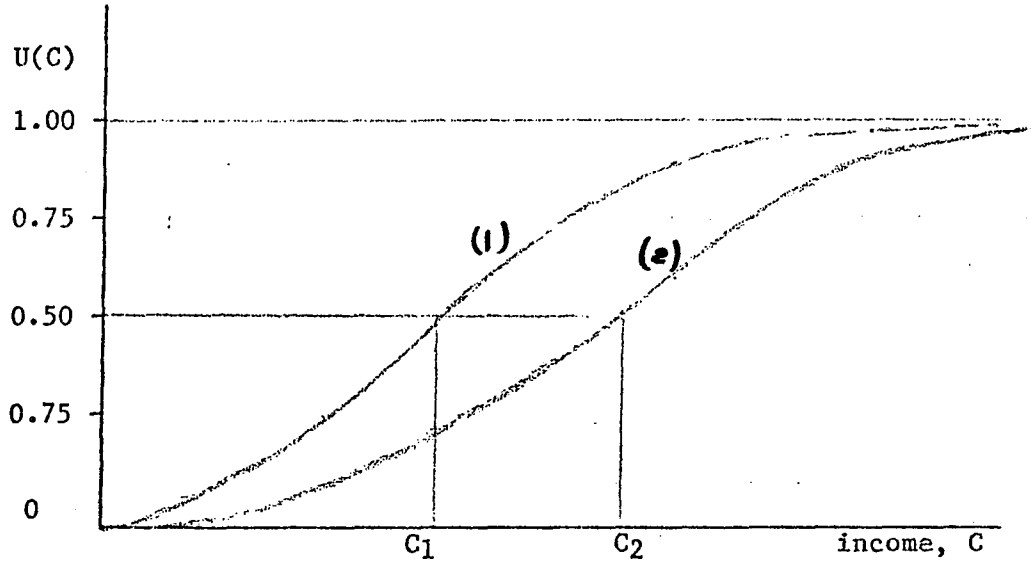

Figure 1. Two individual welfare functions of income.

Given the answers to the income evaluation question, a WFI can be estimated for each household. Again the answers show systematic variation with family size, thus enabling the researcher to calculate the cost of a child. For instance, if graph (1) in Figure 1 refers to a childless couple and graph 2 to a couple with one child, to cost of a child for utility level .50 is calculated as $C_2 - C_1$.

Using this approach, Kapteyn and van Praag (1976) derive a full set of family equivalence scales.

In the next section I shall discuss their results, together with results obtained by the various other methods of measuring welfare that we have discussed in this section.

4. ESTIMATES OF THE COST OF A CHILD

Virtually all studies from which I shall obtain estimates of the cost of a child deal primarily with the estimation of complete "family equivalence scales." To ease the exposition I shall start this section by discussing estimates of the cost of a first child. Thus the question is: How much income does a couple with one child need, to obtain the same (prespecified) level of economic well-being as a childless couple?

The second part of this section deals with the cost associated with subsequent children.

4.1 The Cost of a First Child

Table 1 we presents estimates of the cost of a first child, obtained by first converting the equivalence scales found in the literature to make a childless couple the reference household. Then the cost of a first child is obtained by multiplying the reference household's income level by this equivalence scale.

As the table readily reveals, there is not much consensus about the numbers. The percentage increase of income needed to compensate a couple for having a first child runs from 0% to 42%. There seems to be no systematic relation between the outcome and the technique used. Henderson, basing his estimates on "adult consumption," gets numbers between 17% and 22%, depending on income level. The finding that the percentage increases with income, however, is counter-intuitive, though

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[1]Ignoring here the British pence and pounds contributions. Their "mid-range" estimates run from 9%-22%. We also ignore the outliers.

Table 1

Estimated Cost of a First Child

Author	Technique	Income[a] Level	Income Increase Needed (%)	Cost of[b] First Child	Remarks
Henderson (1950)	adult cons.	600 pence/ week, 1937	17%		
		1000	16		
		1600	22		
Espenshade (1973)	food prop.	$ 7,360	40	$2,944	These are
		11,657	32	3,730	averages over
		18,223	26	4,738	an 18-year
Dubnoff (1979a)	food prop.	*	30		period
Dubnoff (1979b)	direct	8,522	28	2,526	
Seneca, Taussig (1971)	food prop.	5,544	1	55	
		12,312	42	5,171	
		32,160	29	9,326	
	necessities	5,544	7	388	
		13,608	40	5,443	
		34,560	26	8,986	
Goedhart et al. (1977)	direct	5,220	13	691	
Kapteyn, v. Praag (1976)	direct	*	19		child age: 2
		*	14		22
Muellbauer (1977)	constant U	£20/week, 1975	16		child age: <5
	40		9		<5
	100		0		<5
	20		30		>5
	40		22		>5
	100		13		>5
McClements (1977)	constant U	£27.50/ week,1972	8		child age: 0-1
			22		8-10
			35		16-18
van der Gaag, Smolensky (1981)	constant U	$11,239	0	0	child age: <6
		8	899		6-11
		12	1,349		12-17
		34	3,821		18+
BLS (U.S. DHEW, 1977)	food prop	*	37		

*not dependent on income level.

[a]These income levels refer to childless couples. All amounts are 1979 dollars, unless otherwise stated.

[b]The cost of a child is defined as the additional income needed if one child is added to a childless couple. The additional income will keep the household at the same level of economic well-being as it was before the addition of a child.

Seneca and Taussig do show a similar result for their lower levels of income.

The "proportion spent on food" method yields anywhere between 0% and 42% increase. The "necessity" method gives between 7% and 40%. The various direct approaches yield between 13% and 30%, while the constant utility approach results in 0% to 35% increases. Even if we disregard the outliers (the three zeros and the four numbers over 35%), we are left with results evenly distributed between 6% and 35%.

Some of this variation is explainable. With the two exceptions mentioned above, the percentage increase needed declines with income. Looking at the income levels around $12,000, we find 32% (Espenshade) and 0%-35% (van der Gaag, Smolensky).[1] The latter result depends on the age of the child, another major source of the variation in the results. All estimates show that the cost goes up with the age of the child, except Kapteyn and van Praag.

Espenshade's result (32%) is the average cost of a child over an 18-year period. The van der Gaag-Smolensky result is consistent with the assumption that the cost increases with approximately two percentage points each year, yielding an average cost of 18%.

Thus, this tour de force to reduce the range of the results yields the result that between 18% and 32% additional income is needed for a couple with about $12,000 income. Note finally that Muellbauer's results are consistent (for the midrange of income) with a 2% to 3% increase per year of age, implying an average cost of 18%-27%, and McClements's results also fall in this range, showing 22% for the "average nine-year-old."

If I were obliged to give an estimate on the basis of the information given above, I would say that the "true value" of the cost of a first child is between 20% and 30% of a childless couple's income. An obvious point estimate would be 25%.

Thus a couple with a yearly income of $12,000 needs, on average, $3,000 more per year to enjoy the same level of economic well-being with one child. Stated otherwise: a couple with one child, and $15,000 income, spends $3,000, or 20%, of that income on the child. But we would like to emphasize the large variance in the estimates. Other observers might easily reach a different point estimate.

A final word on the effect of the income level. It can be shown that for the constant utility approach (Barten, 1964, Muellbauer, 1977) the percentage of compensating income decreases if the income (utility) level increases. Muellbauer's results are in accordance with that, and so are the results of van der Gaag and Smolensky. However, the latter show that the equivalence scale is virtually constant over a large income range. Only at very high incomes does the scale become flatter. Adopting this last result for the next subsection, and I shall proceed under the assumption that the equivalence scales are approximately constant over the relevant income range.

4.2 The Cost of Second and Subsequent Children

Though I did derive at a point (qu)estimate for the cost of a first child in the previous subsection, I was able to do so only after extensive manipulation of the data. Unfortunately, the consensus about the cost of subsequent children is even lower than that for the first child. Table 2

Table 2

Estimated Income Increases Needed to Compensate for Increasing Family Size (the reference household is a childless couple)

Author	Income Level[a]	1 Child	2	3	4	5
Henderson (1950)	600 pence/week, 1937	17%	8			
	1000	16	13			
	1600	22	16			
Espenshade (1973)	$7,360	40	18	17		
	11,657	32	15	14		
	18,223	26	13	12		
Dubnoff (1979a)	*	30	29	25	26	22
Dubnoff (1979b)	8,522	28	26	22	21	
Seneca	5,544	1	29	35	42	53
Taussig (1971)	12,312	42	34	27	31	26
	32,160	29	19	11	4	8
	5,544	7	34	21	22	27
	13,608	40	15	16	18	20
	34,560	26	13	10	11	11
Goedhart et al. (1977)	5,220	13	11	8	8	7
Kapteyn, van Praag	*, young children	19	9	8	3	
(1976)	*, older children	14	7	6	3	
Muellbauer (1977)	£20/week, young children	16	9			
	40/week, young children	9	4			
	100/week, young children	0	-4			
	£20/week, older children	30	27			
	40/week, older children	22	20			
	100/week, older children	13	11			
van der Gaag,						
Smolensky (1981)	$11,239 children < 6	0	9	7	5	4
	" 6-11	8	10	10	5	4
	" 12-17	12	9	7	5	4
	" 18+	34	10	8	5	4
BLS (U.S. DHEW, 1977)	*	37	31	32	34	

*not dependent on income level.

Note: The reference household is a childless couple.

[a]These income levels refer to childless couples. All amounts are 1979 dollars, unless otherwise stated.

shows the increase, in percentage points, in income needed to compensate a household if one or more children are added.

Espenshade estimates the cost of the second child to be about half that of the first child. Some of the estimates of Henderson (low income), Seneca and Taussig (high income), Kapteyn and van Praag, and Muellbauer (young children) are in agreement with this result. However, Dubnoff's results imply approximately constant cost per child, as do the BLS results. Some of the results of Seneca and Taussig (for low income levels) and van der Gaag and Smolensky (young children) show the second child to be more expensive than the first.

The results for the third child are quite similar: the third child is approximately as costly as the second. The cost for subsequent children decreases fast, according to Goedhart, Kapteyn and van Praag, and van der Gaag and Smolensky, but does not change much according to Dubnoff or the BLS. The Seneca and Taussig estimates are erroneous in this respect.

It should be noted that where the age of the children is taken into account, we generally find the second child to be roughly half as expensive as the first. (This includes Espenshade's results, giving the average cost over an 18-year period.) The cost of the third child is roughly equal to the cost of the second. And, in addition, we find the cost decreases rapidly after the third child.

Since, as we saw above, the age of the child is an important factorin determining its cost, it is likely that where the age of the child is ignored, the effect of the number of children is contaminated by the age effect. This could explain to some extent the deviant results of Dubnoff

and Seneca and Taussig. It does not explain the results of van der Gaag and Smolensky for young children, however.

Thus, if any general result can be derived from Table 2, one could argue that the second child costs about half as much as the first, the third costs the same as the second, and the subsequent children are about half as expensive as the second and third. If we tie this to our previous (qu)estimate of 25% for the first child, we obtain Table 3. Again I should emphasize that, because of the large variance in the estimates, Table 3 could only be obtained after excessive data manipulation.

Column 2 of Table 3 shows the percentage of compensating income needed for the additional child, to keep the household "as well off as a childless couple with $12,000." Column (4) shows equivalent income levels from which the dollar cost of a child can be obtained (column 5). Column 7 shows this dollar cost as a percentage of the equivalent income. Thus this column can be interpreted as the percentage of income that the parents use for their children.

Up to now, some readers might have the impression that, in spite of the variety in the techniques used, the theory is well established and some consensus can be reached from the empirical results. In the next section we will partially discomfort those readers.

5. Some Problems Related to Measuring the Cost of Children

As we have seen in the previous sections, the concept of the cost of a child can be considerably clarified if we start with the assumption that households maximize a utility function given their resources. The welfare comparisons based on the utility levels reached provide the

Table 3

Average Cost of Children

Number of Children (1)	Cost of Subsequent Child (%) (2)	Equivalence Scale (3)	Income (4)	Cost of Subsequent Child ($) (5)	Cost of All Children ($) (6)	% income "shared with children" (7)
0	-	100	$12,000	-	-	-
1	25%	125	15,000	$3,000	$3,000	20%
2	12.5	137.5	16,500	1,500	4,500	27
3	12.5	150	18,000	1,500	6,000	33
4	6.25	156.25	18,750	750	6,750	36
5	6.25	162	19,440	750	7,500	39

Note: The reference household, a childless couple = 100; the reference income is $12,000.

information for measuring the cost of a child. Up to now, I have assumed that the only arguments in the utility function are consumption goods. Consequently, the appropriate budget constraint refers to total consumption expenditures. In what follows I shall discuss a number of other arguments that should enter the utility function in order to make meaningful welfare comparisons.

5.1 How Many Children?

The most controversial additional source of utility is the children themselves. Why do couples decide to have children, if this results in a drop in their welfare level? Or, to paraphrase Deaton and Muellbauer (1980a), where do children come from, from the storks? Clearly, if children themselves are a source of utility, the cost of a child cannot be obtained from analyzing constraint consumption behavior alone.

Pollak and Wales (1979) show that in order to make unconditional welfare comparisons (i.e., comparisons in which children are not treated as given, but are treated as arguments in a household utility function) we need information of the following kind: what would you prefer, a household with two children and an income of $12,000, or a household with three children and a $15,000 income. But, of course, many households prefer three children over two, even without the income adjustment.

Thus, Pollak and Wales argue, the household's preferences should not only be defined over consumption goods but should include the number of children. More generally, it should include all household characteristics that can reasonably be assumed to be an object of choice. Living alone, in conventional households or in extended households, can

all be arguments in the utility function. Welfare comparisons should be based on these unconditional utility functions.

If one accepts this argument (and it is especially appealing in a world where having children is more and more the result of a conscious choice rather than of an unpredictable stork) one may wonder whether the approach to measure the cost of a child, as sketched in the previous section, is still valid.

I argue that it is. The conditional welfare comparison does yield a compensating amount of income, ignoring the utility derived from children. As such it provides us with a clear measure of the cost of a child (the gross cost, if one wants, since the benefits of having the child are ignored).

However, as the argument of Pollak and Wales makes clear, it is not obvious that a household should be financially compensated for this cost. While conditional welfare comparisons can form the base for estimating the cost of a child, it is questionable whether the cost estimates thus obtained should be used to correct household income in defining "equals." For many policy purposes[1] it might be reasonable just to accept that some people prefer large households over small ones, and consequently decide that they are better off with, say, two children than with one, even without any compensation in income.[2]

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[1]Tax schedules, eligibility for social programs, transfer payments, etc.

[2]Note that in this entire discussion, we use the notion of "household welfare," and not welfare of the parents, welfare of the first child, etc. In making transfer payments, for instance, one might argue that the family size should be taken into account, in order to raise the welfare level of the children, who were not involved in deciding the family size, to an acceptable level.

5.2 The Time Cost of Raising Children

One of the main aspects of the cost of children is the time input of the parents. Ignoring the cost of time will result in highly questionable estimates of the cost of a child, but in all the literature reviewed above, the parent's time input is not included.

Conceptually the time cost can easily be incorporated in the present framework. We make the following simplifying assumptions: (1) only the wife's time is relevant; (2) time can be used for two purposes only: working in the market place and leisure.

The "leisure" includes all activities outside the market place, such as housework, child raising and real leisure itself.

The standard model of utility maximizing households can now be reformulated as:

$$\underset{q_1,\ldots,q_K,L}{\text{maximize}} \quad U = U(q_1, \ldots, q_K, L; h), \tag{18}$$

$$\text{subject to} \quad \sum_{i=1}^{K} p_i q_i + wL = y_o + wT$$

where: L is the leisure of the spouse,

w is the wage rate of the spouse,

y_o is household income not earned by the spouse (i.e. nonlabor income plus the husband's earnings),

T is total time available to the spouse.

Thus households maximize a utility function with, as arguments, the consumption goods $q_1, \ldots, q_K$ and the leisure of the spouse, L, measured in, say, hours per year. As before, this utility function is conditional

upon household characteristics, h. The budget constraint says that expenses on goods, $\Sigma p_i q_i$, plus "expenses on leisure," wL, cannot exceed "full income."

Expenses on leisure are equal to the opportunity cost that the spouse accepts for not working L hours in the market place. Thus the cost of an hour of leisure is equal to the spouse's hourly wage rate. Full income is defined as total household income in the event that the spouse works a total of T hours.

The maximization again yields a set of demand equations for goods, plus one for leisure. The demand-for-leisure equation can, of course, be transformed in a labor supply function by using H = T - L, where H is hours of work in the market place. This labor supply function specifies the number of hours the wife spends in the market place, given prices (including her wage rate, w), nonearned income y_o, and the characteristics of the household, h.

For example, we can specify the utility function in equation (18) as:

$$U = \Sigma\beta_i \ln\left(\frac{q_i}{m_i} - \gamma_i\right) + \beta_L \ln\left(\frac{L}{m_L} - \gamma_L\right) \qquad (19)$$

Thus, equation (19) is an augmented form of equation (14) presented in Section 3. The augmentation specifies the contribution of the spouse's leisure to the household's utility. The weighting factor m_L is again a function of household characteristics, h, indicating that leisure in a household with children is different from leisure in a household without children. If h represents the number of children, and m_i, i=1, ..., K, L, is specified as in equation (15), "committed consumption plus leisure"

for a couple with one child equals $\Sigma\gamma_i m_i + \gamma_L m_L$, and for a childless couple $\Sigma\gamma_i + \gamma_L$.

The total cost (money and time) of one child is thus:

$$(\Sigma\gamma_i m_i + \gamma_L m_L) - (\Sigma\gamma_i + \gamma_L) =$$

$$(\Sigma\gamma_i(1 + \delta_i) + \gamma_L(1 + \delta_L)) - (\Sigma\gamma_i + \gamma_L) = \Sigma\gamma_i\delta_i + \gamma_L\delta_L,$$

the additional cost of goods plus the additional cost of leisure.

As before, all parameters can in principle be estimated from consumption equations, now augmented by a labor supply equation for the spouse. From the literature on female labor supply, we know that the presence of children has a large impact on female labor participation. This suggests that the time cost of children is indeed considerable.

The model can easily be extended to include the husband's time input. The same model can be used to analyze the total cost of a child in single-parent households. It is likely that in these households the time cost is especially large.

It is important to emphasize two restrictions of this model. First it is assumed that the wife can choose the optimum number of hours she wants to spend in the market place. In practice there might be many restrictions in the labor market that are not accounted for in the model. Only full-time jobs might be available, or no jobs at all. Incorporation of these restrictions into the model would severely complicate the analyses.

Secondly, we distinguished between time in the market place and time at home ("leisure") only. Much would be gained if we could split the time at home into time related to child-raising and other time. Obviously

this would produce serious measurement problems (which part of "time for cooking" is related to the child?).

Turchi (1975, Chapter 3) analyzed the hours a wife spends on "housework" (as distinguished from market work and leisure). He finds, for instance, that the first child adds about 835 hours per year[1] to the time spent on housework, or more than 16 hours a week. At wage rate of, say, $5.00 per hour, this means that the wife invests per year more than $4000 worth of her time in raising the child. A considerable amount, indeed, as compared to the money cost figures presented in Section 4.

This shows, as stated before, that measures of the cost of a child that ignore the time inputs of the parents will be seriously biased downwards. Though we did find it reasonable, for some purposes, to ignore children as arguments in the household utility function, it is much harder to find examples where ignoring leisure as a factor relevant for a household's welfare can be theoretically justified.[2] Consequently, in estimating the cost of a child, the parent's time input in raising the child should be included.

The next subsection will deal with yet another factor that is generally ignored in measuring the cost of a child.

5.3 Savings and Other Problems Related to Estimating the Cost of a Child

Up to now we have assumed that in any given period, say one year, households spend their entire income in goods and services. Thus we

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[1]This is an average over 22 years.

[2]Household equivalence scales, of course, are generally used to make welfare comparisons based on household income only. But income is mainly chosen as the appropriate welfare indicator for practical reasons, not because it is theoretically the best measure.

implicitly assumed that income equals total consumption expenditures. Savings or dissavings were ignored. However, it is quite likely that the presence of children will have an impact on a household's savings behavior, and this change should be taken into account when estimating the cost of a child.

The simplest way to do so is to treat savings as just another good, and proceed as sketched in Section 3. But this approach ignores the importance of the length of the period over which the households are observed. Households may anticipate having children, and save in advance to meet the higher cost of obtaining a specific level of living. Once the children are there, we will observe dissavings. However, this might change if the parents start to save to pay for, say, a future college education for the children.

A policy of treating savings as just another good and basing our estimates on observations during one year only cannot take these complications into account. For instance, using the spending and saving behavior of a childless couple as the reference point will yield biased results if some of these childless couples have modified their behavior in anticipation of having children. A lifetime welfare comparison seems to be in order, but for all practical purposes, comparing welfare levels of households with and without children over more than just a few years seems infeasible. Nevertheless, in making these short-term comparisons, we should be aware of the possible bias in the results arising from the short length of time the households are observed.

I end this section with three technical notes on the estimation of the cost of a child.

First, in the absence of all information on prices, it is not possible to obtain constant-utility household equivalence scales from demand equations without using additional information (Muellbauer (1975), Cramer (1969)).

The cause of this fundamental identification problem is relatively simple: since households supposedly spend their entire budget, information on how much they spend on good K is redundant once we know how much they spend on the first K-1 goods. So we only have K-1 independent pieces of information, when we estimate K demand equations. This is not enough to derive the K good-specific weighting factors m_i that appear in the cost function.

This problem does not occur if we have observations on households that vary in family size and face different prices. However, most data sets that are rich in household composition data are poor in price variation and vice versa. Solutions to the problem include the use of additional information (e.g., nutritional requirements for households of different size) or the adoption of additional assumptions to the consumer demand theory (compare Kakwani, 1977, and van der Gaag and Smolensky 1981). The results one obtains depend, of course, on the particular solution chosen.

A second problem relates to the particular form of the utility function (and consequently the cost function) chosen. The Stone-Geary function leads to the familiar Linear Expenditure System as in equation (13). However, the implications of this system are quite restrictive. We chose the system for expositional convenience and because it is one of the most widely used systems in empirical work.

The choice of the system is merely an empirical question, thus it is preferable to start with as general a specification as possible. Recent work on the Almost Ideal Demand System (Deaton and Muellbauer, 1980) might turn out to be important in this respect.

The final problem is somewhat related: How do we incorporate household composition variables in a demand system? Barten chose a particular form, known as scaling--compare equation (14). Recently Pollak and Wales (1980) compared scaling with various other approaches giving insight into the sensitivity of the results to the method chosen. However, none of these authors translated the estimation results in family equivalence scales. It is likely, however, that improved estimates of the cost of a child will come from these recent developments in consumer demand analysis.

As we have shown, a large body of the literature on household composition and consumer behavior can be embodied in one general framework. This framework--utility maximization--provides a convenient way to define and estimate the cost of a child. One of the most widely used estimates of the cost of children, however, does not fit in this framework: the Orshansky Poverty Line Equivalence Scale. We will discuss the base of this scale and some related approaches in the next section.

6. ALTERNATIVE APPROACHES TO MEASURING THE COST OF A CHILD

The current official U.S. poverty measure consists of income cutoffs for 124 different family sizes and types. The cutoffs vary by the age of the household head, age of the children, sex of the household head, and total family size. These cutoffs are obtained as follows.

Food costs for families of different age-sex composition (family types) were derived by "costing out" food needs based on nutritional requirements (for men, women, and children of different ages) suggested by the National Research Council; this allows consideration of age and sex differences in need. A multiplier was then applied to the food requirements to reflect nonfood needs (U.S. DHEW, 1976, p. 78).

Thus, where the equivalence scales discussed in the previous sections were all based on observed consumer behavior, the equivalence scales implicit in the U.S. poverty line (the "Orshansky scale") are primarily based on differences in nutritional requirement.

The U.S. Department of Agriculture thrifty-food plan was adopted to derive these differences across families of different composition, after which the total cost of the corresponding market basket was obtained. Thus, if the diet of a couple with a child is 13% more costly than that of a childless couple, the corresponding income equivalence scale is 113. Thus this scale implicitly assumes that goods-specific equivalence scales are the same for all goods. It ignores the possibility of differences in economies of scale between food needs and, say, housing needs. As such it is equivalent to the original Engel approach (see equation [1]), with the equivalence measure derived from food needs. Consequently, the critiques of the Engel approach, starting with Sydenstricker and King (1921), hold for the U.S. poverty line equivalence scale.[1]

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[1]The multiplier used to transform the food cost into an income level stems from the 1955 Food Consumption Survey in which the average food expenditure-income ratio was found to be 1:3. However, for some family types a slightly different ratio was used, thus making the Orshansky scale a combination of a nutrition need and food proportion scale.

Yet another approach to estimating the cost of a child is due to Turchi (1975). For a given income group he estimates equations of the form:[1]

$$Exp_i = \alpha_i + \beta_i \text{ Child} \qquad (20)$$

where Exp_i = expenditures on good i, and

Child = 1 if there is one child in the household,

= 0 otherwise.

Using Turchi's interpretation, the α_i equals the expenditures on good i for a childless couple, the β_i the additional expenditures for a child. But it is misleading to interpret the sum of the β_i's over all goods as the cost of a child. Households can spend a given income only once, so if, because of a child, they spend more on some goods, they have to spend less on some other goods. Consequently, if all goods are taken into account, the β_i's will sum to zero.

Finally, there is the very extensive analysis of the cost of a child by Lindert (1978, 1980). Lindert defines the relative cost of a child as the ratio of all inputs into the child (goods, services and other family member's time) relative to the inputs in all activities that would have been enjoyed in the absence of the extra child. This relative cost-notion is defined over the entire planning horizon of the parents. In theory this approach could fitted into a lifetime utility framework, in which households maximize their well-being by deciding how to distribute their available lifetime resources among raising children and other "enjoyable

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[1]Turchi uses a more general form; equation (20) is stated so as to compare expenditures on a given good between a childless couple and a couple with one child.

activities." In applied work however, this lifetime approach has numerous practical problem, among them measuring the input of goods and time into raising children and defining and measuring the counterfactual: "inputs in all other activities that would have been enjoyed in absence of the extra child." Lindert's results are based on many ad hoc assumptions regarding these inputs, and therefore lack the theoretical base of the approaches discussed in Section 4.[1]

7. Summary and conclusion

In this paper we sketched the development of that part of the economic literature that implicitly or explicitly deals with the estimation of the cost of children. As we have shown, the development of the estimation of the cost of a child parallels the development of the analyses of consumer demand. In all cases to which we referred to as the indirect techniques, differences in consumption patterns formed the basis for measuring differences in levels of economic well-being, and measured differences in economic well-being enabled us to estimate the cost of a child.

A relatively new and particularly attractive technique does not rely on observed consumer behavior, but directly obtains the necessary information through survey techniques.

Both the direct and the indirect approach fit into the same theoretical framework, since they try to answer questions of the following kind:

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[1]The short discussion of the approaches of Lindert and Turchi cannot do sufficient justice to their work, especially since both authors are among the very few that explicitly tried to estimate the money and time cost of a child. However since the approaches of both authors are less theoretically justifiable, and based on a less precise definition of the cost of a child than the one presented in section 4, I only briefly mention them. The interested reader, however, is referred to Turchi (1975), Lindert (1978) and various chapters of Easterlin (1980).

> How much does it take for a household of given composition to reach a given, prespecified level of well-being? How much more or less does it take for a household of different composition to reach the same level?

As we have seen, defining the cost of a child by using the answers to these questions highlights the problems that we must solve in order to obtain an estimate of the cost of one child.

First, we have to specify the basis of the "level of well-being;" in other words, we have to decide which arguments should enter the utility function. Generally, this will depend on the purpose of the analysis. If our goal is to make unconditional welfare comparisons, i.e., if we consider household composition as one of the results of the household's choices in maximizing its own welfare, the number of children should be one of the arguments in the utility function.

If, however, the purpose of our analysis allows us to treat household composition as given, we can make conditional welfare comparisons. The utility function is then conditional upon the number of children but the number of children is not a choice variable. The utility function is defined over a set of goods and services only. "Leisure" should be included if one intends to estimate the "full cost" of a child in both money and time. Savings should be included too, but, as we have seen, this causes severe problems related to the period over which information is collected.

Various ad hoc appproaches have been used to define equal levels of well-being. Among them are equal proportions of income spent on food and on necessities respectively. Sometimes the cost of a child is estimated without much reference to the level of well-being specified. However, in

principle the cost of a child in a rich household will differ from the cost of a child in a poor household.

The various approaches employed seem to yield different results, but no systematic relationship between the techniques used and the results obtained could be detected. It would be worthwhile to apply the various techniques, including the direct approach, to the same data set, in order to assess their relative merit.

Second, in the estimation of the cost of a child, we have to decide which household characteristics to include in the analysis, i.e., what factors constitute "different household composition." Obviously, the age of the child is an important factor. But so is the "age of the household," since households in various stages of the life cycle show different consumption and savings behavior. We have, therefore, to address several questions: Are we going to ask whether the cost of a child depends on the parents' ages, or on their employment status, or on the number of adults in the household? Or on other household characteristics?

If more than one child is involved we have to decide whether sex, birth order, and differences between ages are important. Obviously there is no theoretical answer to these questions. Again it is likely that the purpose of the analysis will suggest the factors that are relevant. If our aim is to set standards for a minimum welfare level of a child our choice might be different from what it might be if we try to define "equals" for public policy purposes. In addition, the data available will usually automatically reduce our set of choices.

Once we know how to measure "levels of well-being" and "differences in household composition" we have all the ingredients needed to measure

the cost of a child (of given age, sex, with both parents present, etc.) at various levels of well-being.

As we have seen, the estimates currently available in the literature have a large variance. I derived a point estimate, ignoring time cost, of $3000 for the first child in a family with an income of $12,000. But I emphasize again that I could only obtain this estimate after excessive manipulation of the data. In spite of the century-long development of literature on the topic, little consensus on the "correct answer" has been obtained. But at least there is consensus about the correct way of posing the question.

The approaches that do not fit within the utility-maximizing framework are all based on questionable or imprecise definitions of the cost of a child. It seems unlikely that further work in these directions will lead to better estimates of a child's cost. It is more likely that improvements of the cost estimates will come from further developments in consumer demand analyses and in the direct measurement of individual welfare functions. At the moment, however, we should be aware that the estimates of the cost of a child presented in the literature are based on a large number of varying assumptions. Therefore, in evaluating these estimates of the cost of a child, it is important to get precise answers to at least the following questions: what cost? which child? and whose?

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Regression Analysis in the Case of Non Random Missing Data on the Dependent Variable: The Estimation of Absent Fathers Income (A case where the answer came out all wrong!)

Donald T. Oellerich

December 1981

INTRODUCTION

This papers explores the use of a statistical technique which can be used to develop unbiased estimates of population parameters when data are non-randomly missing on the dependent variable. After briefly reviewing the substantive issue of child support collection effectiveness and the absent father's ability to pay, the methodology will be presented. The methodology will then be applied to a state subsample of the 1976 Survey of Income and Education. The findings were not congruent with expectations and a discussion of possible reasons for this will follow.

THE QUESTION OF COLLECTION EFFECTIVENESS

Since 1975 federal, state and local governments have taken an increasingly active role in collecting child support for AFDC recipients. The reason for this is quite obvious--collections are used to offset AFDC payments. While there is a large incentive to induce jurisdictions to collect child support, the effectiveness of the program is questionable. Hays (1981) reported that states' recovery of AFDC payments varies from two to fourteen percent. MacDonald (1979) and Sorensen and MacDonald (1981) report that 89 percent of the AFDC mothers eligible to receive support received nothing.

The failure of government to collect even a modest amount from the absent father in these cases raises the question, do absent fathers have income sufficient to pay child support? Or, is government attempting to draw dollars from an empty pool? To answer these questions a statistical

technique was applied in an attempt to estimate an absent father's* income.

WHY ESTIMATE?

The need for estimating the absent father's income is due to the lack of information on his characteristics and income on both the state and national level; nor is reliable survey data available on the absent father. Two national surveys, the 1979 Current Population Survey, March/April Match (CPS) and the 1976 Survey of Income and Education (SIE) contained questions addressed to custodial parents regarding child support, but there were no questions addressed to absent parents. The CPS asked the custodial parents about the absent parents' income, but approximately two-thirds did not respond. The SIE did ask a question which would allow for the identification of absent parents in the sample but the proportion of absent fathers to custodial mothers is about half, indicating serious under-reporting. For this reason, it is necessary to estimate income.

THE ESTIMATION METHODOLOGY

The data available from these national surveys does include information on the characteristics of the AFDC mothers, the characteristics of wives, their husband's income and number of children. Employing this

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*This analysis deals exclusively with AFDC absent fathers. Those approximately 2 percent of AFDC cases were the father is the custodial parent are excluded.

data and the presumption that there is a relationship between a wife's characteristics and her husband's income, the income of fathers can be estimated using regression analysis.

The estimation process will use the Wisconsin subsample of the SIE. Of the 4,470 families in the sample 1,538 families qualify for inclusion into the analysis. These families all have children under 18 years of age.

In the ideal world of normal distributions, random samples and no missing data on the dependent variable, the estimation of population parameters would be straightforward ordinary least squares regressions. These estimates can then be applied to a sample of AFDC mothers to impute absent father's income. For example:

let Y = income of father

X = characteristics of mother plus number of children

then

$$E(Y/X) = X\beta + \varepsilon_1 \text{ where } \varepsilon_1 \sim N(0, \sigma^2). \qquad (1)$$

The estimates of β produced from equation (1) would be biased if used to estimate for all fathers (present and absent) or absent fathers only. This is because absent fathers are not included in the sample for equation (1) and marital dissolution and out of wedlock parenting cannot be assumed random acts. To produce unbiased estimates of β the methodology becomes more complex.

The income of the fathers who are present is observed in the sample and the income of the absent fathers needs to be estimated.

Let Y = income of father

X = characteristics of mother plus number of children

H = 1 if father is present in the household

H = 0 if father is absent.

Therefore what is observed is

$$E(Y/X, H = 1) = X\beta + E(\varepsilon/X, H = 1). \qquad (2)$$

Heckman (1979) provides a two step process to alleviate the biasness in the estimated β's due to the conditional expectation of epsilon on the father being present. The methodology employs a Probit equation in step 1 to predict the probability of inclusion into the sample [$\rho(H = 1)$] from this a new term is constructed. The second step is an OLS regression which includes this new variable as a predictor variable.

In this example, the probability that the father is in the household is predicted from the mother's characteristics. These characteristics include the age, education, race, residence and whether or not the mother works. It was expected that both age and education would have a positive effect on the father being present, that whites were more likely to be present then nonwhites, urban less liekly than rural fathers and that the labor force participation of the mother would have a negative effect on the father being present. The results of the Probit equation can be seen in Table 1 Column 3. All of the explanatory variables are significant and the direction (size) is as expected. The first step Probit equation appears as:

$$\rho(H_0^1) = X\gamma + \varepsilon_2 \text{ where } \varepsilon \sim N(0, \sigma^2) \qquad (3)$$

From this step a new variable, denoted lambda, is constructed. The formula for lambda is

$$\gamma_i = \frac{f(X\gamma)}{1 - F(-X\gamma)}$$

where f is a probability distribution function of the standard normal

F is a cumulative normal density function

$$\gamma_i = \frac{\frac{1}{\sqrt{2\pi}} \exp \frac{-(X\gamma)^2}{2}}{\int_{-\infty}^{} \frac{1}{\sqrt{2\pi}} \exp \frac{-(X\gamma)^2}{2} dz}$$

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Table 1 About Here

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Lambda is the inverse of Mill's ratio and a monotomically increasing function of the $\rho(H)$. The new term is then used as an independent predictor variable in the second step OLS regression in addition to the characteristics of the mother which are the same as in the Probit step.

The expected effects of the independent variables are:

age and education - positive

nonwhite - negative

rural - negative

age^2 - negative (included due to assumed nonlinear relationship between age and income)

lambda - positive

The OLS regression equation is:

$$E(Y/E, H = 1) = X\beta + \sigma_{12}\gamma_1 + \varepsilon_3 \qquad (5)$$

where σ_{12} is the covariance of the error terms in equations 2 and 3. The β estimated in equation 5 are unbiased but inefficient; this inefficiency is due to the heteroscedasticity of the errors in equation 5. This inefficiency effects the size of the standard errors so that the significance T test is of questionable value.

The results of this step 2 equation can be seen in Table 1 Column 2. First, note that the significance and the signs of the mother's characteristics are as expected. The coefficient for lambda is negative which was expected. The expectation was that there would be a positive relationship between the likelihood that the father would be present and his income. Looking ahead, it is this negative coefficient of lambda which caused the estimation process to fail. The coefficient for lambda (σ_{12}) shows that there is a negative relationship between the errors which predict the father present, equation 3 and father's income, equation 2.

The primary interest in this process is to impute income for absent fathers so that potential for child support can be ascertained. Since it is now kown that income for present fathers is equal to equation 5 and income for all fathers equals:

$$E(Y/X) = \rho(H = 1)*E(Y/X, H = 1) + \rho(H = 0)*E(Y/X, H = 0) \qquad (6)$$

Then equation 6 can be solved for absent fathers:

let $E = -X\gamma$

(a) $X\beta = [1 - F(Z)*X\beta + \sigma_{12} \frac{f(Z)}{(1 - F(Z)} + F(Z)*Q$

where $Q = E(Y/X, H = 0)$

(b) $-F(Z)*Q = 1 - F(Z)*X\beta + \sigma_{12} \frac{f(Z)}{1 - F(Z)} - X\beta$

(c) $-F(Z)*Q = X\beta - F(Z)X\beta + \sigma_{12} \frac{f(Z)}{1 - F(Z)} - X\beta$

(d) $-F(Z)*Q = -F(Z)X\beta + \sigma_{12} F(Z)$

(e) $-Q = -X\beta + \sigma_{12} \frac{f(Z)}{-F(Z)}$

(f) $Q = X\beta - \sigma_{12} \frac{f(Z)}{F(Z)}$

Therefore:

$$E(Y/X, H = 0) = X\beta - \sigma_{12} \frac{f(X\gamma)}{F(-X\gamma)}$$

or

$$E(Y/X), H = 0) X\beta + \sigma_{12} - \lambda \qquad (7)$$

where $-\lambda = \frac{-f(X\gamma)}{F(-X\gamma)}$

Using equation 7 and the parameter estimates from equations (5) (β and σ_{12}) and 3 (γ's), the next step is to impute the absent father's income using the characteristics (X) of the mothers.

TROUBLE

The computation of the absent father's income is straightforward addition, subtraction and multiplication except for the computation of

lambda. All of this is handled quite easily in the computer. The results of this computation of income for absent fathers were, to say the least, astounding. In 1975 dollars, the mean income for a Wisconsin absent father was estimated to $50,351. The range of absent father income was a low of $32,839 to a high of $67,346. According to these estimates, AFDC absent fathers are extremely wealthy, especially compared to the circumstances of the custodial mother and the children.

Since the estimate of the absent father's income were so outrageous, the next step was an attempt to ascertain the cause. The fault was thought to lie in the lambda term. The coefficient for lambda from equation 5 is significantly negative, with a value of -$21,556. The construction of lambda for absent fathers is given by the formula:

$$\lambda = \frac{-f(Z)}{F(-Z)}$$

where

$$Z = X\gamma$$

from the Probit equation. By construction then, the sign of lambda for absent fathers is negative. Since a negative multiplied by a negative equal a positive, the resulting income for absent fathers was increased by some factor (lambda) of the coefficient.

To see the effect of lambda in dollars, the income of the absent fathers was imputed using equation 1. The coefficients obtained from regression equation 1 appear in Table 1 Column 1. The resulting income estimates had a mean value of $12,350 and a range of $5,690 to $19,821. This lends support to the hypothesis that the fault lies in the lambda term.

The next step was to go back and examine the results of the Probit equation. This was accomplished with the use of a 2x2 contingency table. The predicted value from the Probit equation was normalied [$F(X\gamma)$] to produce the probability that the father would be present given a mother's characteristics. A probability level of .5 was chosen as the cut-off point, above which the father should be present. Those cases above .5 were coded 1 for father present and those below .5 were coded 0 for father absent. The dependent variable from the Probit regression is H which is coded 1 for father present, 0 if father absent. The results of this 2x2 table can be seen in Table 2. The equation correctly predicts

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Table 2 About Here

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close to 98 percent of cases where the father is present, but in cases were the father is absent only 4 percent are correctly predicted. The Probit equation does not do a very good job in distinguishing whether or not a father is present in the home given the mother's characteristics, although the Chi square test is statistically significant. This significance is probably due to the large number of observations rather than any relationship being present.

The lack of good differentiation between the absent father present is one possible reason why the methodology failed to produce the desired results. Another possibility for the failure is the existence of outliers in the sample. The effect of outliers is to distort the true regression line. A classic example of the effect of an outlier can be seen in Figure 1.

The dash line depicts the regression excluding Case A while the solid line depcits the regression including Case A. The effect of Case A on the regression is obvious; what to do in such cases is a subject of considerable discussion in the statistical literature.

Figure 2 (attached) is a scatterplot of the residuals of the OLS regression from equation 1 and the lambda term. The relationship between the father's likelihood of being present and his income was assumed to be positive. Notice that for the large residual values (above 2.78) the lambda term is low while for smaller residuals the lambda term is considerably higher. (Residuals should be largest at the extreme end of the distribution.)

Figure 3 (attached) is a scatterplot of the same cases only this time the lambda term is plotted against the actual values of father's income. Notice that for the higher values of income (>$35,000) the lambda term is low; this corresponds to the same sector of the scatterplot in Figure 2. The same relationship shown in Figure 2 also appears in Figure 3, where the lambda term is large and the income is low. It is possible that these two sets of cases are both acting on the regression line and causing the negative effect of the lambda term on income. By excluding these 50 to 60 cases from the analysis it appears that lambda does not have a linear relationship to income. For this reason, the methodology may fail to produce the desired results.

SUMMARY

This analysis attempted to estimate the income of absent fathers in order to provide a measure against which states could be evaluated on

their child support collection effectiveness. Since data were nonrandomly missing on the dependent variable a two stage statistical procedure suggested by Heckman (1979) was used to reduce the selectivity bias in the estimated parameters. The result of this application of Heckman's procedure was outragously high estimates of absent fathers incomes. Two possible causes of these estimates were explored. Each was found to have possible effects on the outcome.

Sophisticated statistical techniques are useful to the social scientist but they require robust assumptions. In this example of regression analysis the two major assumptions of normality and linearity appear to be violated. Violation of these assumptions appears to be directly related to the failure of this technique.

TABLE 1

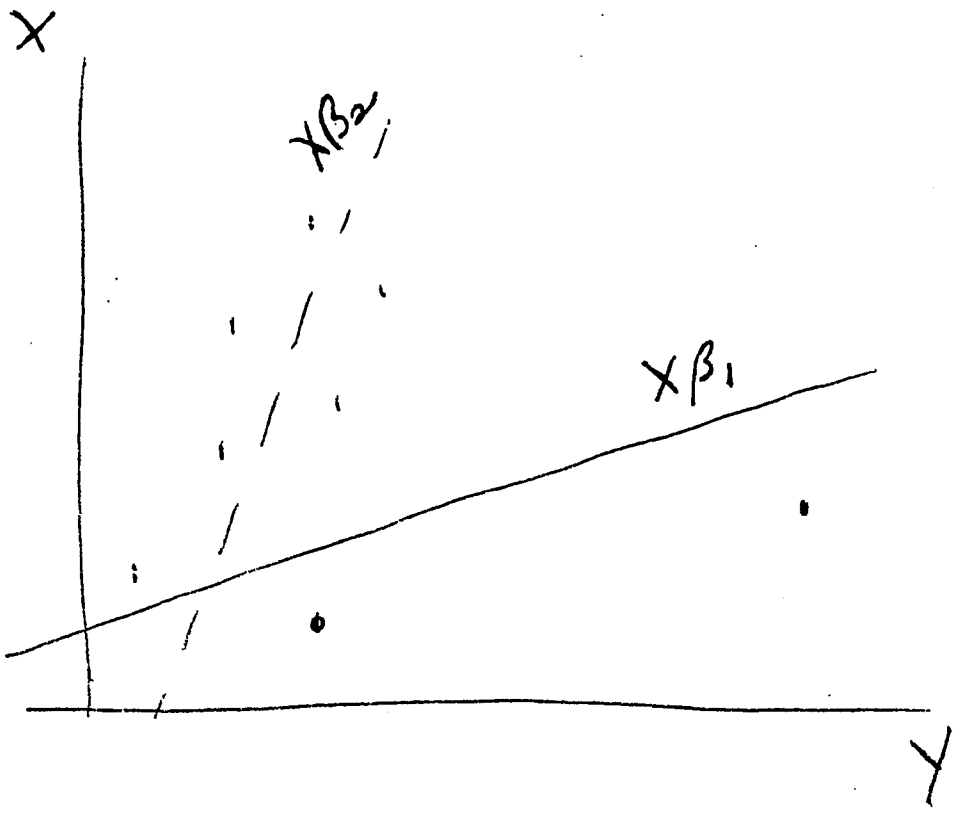
PARAMETER ESTIMATES FROM REGRESSION ANALYSIS

VARIABLE	OLS WITHOUT LAMBDA	OLS WITH LAMBDA	PROBIT
AGE	1173 *	1235. *	-.002061
	(182.88)	(181.09)	(-003851)
EDUCATION	888. *	-129.	.1329 *
	(112)	(215.66)	(.0198)
LABOR FORCE (1 if working)	—	—	-.2630 *
			(.0902)
RACE (1 if nonwhite)	-3928. *	8042. *	-1.0499 *
	(1543)	(2653.3)	(.1707)
RESIDENCE (1 if rural)	-3773. *	-7538 *	.51479 *
	(747.84)	(1006.2)	(.16479)
AGE^2	-13.49 *	-13.99 *	—
	(2.368)	(2.34)	
LAMBDA	—	-21869. *	—
		(3966.1)	
CONSTANT	-21142.	-2528.	.83894
NUMBER of OBSERVATIONS	1246	1246	1538
F test	27.94	28.83	—
R^2	13.64	15.72	

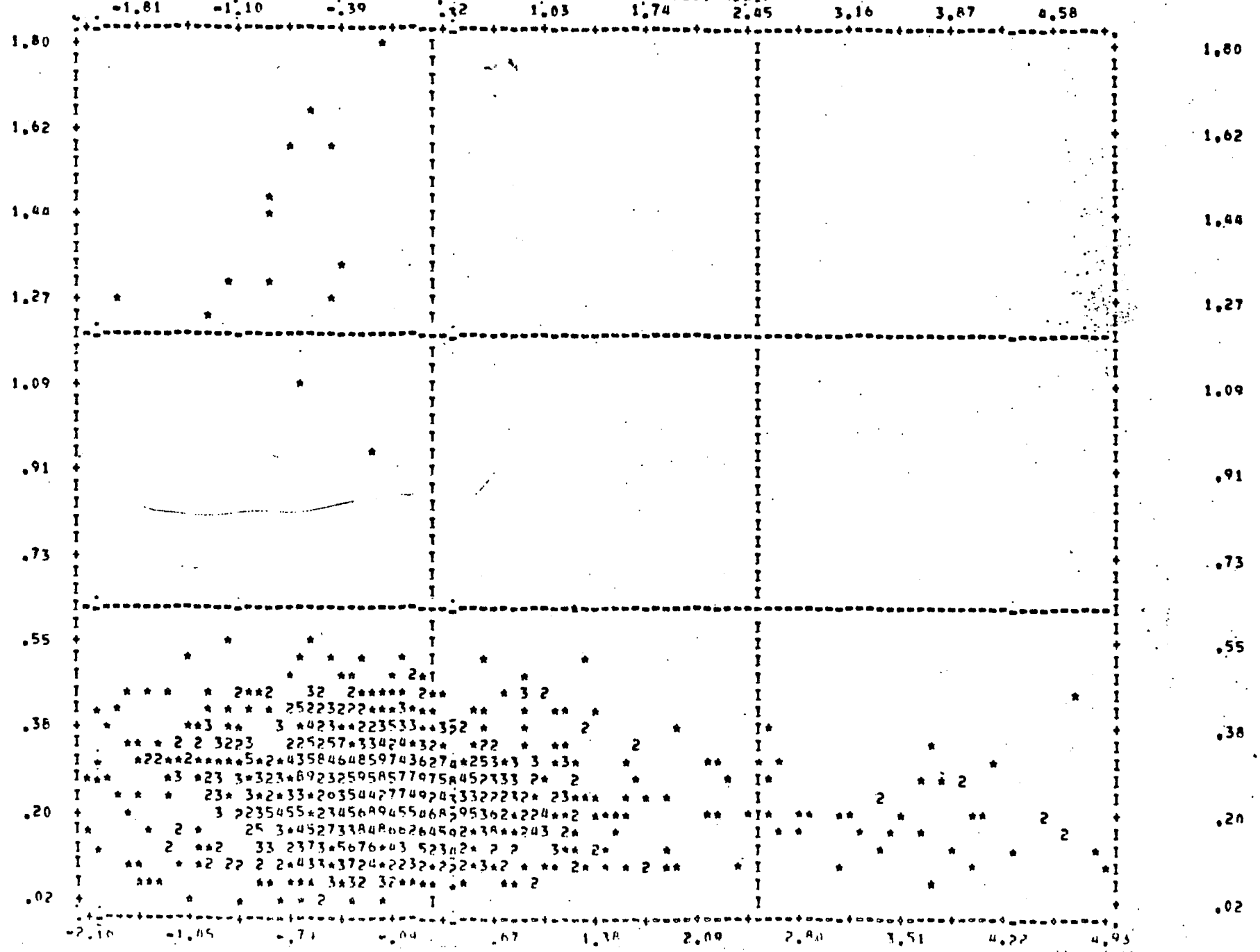
TABLE 2

H		PREDICTED 0	PREDICTED 1	
	ABSENT 0	11 (04)	281 (96)	292 (100)
	PRESENT 1	3 (02)	1243 (99.2)	1246 (100)
				1538

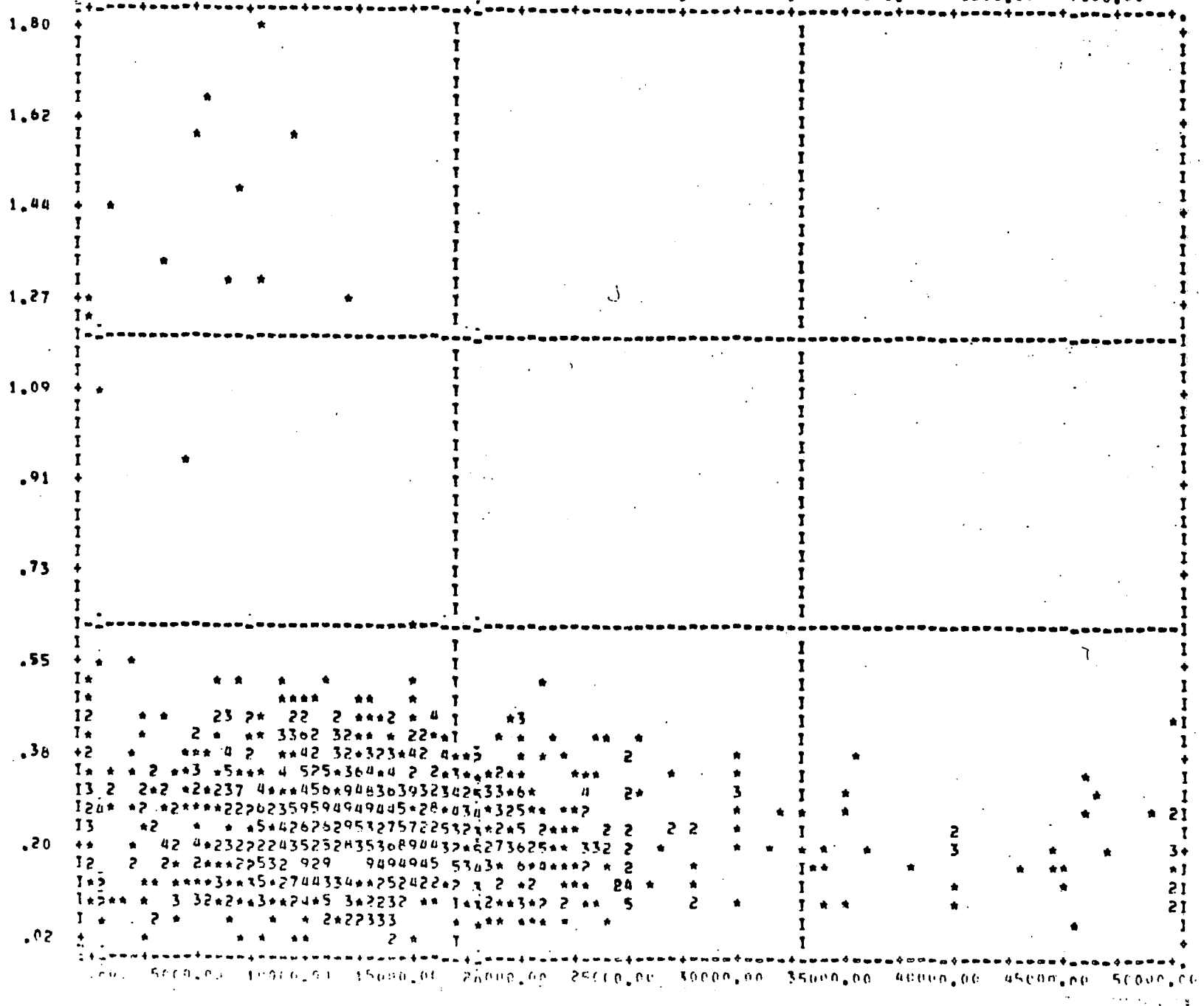
$\chi^2 = 11.25$ with 1 df


X
$X\beta_2$
$X\beta_1$
Y

FILE (CREATION DATE = 11/03/81)
SURFILE LAMBDA
SCATTERGRAM OF (DOWN) TERM (ACROSS) RESID



FILE (CREATION DATE = 11/03/81)
SUBFILE LAMBDA
SCATTERGRAM OF (DOWN) TERM (ACROSS) MWS



The Absent Parents' Ability to Pay: A New Measure of State IV D Child Support Enforcment Programs for AFDC Households

Donald T. Oellerich
December 11, 1981

Introduction

Since 1975 Federal, State, and local governments have taken an increasingly active role in collecting child support for recipients of Aid to Families with Dependent Children (AFDC). The collection program has two major goals:

1. to generate revenue
2. to decrease welfare expenditures (Hays, 1981).

The effectiveness of this collection program has been gauged by two outcome measures. The first measure is the ratio of child support collections to AFDC payments. The second measure is the ratio of child support collections to administrative costs.

This paper will discuss several shortcomings of these two measures and will then propose the use of a new measure of outcome performance, the ratio of child support collections to the absent parent's ability to pay. Following this, the methodology for the construction of the new measure will be presented and applied to the fifty states and the District of Columbia. The consequences, in terms of measure program outcome, will then be compared by ranking the fifty-one jurisdictions by each of the three measures. Finally,the policy implications of the new measure will be presented.

The Child Support Program

The Child Support Enforcement Program is an intergovernmental operation involving the Federal, State and local governments. The legislative basis for this relationship is PL 93-467, the Social

Security Amendments of 1975. Part of this legislation created a new Part D of Title IV of the Social Security Act. The provisions of Part D provide for "enforcing the support obligations owed by absent parents to their children, locating absent parents, establishing paternity, and obtaining child support" (US-HHS-OCSE 1980, p. 1x).

The Office of Child Support Enforcement (OCSE) was established within the Department of Health and Human Services (then HEW) to administer this program at the Federal level. One of the primary responsibilities of the OCSE is to evaluate state program effectiveness and to report the results annually to the Congress (US-HHS-OCSE, 1979, p. 3).

Two measures of program performance employed by OCSE are:

1. the ratio of child support collections to AFDC payments (recovery ratio)
2. the ratio of child support collections to administrative costs (cost effectiveness ratio).

The first measure, recovery ratio, reflects how well each state performs to recovering its AFDC benefits from absent parents. This corresponds to the second major goal of the enforcement program--to decrease the public welfare burden. There are two shortcomings in the use of this ratio as an outcome measure; both relate to the use of AFDC benefit payments as the denominator.

The first drawback is in assessing a single State's collection effectiveness. The recovery ratio is sensitive to changes in AFDC benefit rates. Therefore, a state could lower its benefit levels and increase its recovery ratio without increasing collections. (The reverse

could also be the case; where a state increases benefit levels it may reduce its recovery ratio holding caseload constant.)

The second drawback is the inherent bias, due to the denominator that results when comparing "between" state collection effectiveness using the recovery ratio. AFDC benefit levels are set by the individual states and states vary greatly in their generosity. For example, Alabama ranks eight in the nation with a recovery ratio of 8.2%. New York, on the other hand, ranks forty-second with a recovery ratio of 3.4%.* The average per recipient benefit in Alabama is $39.01 while in New York the average is $123.15.** Alabama generates an average of $9.00 per family per month. New York generates $12.63 per case per month.*** The result of employing the recovery ratio to compare these two states is that Alabama performs nearly two and a half times better recovering its low benefits vis a vis New York which collects more dollards per case. Therefore, the comparison of State collection effectiveness based on their recovery ratio produces a biased picture of overall performance.

The second measure used to evaluate State Child Support Enforcment Agencies is the cost effectiveness ratio. This ratio singely measures inputs (administrative dollars) to outputs (child support dollars). It is this very simplicity thatturns out to be the major shortcoming of this measure. The cost effective ratio fails to account for the myriad of other inputs into the system.

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*Source: US-HHS-OCSE, 1980, Table 29.

**Source: Social Security Bulletin, October, 1981, Table M-31.

***Source: Computed from Table 29 and Table M-31.

When used to compare state performance, this measure requires the assumption that all other inputs are equal between states. Such inputs as demographically different caseloads and "returns to scale" are ignored by the use of this measure. This results in a biased picture of state performance.

The new measure proposed here is the ratio of child support collections to the absent parents ability to pay (CS/ATP). This ratio goes beyond the recovery ratio and cost effectiveness ratio by measuring the states effectiveness in attaining the major goal of the enforcement program--to generate revenue from the absent parent. This new measure will also overcome the baises inherent in the other two performance measures.

The CS/ATP ratio receives strong support on both the aggregate and individual levels. On the aggregate level, the denominator defines the tax base from which the states can draw revenue and reflects the demographic characteristics of the state AFDC caseload. On the individual level, the denominator accounts for the single most significant predict-or variable of whether or not an absent parent pays child support his income (Jones, 1976). The CS/ATP ratio provides an outcome measure which can be employed to answer two questions:

1. How well does a state do in collecting child support in relation to available dollars?
2. How does State A compare to State B in tapping the absent parent pool of dollars?

Having dealt with the problems of measuring the enforcement program performance using the recovery ratio and the cost effectiveness ratio and point out the strengths of the new measure, the methodology will be presented and applied.

The two components of the new measure ratio are the aggregate child support collected from absent parents and the aggregate absent parent ability to pay.

Data on the numerator of the ratio are readily available from state reports to the OCSE. The denominator is not available and must be estimated.

Information on the characteristics and income of the absent father is not readily available on either the state or national level; nor is reliable survey data available on the absent father. Two national surveys, the 1979 Current Population Survey, March/April Match (CPS) and the 1976 Survey of Income and Education (SIE) contained questions addressed to custodial parents regarding child support, but there were no questions addressed to absent parents. The CPS asked the custodial parent about the absent parent's income, but approximately two thirds did not respond. The SIE did ask a question which would allow for identifying absent parents in the sample but the proportion of absent fathers to custodial mothers is about half, in dictating serious under-reporting. For this reason it is necessary to estimate income.

The data available from these national surveys does include the characteristics of the AFDC mothers and number of children, the charact-eristics of the wives, incomes of their husbands, and number of children. Employing this data and the presumption that there is a

relationship between a wife's characteristics and her husband's income, the income of fathers can be estimated using regression analysis. The resulting parameter estimates can then be used to impute the absent father's income from the AFDC mother's characteristics. (No causal relationship between wife's characteristics and husband's income is assumed.)

The data source for this estimation process is the 1976 SIE. The SIE used as its base the Annual Demographic Survey of the CPS but added additional questions and an expanded sample. This increased sample size permits reliable estimates to be made for individual states as well as the nation. Oversampling of the poor and multi-lingual households ensure adequate representation of these groups in the sample. The total sample for the nation is 151, 170 households. This estimation process employs an extract of approximately 46,000 intact families with children under eighteen and 4576 AFDC families.

The estimation of population parameters to be used to impute absent parent income employs ordinary least squares regression (OLS). The dependent variable is the income of the husband. This income variable includes wages and salary, self employed and farm income plus income from interest, dividends and rents. The dependent variable is treated as a continuous variable with values ranging from $20,000 to + $100,000.

The independent variables include the wife's age, education, residence (urban/rural), a set of three dummy variables for number of children, an interaction term for age and education, age squared, and dummy variables for states. Two separate regressions were done: one for whites and a second for non-whites. This was done to avoid

misspecification of the interaction of the independent variables and race.

The results of the regression analysis, summarized by R^2, show that for the white sample from 13 to 22 percent of the variable is explained by the independent variables. For non-whites the R^2 equaled 19 percent.*

The estimated parameters from these regressions were then applied to the SIE sample of AFDC women and income estimates were imputed for the absent parents.

Before the absent parent's ability to pay could be computed from these estimates several adjustments were necessary. First, the income reported in the SIE was for 1975 and it had to be adjusted upward to reflect increases in earnings over the five years. The Average Wage Index reported by the Department of Commerce rose from 163.5 in 1975 to 228.1 in 1980 for an increase of 40 percent (U.S., 1980). Therefore, the estimated incomes were increased by 40 percent. The resulting income estimtes wll now be too high. This upward bias results from the fact that married men, divorced or separated men, and never married men have different earnings although they have the same earnings capacity; to some extent marital status dictates men's tastes for work. These unmeasured tastes were accounted for in this estimation process by the use of a ratio of the mean divorced/separated men's earnings to the mean married men's earnings. This ratio of .86,

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*For whites, nine regional regressions were done to account for between state variation. For nonwhites, no significant between state within region variation was found so one regression was done to account for between region variation. The results of these regressions can be made available.

computed from the SIE, may overcorrect due to its simplicity. The ratio does not control for age, education or race. Adjustments were also necessary in the SIE AFDC sample. Under counting of AFDC families and growth in state AFDC caseloads since the survey year were accounted for by reweighting the sample cases. The new weight is the product of the individual family weight times the ratio of the 1980 AFDC count to the Survey AFDC count for the families state of residence.* Additionally, AFDC cases which are not eligible to receive child support due to either the death of the father or his institutionalization (jail or hospital) had to bexcluded from the analysis. This reduction factor averaged seven percent nationally; varying little between states with four percent deceased and three percent institutionalized (US-HEW, 1974).**

Three sources of bias are not accounted for in this analysis. The first is the case of multiple fathers for one AFDC family. Not accounting for two or more absent fathers in this estimation process will lead to an underestimate of absent parent income. The second source of bias is one father for multiple AFDC families. In this case the methodology overestimates the income pool because it assumes that the income of the father will be available to one AFDC family. The extent which these two biases offset each other is unknown,

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* This reweighting of the sample does not account for any changes in the demographic profile of state AFDC populations. It is assumed constant.

** Institutionalized fathers may have income from various sources which will not be counted. This will lead to a small but unknown underestimate of incomes..

leaving the overall direction and severity of the bias unknown. The third source of bias is not accounting for cases with absent fathers beyond the reach of the law. (e.g., Paternity cases beyond the statute of limitations can no longer be pursued.) Not accounting for this in the estimation process will lead to an overestimate of potential income.

The estimates of absent parent income can now be imputed for the AFDC sample using the parameter estimtes from the OLS regressions, the characteristics of the AFDC mother, and the adjustments discussed above. Having completed this the next step is to apply a normative standard or tax rate to the absent parent's income to determine his child support liability or ability to pay.

The normative standard chosen for this analysis is one of several recently proposed by the Wisconsin Child Support Reform Group (Garfinkel, 1981a). The standard employs a decreasing tax rate per child. The tax rate is 15 percent for the first child, an additional 10 percent for the second, and an additional 5 percent for the third. The maximum tax for the absent father with three or more children is 30 percent of his total money income. The tax is applied to the first dollar of income; there is no cap or set-aside.

The absent parent's ability to pay computed using the normative standard, is then summed over all AFDC families within each State. This produces the state's total tax base. It is expected that State's would collect 100 percetn of this tax liability. This tax base provides the denominator for the program outcome measure. The numerator comes from state reports to the OCSE for fiscal year 1980 (US-HHS-OCSE, 1980).

This is the total amount of AFDC child support collected by each State during the fiscal year.

The national total absent parent ability to pay for AFDC families is $8.9 billion. If states collected 100 percent of this tax liability much of the amount would go to offset the $11.1 billion in AFDC expenditures for fiscal 1980. In cases where the child support exceeded the AFDC grant, the family would receive the excess. (In reality the family would become ineligible for AFDC.)

State collection performance is displayed in Table 1, column 1. The state's ranking and performance employing the cost effective and recovery ratios appears in columns two and three. The national average of 6.75 percent collection effectiveness using this new measure shows states doing a poor job collecting the absent parent liability. Utah ranks highest with a 17.26 CS/ATP ratio while only 18 additional states rank above the mean. Nine states collect less than three percent of the absent parent liability and two states collect thess than two percent.

Table 2 presents the rankings of the top ten states using each of the three measures. Only four states appear in the top ten for all three measures. Utah ranks first in effectiveness using the CS/ATP and recovery ratios but ranks twenty-third in cost effectiveness. Massachusetts ranks dirst in cost effectiveness but only nineteenth in recovery and twelfth in CS/ATP.

Implications

This new measure of state collection performance provides quantitative support to the argument that the present child support system is failing

Table 1

State Collection Performance

State Ranked by CS/ATP	CS/ATP (Percents)	Cost Effectiveness Ratio (CS/ADIM) (Dollars)	Recovery Rate (CS/AFDC) (Percents)
Utah	17.26	1.53 (23)	14.3 (1)
Oregon	14.72	2.50 (9)	9.5 (2)
Wisconsin	14.03	2.79 (6)	8.8 (6)
Michigan	12.85	3.54 (2)	8.0 (9)
Minnesota	12.27	1.69 (20)	7.9 (10)
Iowa	11.99	2.77 (7)	9.3 (3)
Idaho	11.59	2.05 (14)	9.2 (4)
Maine	11.24	3.09 (3)	7.4 (12)
Washington	11.09	2.10 (13)	7.8 (11)
Connecticut	10.42	2.29 (11)	7.0 (15)
North Dakota	9.79	1.88 (19)	9.1 (5)
Massachusetts	9.61	3.80 (1)	6.3 (19)
New Hampshire	9.47	2.03 (15)	8.5 (7)
South Dakota	9.03	1.31 (31)	6.9 (16)
Vermont	8.45	2.57 (8)	4.4 (39)
Rhode Island	7.95	2.86 (5)	5.1 (31)
New Jersey	7.55	1.36 (28)	6.0 (22)
California	7.24	1.38 (25)	4.6 (36)
Nebraska	7.08	1.65 (22)	6.4 (18)
Maryland	6.57	1.32 (20)	6.7 (17)
Pennsylvania	6.55	1.92 (17)	4.6 (37)
Kansas	6.19	1.42 (14)	5.7 (24)
Wyoming	6.04	2.88 (4)	5.7 (26)
North Carolina	5.95	1.33 (29)	6.3 (20)
Delaware	5.88	1.94 (16)	5.4 (29)
Indiana	5.62	1.91 (18)	7.2 (13)
Ohio	5.39	1.67 (21)	4.8 (33)
New York	5.38	.98 (38)	3.4 (41)
Louisiana	5.26	.95 (40)	6.0 (21)
Virginia	5.14	1.38 (26)	5.5 (28)

Table 1--Continued

State Ranked by CS/ATP	CS/ATP (Percents)	Cost Effectiveness Ratio (CS/ADIM) (Dollars)	Recovery Rate (CS/AFDC) (Percents)
Nevada	5.07	.39 (49)	7.1 (14)
Florida	4.84	1.17 (34)	5.6 (27)
Colorado	4.62	.77 (45)	4.9 (32)
Montana	4.62	.91 (44)	4.7 (35)
Arkansas	4.48	1.12 (35)	4.7 (34)
Hawaii	4.39	2.10 (12)	3.2 (44)
Alabama	3.99	1.23 (32)	8.2 (8)
Tennesee	3.73	1.01 (37)	5.2 (30)
South Carolina	3.73	2.44 (10)	5.7 (25)
West Virginia	3.39	.95 (41)	3.4 (42)
New Mexico	3.26	.94 (42)	3.6 (40)
Kentuckt	3.00	.91 (43)	3.1 (45)
Georgia	2.92	1.37 (27)	4.4 (38)
Missouri	2.84	.97 (39)	3.0 (46)
Texas	2.65	.55 (46)	5.8 (23)
Alaska	2.64	.26 (51)	2.6 (47)
Mississippi	2.26	1.18 (33)	3.3 (43)
Oklahoma	2.19	.44 (48)	1.7 (49)
District of Columbia	2.17	.49 (47)	1.4 (51)
Illinois	1.90	1.10 (36)	1.6 (50)
Arizona	1.55	.30 (50)	2.4 (48)
U.S. Average	6.75	1.56	5.20

Sources:

[1]U.S. HHS OLSE, Child Support Enforcement 5th Annual Report, 1980, Table 32.

[2]U.S. HHS OCSE, Child Support Enforcement 5th Annual Report, 1980, Table 29.

[3]Numbers in brackets are the state's rank using that measure

Table 2

Top Ten States by Outcome Measure

Column 1	CS/ATP (%)	Column 2	CS/ADMIN ($)	Column 3	CS/AFDC (%)
Utah	(17.26)	Massachusetts	(3.80)	Utah	(14.3)
Oregon	(14.72)	Michigan	(3.54)	Oregon	(9.5)
Wisconsin	(14.03)	Maine	(3.09)	Iowa	(9.3)
Michigan	(12.85)	Wyoming	(2.88)	Idaho	(9.2)
Minnesota	(12.27)	Rhode Island	(2.86)	North Dakota	(9.1)
Iowa	(11.99)	Wisconsin	(2.79)	Wisconsin	(8.8)
Idaho	(11.59)	Iowa	(2.77)	New Hampshire	(8.5)
Maine	(11.24)	Vermont	(2.57)	Alabama	(8.2)
Washington	(11.09)	Oregon	(2.50)	Michigan	(8.0)
Connecticut	(10.42)	South Carolina	(2.44)	Minnesota	(7.9)

to effectively tap the resources of absent fathers (Garfinkel, 1981b). That reform to the basic fabric of the enforcement system is necessary and is clearly supported by these findings. Only ten of the fifty-one jurisdictions collect more than ten percent of their absent parent's ability to pay while twenty jurisdictions collect less than five percent.

If governments did as poorly collecting taxes to finance themselves as they do collecting child support to assist needy families the entire governmental structure would collapse due to lack of funds.

Short of total overhaul of the enforcement system, the CS/ATP ratio suggests that states identified as doing well in comparison to other states should be the subjects of an evaluation research project. This project should endeavor to ascertain what program attributes contribute to the "success" of these state programs. Program characteristics identified in this way could then be implemented in other states with the goal of improving the enforcement system nationwide.

Conclusion

This paper has discussed several shortcomings of the outcome measures used to evaluate state performance in collecting child support for AFDC families. A new pmeasure made up of child support collection and absent parent liability was proposed that overcomes these biases. Additionally, the CS/ATP measure provides a means to evaluate states performance in attaining the major goal of the child support enforcement program in generating revenue. The methodology for the construction of this measure was presented and applied using national survey data.

The results for the fifty-one jurisdictions were presented by ranking state performance by the CS/ATP ratio. The implication of this new measure is that the child support enforcement system is failing to tap the absent parent's ability to pay.

The AFDC child support enforcement program cost the Federal, State and local governments $464.7 million to administer in fiscal year 1980. During this period the national AFDC child support collection total came to $603.2 million or only 6.75 percent of the absent parents' liability. At this rate, government would have to spend in excess of $6.8 billion to collect 100 percent of the absent parents' ability to pay ($8.9 billion).

The need for reform of the child support enforcement program is supported by the results of this analysis. Reform, such as the one proposed by the Wisconsin Child Support Reform Group which would apply a normative standard to assess liability and collect through the tax system, can substantially improve the collection of child support.

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CHILD SUPPORT: WHO PAYS WHAT TO WHOM?

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ABSTRACT

The paper reviews findings from recent descriptive data on child support and estimates a multivariate model of the determination of child support income. The descriptive data show large differentials in award status among sociodemographic subgroups of women. Once an award has been made, variation in recipiency rates is small. Payments constitute a significant part of the incomes of women receiving child support, although the average payment per child is only $1800 per year. The multivariate analysis of child support income for AFDC recipients supports these findings. In addition, it shows relatively large differences among states in the percentage of women with an award and in the percentage of those who receive any payments. The almost complete lack of data about the absent father's ability to pay and his reasons for not paying makes it difficult to answer the question, Who pays what to whom? and to assess the equity of the current child support system. Future studies of the child support problem should therefore attempt to gather direct information about the absent parent's ability and willingness to provide support for his children.

CHILD SUPPORT: WHO PAYS WHAT TO WHOM?

1. INTRODUCTION

To answer the question of who pays what child support to whom, we shall review and summarize descriptive empirical evidence and begin to expand upon this by conducting a multivariate analysis of 1977 AFDC survey data.[1]

First the paper develops a perspective on the information needed to evaluate the payment of child support. We take two approaches. First, we discuss the evidence needed to determine whether child support constitutes a serious social problem; for this, the adequacy and equity of support income are considered. Then we examine how an empirical analysis of the process by which a custodial parent obtains child support income might inform policies of public intervention. The support system is characterized as having stages, with the transitions between them providing opportunities for intervention.

The body of the paper reviews findings from descriptive data and estimates a multivariate model of the determination of child support income. We review published data from three large, representative, national surveys to describe the characteristics of child support recipients, the variation in their support award status, and differentials in recipiency rates, and compare the adequacy of their child support income. This leads to a modeling strategy to exploit the advantages of the larger

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[1]We would have preferred to analyze the recent Current Population Survey supplement on child support, but the Public Use Tape for these 1979 data was not released in time.

data sets that have become available since Cassetty (1978) and Jones et al. (1976) conducted their pioneering work. After discussing the policy implications of our findings we speculate about what might be further revealed by an analysis of the 1979 Current Population Survey supplement on child support. We also comment on needs for more data collection.

2. PERSPECTIVE ON INFORMATION NEEDS

Is Child Support a Social Problem?

Child support from absent parents may be judged a social problem if there are children whose support is deemed inadequate, or if it seems that the distribution of child support income among recipients is inequitable. Although equity and income adequacy are inherently subjective concepts, there is some general agreement about how to define them for child support income.

The official poverty lines frequently serve as a gauge for determining whether a household has an adequate income. Thus it seems sensible to consider how well child support payments contribute to reductions in the incidence of poverty among children eligible for support. If the data indicate there are many eligible children who remain needy, this might be taken as important evidence of widespread lack of support. Yet this may be only circumstantial evidence, because the absent parent's ability to pay must also be accounted for. For instance, if most officially poor support-eligible children remain poor, although they receive payments from absent parents that constitute high proportions of those parents' ability to pay, then there would be an income adequacy problem, but not necessarily a child support problem. Hence it seems

clear that the adequacy of child support payments ought to be assessed with respect to both recipients' needs and absent parents' ability to pay. Unfortunately, there are very little data on absent parents. The Michigan Panel Study is the only nationally representative data set currently available that has information on the income of absent fathers, and even this is restricted to a subsample of all absent fathers. For about three quarters of the approximately 600 respondents who were eligible for child support, current information was only available for the mother and her children. Cassetty and Jones et al. had to rely on pre-divorce income for many absent parents; this may not represent the absent parents' actual ability to pay. And the relatively small Michigan Panel sample of support-eligible households also restricts our ability to analyze important differences in support income that are associated with variation in state child support enforcement.

There is less consensus about equity. What constitutes evidence that child support incomes are unfairly distributed? Two ideas about child support equity often appear in the literature. Perhaps the more prevalent one is that similarly situated children ought to receive about the same amount of support from absent parents, ability to pay permitting. Another common idea, of vertical equity, is that insofar as possible the children's standard of living should be maintained at the level they experienced before becoming eligible for child support. The former idea is much easier to assess with available data, since it only requires information on the characteristics of support-eligible children and the amounts of child support they receive. Our review of the empirical knowledge provides this type of assessment. Evaluating how well children are able to maintain their living standard after they become eligible for

support payments requires an analysis of panel data that has not been conducted. We note that the Panel Study of Income Dynamics would permit these comparisons of children's well-being before and after support eligibility. Saul Hoffman (1977) has analyzed relationships between changes in marital status and the economic status of women and children, but he did not specifically examine the influence of child support on children's economic status after marital disruption.

Policy Issues and Analysis of the Support Process

It is widely believed that child support is a serious social problem, despite the increased efforts of State IV-D agencies and the 1975 expansion of federal powers to assist the states under PL 93-647. Policy analysts have proposed various mechanisms to improve child support collection, but these differ substantially and it is difficult therefore to use them as guides for collecting specific information. To limit our scope and yet remain policy-relevant, we will focus primarily on two general aspects of the current support process that are seen as the logical opportunities for policy intervention. These are the process that establishes a child support award, and payment enforcement once an award status is established. If the policy concern is to remedy inequities in child support, then these can be viewed as originating in an inequitable awards process, and/or in an unfair or haphazard enforcement process. If the policy is mainly concerned with the adequacy of child support for the needy, it is likely that an increase in award amounts will be advocated. However, such a policy must be concerned with enforcement, since better awards are ineffective without it. Therefore it seems generally worthwhile to have some fairly accurate knowledge of the relative impor-

tance of award status and of the enforcement process in determining child support income.

Later in the paper we attempt to provide the kind of multivariate analysis that is needed to separate the influences of the award process and award status from those of payment enforcement. In that analysis we find it useful to think of award status as having two important antecedents—demographic eligibility, that is, the characteristics that describe an eligible child support recipient unit, and legal marital status (divorced, separated, etc.). These variables condition the likelihood and amount of the support award and may also have their own effects on child support income. To illustrate, children of never married mothers must have paternity established to benefit from a court order, making it more difficult to obtain support. Once such an order is established it may also be more difficult to enforce.

Obviously the data requirements for disentangling the relative importance of awards and enforcement are quite demanding.

3. DESCRIPTIVE KNOWLEDGE

Data on Child Support

Here we employ data from three recent studies, the 1975 Survey of Income and Education (SIE), the March 1979 supplement to the Current Population Survey (CPS), and the 1977 AFDC survey. Each of these provides data on a national sample of households. All women in the SIE and CPS sample households who were living with one or more children whose father was absent from home were interviewed about the support the absent father provided his children. The SIE, conducted in 1976, provides data

on child support payments during 1975 for about 5000 women. The CPS conducted in 1979 provides data on child support payments for 7000 women during 1978; it also notes whether the woman has been awarded child support. Supplementing the data from these two surveys are data on women receiving AFDC in 1977. The AFDC survey consists of a sample of case histories reported by social workers. For this study we selected women who received AFDC in March of 1977, and who had at least one child living at home whose father was absent because the marriage had dissolved or because he had never been married to the mother. The AFDC survey provides data on child support award status--and about the amount awarded--and on payments of child support during the survey month, either directly to the family or to the IV-D agency. The payment figures used in this study are obtained by summing these two figures. Similar information was collected in the CPS study, but no published data were available on support awards at the time of writing. The AFDC survey was, therefore, in one respect the most complete data source at our disposal. Its drawback, clearly, is that women on AFDC are a very special subsample of the population of women who are potentially eligible for child support.

It is characteristic for all three data sources that little or no information on the absent parent is collected. The CPS study did ask the woman about the absent parent's income during 1978; no tabulation based on these questions have been published, which leads us to believe that the quality of data may be problematic. In the AFDC survey, the case worker was asked to supply some information about the absent parent, but the proportion of unknowns on these questions is very high, and reduces the usefulness of such items. It is fair to say that these recent studies of child support provide a reasonably good basis for describing and

evaluating the child support situation for the custodial mother, that is, they provide sufficient data to evaluate the need for child support and analyze the role of child support in the economic well-being of children living away from their father. But these data provide only indirect information on the absent parent's situation, on his reasons for not agreeing to a child support award or not complying with one, and on the impact of child support payments on his economic well-being. In other words, these data sources allow us to study and gain an understanding of the child support payment process only indirectly, by relying on the assumption that the mother's characteristics and current situation will tell us something about the absent father's ability and willingness to pay child support. This may be unfortunate, because in light of previous findings (Jones et al., 1976; Cassetty, 1978) the absent father's ability to pay is the most important determinant of the likelihood that a woman will ever receive any child support payments. The Panel Study of Income Dynamics data used by Jones et al. and by Cassetty are in many ways inferior to the recently collected CPS data, but this study is still the best available source of information about the absent parent. It is ironic that none of the recent surveys have focused on the party who is to pay child support; after all, if this problem is to be remedied it is most likely not sufficient to show the consequences of nonpayment—its causes also must be assessed. In this paper we approach this problem by assuming that the mother's characteristics at least to some extent reflect the absent parent's ability and willingness to pay child support. We have no way of assessing the validity of such an assumption with the available evidence.

Who is Getting Child Support?

Previous research has demonstrated that a large proportion of women living alone with children never receive any support from the child's absent father, and that the women who do receive child support often receive this in insufficient amounts and at irregular intervals (Jones et al. 1976; Cassetty 1978). This conclusion is not contradicted by more recent data on national samples of women living with children whose father is absent from home. Table 1 gives the percentage of women, living with children eligible for child support, who actually received some child support payment during a specified time period.

It is evident from Table 1 that only a minority of demographically eligible women receive any child support payments. One in four of the women surveyed by SIE reported that they received some child support payments during 1975; in the CPS data close to 35% of the women had received some child support payments during 1978. While the recipiency rates for women in the SIE and CPS surveys are not impressive, they certainly are much better than that reported for mothers on AFDC in 1977. This of course should come as no great surprise, since one of the main reasons for women to receive AFDC is the absence of support from the children's father. On the other hand, AFDC rules require efforts on the part of both the mother and the child support enforcement agency to collect child support from the absent father. In only one of ten cases did the absent parent actually pay child support, either directly to the mother or to the IV-D agency. (The tax rate on child support payments is 100% for many AFDC recipients. It is, therefore, likely that AFDC recipients would underreport child support, either because the recipients

Table 1

Child Support Recipiency Rates for Women Living with Children Eligible for Child Support

Characteristics of Mother	% Receiving Some Child Support Payments		
	1975 SIE	1977 AFDC	1979 CPS
All women	25.3	10.5	34.6
Race or origin			
Black	10.7	5.4	13.7
White	31.2	15.3	42.6
Spanish origin	16.5	8.2*	24.0
Marital Status			
Divorced	42.0	23.3	51.9
Separated	18.1	21.9	26.7
Never-married	4.0	4.8	6.3
Remarried	26.2	—	39.0
Nonlegal sep.	—	7.7	—
Education			
< 12 years	14.6	9.5	22.6
High school	29.2	13.1	38.1
12 years +	38.4	14.8	45.6
No. of children			
1 child	23.1	—	30.2
2 child	27.8	—	41.9
3+ child	25.9	—	35.0

Sources: Col. 1, Table 8 in CPR 1979; Col. 2, Table 1 in CPR 1980; Col. 3, tabulations from AFDC Survey, 1977.

never see the money being paid to the IV-D agency, or because private payments would be kept private. Since the AFDC survey relies on case worker reports, only the last possibility presents a problem for this analysis. IV-D payments are reported separately by the case workers, and counted as child support payments.)

The remainder of Table 1 describes sociodemograpic differentials in rcipiency rates. In all three data sources, white women are at least twice as likely to receive child support as black women. Divorced women are more likely to receive child support, while women who have never married their child's father very rarely receive any payments. The education differentials in all three data sets show that women with the fewest years of schooling also are least likely to receive child support. In the 1979 CPS data the recipiency rate for women with more than a high school diploma is twice that for women with less than 12 years of schooling.

Although caution is needed, it seems that there may have been some increase in the percentages of women receiving child support. The SIE data report that 25% received some support payments in 1975, while the CPS data estimate the percentage to be close to 35%. No similar improvement seems to have taken place for women who receive AFDC. Both the 1973 and the 1975 AFDC survey estimate that about 10% received child support payments during the survey month (Jones et al., 1978; MacDonald, 1979). To the extent that women who receive child support can get off AFDC or avoid becoming dependent on the program, the lack of change in recipiency rates for the AFDC population is not inconsistent with an improvement in rates for the population in general.

The data reported in Table 1 demonstrate three things: (1) That only a minority of women demographically eligible for child support receive any child support payments; (2) that there is a great deal of variation in recipiency rates for sociodemographic groups of women; and (3) that the child support situation may have improved somewhat during the latter part of the 1970s in the general population. No improvement was observed for the AFDC population.

Child Support Awards and Payments

Although data on the recipiency rates give a clear picture of the scope of the child support problem, they tell us little about the process of collecting child support. The first step toward it is to obtain a child support agreement with the child's father. Many women living with children whose father is absent from home are not legally eligible for child support because they have never obtained any award or an agreement from the child's father to contribute to the support of the child. Table 2 shows who, among potentially eligible women, actually have child support awards and who among legally eligible women receive any child support payments.

Three out of five women have a legally binding child support agreement. If every legally liable absent parent paid child support, then only 60% of mothers living with children who have an absent father would have received any such payments during 1978. Furthermore, award status varies dramatically among subgroups of women. Poor women are much less likely to have such an award: only 38% of mothers on AFDC and of poor women in the 1979 CPS sample report that they do. The legal status of the mother vis à vis the child's father is another important deter-

Table 2. Child Support: Award Status and Recipiency

Mother's Characteristics	1979 CPS Total Sample		1979 CPS Poor Women[b]		1977 AFDC	
	% With Award	% Received Payment[a]	% With Award	% Received Payment[a]	% With Award	% Received Payment[a]
All	59.1	71.7	38.1	58.9	37.4	38.6
Race or origin						
Black	28.8	63.0	22.4	61.4	15.4	39.9
White	70.7	72.9	53.1	58.3	37.4	38.2
Spanish	43.8	65.4	28.2	59.2	20.5	31.0
Marital Status						
Divorced	79.8	73.3	70.2	55.1	67.8	34.7
Separated	45.1	72.6	38.0	62.8	47.0	47.7
Nonlegally sep.					17.0	47.7
Never married	10.6	81.3	8.3	74.4	12.7	42.6
Remarried	77.1	68.3	54.9	55.0	NA	NA
Education						
< 12	46.3	61.4	31.1	51.1	27.4	36.1
High school	63.7	72.9	48.0	64.1	32.2	40.3
12 year +	69.3	79.4	43.3	69.7	34.0	41.0

Sources: Data from 1977 AFDC survey, Table B, Col. 2 and 4, CPR 1980; Table 1, Col. 2, 3, 4, CPR 1980.

[a]Percentages of all those with child support awards who actually received payments.

[b]Women with incomes below the poverty line in 1978.

minant of award status (Panel 2, in Table 2). Black women and women with less than 12 years of schooling are much less likely than other women to have a child support award--to a large extent they are more likely to have children out of wedlock and to be poor. The importance of marital status is well illustrated by Table 3, which shows the proportion of black and white women with a child support award, by marital status. There are still race differentials within marital status groups, but they are much smaller than the difference between all white and all black women.

The data presented in Table 2 and 3 show that there are great differences in child support award status among sociodemographic subgroups of women. Legal status is important, but the data also suggest that the mother's resources and the absent parent's ability to pay are factors which determine whether a woman has a child support award or not.

Given that a woman has a child support award, what is the likelihood that she will receive child support payments? As shown in Table 2, almost 3 out of 4 women with an award surveyed in 1979 reported that they had received some child support payments during 1978. Poor women in the CPS sample were less successful at collecting their payments: only 59% received payments during 1978, and among women receiving AFDC in 1977, only 39% reported any child support payments, either directly to the family or to the IV-D agency. The recipiency rate for women with a child support award varies very little with other characteristics of the mother. Black women in the CPS sample are slightly less likely to receive payments than are white women, but in both samples of poor women there are no differences between white and black women. Interestingly enough, never-married women who have a child support award are more successful at collecting this award than other women. Women with many years

Table 3

Child Support Award Status by Mother's Race and Marital Status

Marital Status	Black Women	White Women
Divorced	50.0	73.4
Separated	34.1	57.1
Nonlegally separated	18.3	33.0
Never married	14.1	17.4

Source: Tabulation from 1977 AFDC Survey.

of schooling also are more likely to receive payments, maybe because the absent parent's ability to pay is greater.

The striking thing about these results is the very small variation in recipiency rates among subgroups of women. No characteristic of the custodial parent, save for her economic standing, is strongly related to whether she receives any child support payments. This is, of course, in sharp contrast to the results for award status, which was found to vary greatly among subgroups of women. These findings suggest that obtaining the child support award is not only a necessary first step, but is also a relatively effective way to obtain support from the absent parent. There is room for a great deal of change at that stage of that process. Once child support is awarded the likelihood of collecting at least some of the award is relatively similar for women whose resources may differ with their race, education, and marital status. The fact that poor women are less likely to collect does suggest that the absent parent's ability to pay is an important factor, but none of the available data sources allow us to show directly how that ability influences payment performance.

The Economic Importance of Child Support

The average amount received during 1978 by CPS respondents who received any support was $1800 per year, $150 per month (Table 4). The support increases with the number of children, from an average of $1288 for women with one child to $2752 for women with four or more children. The support per child is lower the more children there are to support. Divorced and separated women receive somewhat more child support than women who have remarried. Whether this reflects a decline in the need for support, or other characteristics of women who remarry, we cannot tell

from the data in Table 4; Cassetty (1978) also found that the custodial parent's remarriage had a negative effect on the amount of support received. Never-married women receive only an average of $976 per year. There may be different reasons for this low level of support; these women and their partners tend to be very young and thus to have low income, often there is only one child involved, and the support award may be lower for children born out of wedlock than for other children. The absent parent's ability to pay may be the reason for the relatively high support paid to older women (whose partners would have been older men with high incomes) and to women with many years of schooling, and for the relatively low child support received by poor women.

Although the average child support payment is relatively low, it constitutes a significant part of the family income for many custodial parents. In Table 4, the mean money income for women with no child support award is lower than for women with an award, whether they receive payments or not.

Money income varies, of course, by the mother's characteristics, but in most subgroups of women we find that women who receive child support payments are much better off economically than are other women. This is not, however, solely due to the fact that they are awarded and receive child support. The women who get child support also tend to have higher incomes before child support than other women (column 3 compared to columns 1 and 2 in Table 4). There are some interesting exceptions to this pattern that suggest that women who live at the margin of poverty and who receive child support do not have incomes of their own higher than other poor women. Women whose total income was below the poverty line and who did receive child support had, for example, a mean income of

Table 4

Mean Money Income of Custodial Parents by Child Support Award and Recipiency Status

Mother's Characteristics	Mean Money Income				
		Support Award			
			Payments Received		
	No Award	No Payment	Own income	Support income	Payments as % Total Income
All	$4841	$6126	$7145	$1799	20.1%
Marital status					
Divorced	7500	7837	8631	1951	18.4
Separated	4815	5425	6271	1906	23.3
Never married	3915	(B)	3546	976	21.6
Remarried	4372	4587	5585	1602	22.3
Race					
Black	4444	6872	5977	1294	17.8
White	5154	6140	7322	1861	20.3
Spanish	4555	(B)	5604	1318	19.0
Educational attainment					
< 12 years	3497	4507	5108	1503	22.7
High school	5252	6149	6273	1664	21.0
College	6078	8777	8306	2089	20.1
4 years +	10,949	(B)	13,865	2576	29.7
No. of children					
1 child	5077	7047	7219	1288	15.1
2	4584	5720	7173	1995	21.8
3	4605	5230	7182	2528	26.0
4+	4311	(B)	6500	2752	29.7
Poverty status	2742	3003	2317	1219	34.5

Source: From 1979 CPS. See Table 1, CPR, 1980.

(B) means population base is less than 75,000.

their own of only $2317--$400 less than women who had no award and $700 less than women with an award who did not receive any payments. This pattern is also reflected in the figures for black women and for never-married women, a large proportion of whom have incomes below the poverty line. This may simply mean that poor women who do not receive child support income are eligible for a larger AFDC grant than women in similar circumstances who do get child support.

Child support constitutes an important part of the custodial parent's income, especially if there are many children in the family or if the mother's income is very low. For a woman with one child getting child support, the payments constitute 15% of total money income; if the woman has 4 or more children, child support payments constitute almost a third of income. For women with incomes below the poverty line, child support payments constitute fully 34% of total money income.

Another way of measuring the economic importance of child support for the custodial parent is to study the relationship between child support and poverty rates. Table 5 presents data on the percentage of women with incomes below the poverty level, by child support status. In 1975, a third of the women who did not receive child support had incomes below the poverty line, while only 12% of those who did receive support were poor. This does not imply that the payment of child support brought these women out of poverty; in fact if this group of women had not received any child support at all during 1975, the poverty rate would only have gone up to 19%. Again we see that women who in other ways are not well off also tend not to get child support. These findings are supported by the 1979 CPS data. Of those women who did not receive child support in 1978, 38% had incomes below the poverty line, compared to only

Table 5

Poverty Rates by Child Support Recipiency Rates

Support Status	% with Income Below the Poverty Level
SIE 1975[a]	
No support payments in 1975	32.3%
Received support payments in 1975	12.4
If no support had been received in 1975	18.9
CPS 1979[b]	
No support payments in 1978	37.9
No award	42.1
Did have award	25.3
Received support payments in 1978	14.3
If those with award had received full payment in 1978	14.0

[a]From Table 7, CPR, 1979.

[b]From Tables 1 and 2, CPR, 1980.

14% of the women who get child support. Women who had an award, but received no payments, were better off than women with no award. This, again, suggests that although child support payments are important for the family economy, much of the association between child support and the custodial parent's total money income is because the better off economically the custodial parent is, the more likely she is to have an award, and to collect it.

Equity of Support

The results reported here as well as those previously reported (Jones et al. 1976; Cassetty 1978; CPR 1979, 1980) make it very clear that the current child support system results in gross inequities, both horizontally and vertically. The horizontal inequities are strongly reflected in the fact that only 60% of demographically eligible mothers have been awarded child support, and in the great variation in award status between subgroups of women. Vertical inequity arises if the support a child receives from a father it lives with is different from the support it receives from an absent father. Clearly, the many instances where no support award exists mean that children in those families are much worse off economically after a marital dissolution than before. In cases where child support is awarded, the lack of payments by many absent fathers likewise results in vertical inequities. Where payment is forthcoming, it is more difficult to assess the degree to which the child is worse off after the father has left the household. The relatively low level of support reported in the CPS survey sugests that many children who receive child support do not receive a fair share of their absent father's income. The data presented here, however, allow no satisfactory

assessment of the degree to which there is an equity problem in cases where child support is being paid.

The tables presented so far allow us to give a fairly good description of which demographically and legally eligible women are receiving child support and how much they receive. They can further demonstrate the gross inequities and the inadequacies existing under the current child support system, although the lack of data on the absent parent's ability to pay does limit our knowledge of whether the absent father supports his children to his full ability. But to gain a better understanding of the process by which a custodial parent obtains child support income, we need to analyze the different stages of the child support collection process in a multivariate context. To this we turn next.

4. THE PROCESS OF COLLECTING CHILD SUPPORT INCOME

The first step in collecting child support is to obtain a child support award; then the problem becomes one of enforcing the support order. Here we analyze the support collecting process in four steps. First, we estimate a model for award status—what determines the likelihood that a woman has a child support award. Next we look at the determinants of the level of child support awarded, given that there is an award. This is followed by a model for recipiency status, that is whether a woman who has an award receives any payments. The fourth and last model estimates the amount of child support paid, given that there is an award and that some payment was made. Each of these four models is estimated by ordinary least squares regression.

To estimate these four models we need data on child support awards and payments. The CPS data would be well suited for this analysis, but

unfortunately the public use version of the data did not become available in time. The analysis we present here therefore makes use of the 1977 AFDC data, which provide sufficient information about child support awards and payments. The limitation of the sample to women who receive AFDC does present a problem the moment we want to infer from the results obtained for this population to all women eligible for child support. We shall address this issue in the concluding remarks, but we note at this point that the data presented so far do suggest that the process of child support collection is quite similar for poor women and women in general. We showed previously that the likelihood of having a child support award and of collecting the award was lower for poor women; however, socioeconomic differentials in both award and recipiency status were quite similar in the two population groups.

Although there may be problems in generalizing from results based on the AFDC survey, these data are in one sense more appropriate for the analysis of the child support collection process. Policies of public intervention are primarily aimed at securing child support for women who, in lieu of child support income, must depend on AFDC. From a public policy point of view, a study of the child support collection process among AFDC mothers may be more informative than one based on data for the general population of women eligible for child support.

Variables Used in the Analysis

The research of Cassetty (1978) and Jones et al. (1976) suggests that four sets of factors explain variations in award status and child support income: the absent father's ability and willingness to pay, the custodial parent's need for support, and the enforcement of child support

awards. In their studies, and in the one we report here, it is necessary to rely on indirect measures of these factors, since no data set provides any direct measures. In each of the four models we estimate we use the following variables as indicators of one or more of these factors:

Marital status. The mother's legal status vis à vis her youngest child's father is used to construct four dummy variables for marital status. Women who are divorced from the absent father are the reference groups, and legally separated women, nonlegally separated (deserted) women, and never-married women make up the three categories included in the regression equation. The mother's marital status is primarily used as an indicator of the ease with which a child support award may be made. A women who has never married the child's father not only has to obtain a child support award, but also has to establish paternity for the child, something which often proves difficult. In addition, it may be reasonable to see marital status as an indicator of the absent father's willingness to pay child support. A father who has lived for some time with his children may be presumed to take more interest in their well-being than a father who never married the mother and never lived with the child.

Schooling. The number of years the mother has attended school is used as an indicator of the mother's resources for obtaining and collecting child support, and of the absent parent's ability to pay. It also is an indicator of the custodial parent's need for support. The education variable is constructed as 3 dummy variables, less than 12 years schooling, more than 12 years, and education unknown. The left-out category is women with 12 years of school.

Race. Race, like schooling, is seen as an indicator of the mother's resources or need for support, and of the absent father's ability to pay. Black women and women of Spanish origin are compared to white women in all the regression models.

Age of youngest eligible child. The age of the youngest eligible child is introduced as a proxy for the duration of time since the marital dissolution. It may be seen as an indicator of the absent parent's willingness to pay, which declines with time, and of the time available to the custodial parent to obtain a child support award.

Number of children eligible for support. This variable is seen as an indicator of the custodial parent's need for support. Since we here measure both support awards and actual payments per child we expect this variable to have a negative effect on both awards and payments. This does not mean that women with more children get less support, only that the average payment per child is lower the more children there are. The number of children eligible for support may also be an indicator of the absent father's previous commitment to the family; if that is the case we may expect this variable to have a positive effect on the probability of having a child support award and maybe on payment of support as well.

Location of absent parent unknown. This dummy variable simply tells whether the whereabouts of the absent father is known. It is seen as an indicator of the absent father's willingness to pay child support.

A Model for Child Support Award Status

The dependent variable in this model is a dummy variable, taking the value of 1 if one or more of the mother's eligible children has been awarded child support. If none of the children have a child support

award, the variable takes on the value of 0. The OLS estimates of the model for child support award status are given in the first two columns of Table 6.

Divorced women are much more likely to have an award than other women are. The effect of the dummy variables for marital status are -.22 for legal separation, and -.48 for nonlegal separation and never married. Since the range of the dependent variable is from 0 to 1, these differences between marital status groups are quite large. It is quite clear that the problems of establishing paternity and of locating a spouse who has deserted have quite substantial effects on the likelihood that the mother will have a child support award.

The mother's race has a significant effect on award status, but her educational attainment does not. Nonwhite women are less likely to have a child support award than white women, even after we have controlled for marital status and the other variables in the model. This may mean that nonwhite women find it more difficult to obtain a child support award, either because it is too costly for them, or because they consider the absent father's ability to pay so low that the payoff is not worth the trouble.

The positive effect of age of youngest child means that the older the child, the more likely the mother is to have an award; this presumably just means that it takes time to get an award. The positive effect of the number of eligible children we interpret as reflecting greater commitment to the children on the part of fathers with many children. Although both of these effects are small in magnitude, knowledge of the absent father's whereabouts is strongly related to the probability that

Table 6: Regression Models of the Child Support Collection Process[a]

Independent Variables	Award Status b	Award Status S.E.	Support Award per Child b	Support Award per Child S.E.	Recipiency Status b	Recipiency Status S.E.	Payments per Child b	Payments per Child S.E.
Support award per child	—	—	—	—	.0002	.0002	.69*	.02
Legal separation	-.22*	.02	6.21	2.63	.04	.03	12.00*	3.69
Nonlegal separation	-.48*	.01	1.00	1.80	.02	.02	-1.26	3.03
Never married	-.48*	.01	-9.30*	1.57	.07*	.02	-2.04	2.67
Less than 12 years schooling	-.01	.01	-4.51*	1.42	-.02	.02	-4.67	2.41
More than 12 years	.02	.01	-2.50	2.57	.02	.03	-1.87	4.14
Education unknown	-.03*	.01	-3.01*	1.46	.001	.02	.86	2.39
Black	-.05*	.01	-5.52*	1.64	-.04	.02	1.08	2.91
Other non-white	-.10*	.01	-8.33*	3.25	-.07	.04	-4.00	6.18
Age of youngest child	.002*	.001	-.86*	.12	.00	.001	-.14	.21
No. of children	.04*	.002	-9.13*	.41	.02*	.005	-3.80*	.70
Location of absent parent unknown	-.13*	.01	1.63	1.22	-.20*	.01	2.09	2.60
Constant	.23*	.02	99.95*	3.30	.50*	.04	35.41	5.25
State dummies:								
(Michigan reference category)								
# states similar to Michigan	11		44		17		44	
# states worse off than Michigan	39		7		34		6	
Mean b	-.16		-21.35		-.24		-23.55	
Range of b	-.07 to -.25		-14.96 to -40.38		-.11 to -.44		-18.12 to -33.62	
# states better off than Michigan	1		0		0		1	
Mean b	.21		-		-		36.00	
Range of b	-		-		-		-	
Adjusted R^2	.37		.14		.08		.45	
F for regression	173.51 (62, 18339)		15.87 (62, 5537)		8.57 (63, 5536)		25.48 (63, 1825)	
F for state dummies	14.83 (51, 18339)		3.20 (51, 5537)		5.29 (51, 5536)		2.64 (51, 1825)	
Mean	.3043		62.23		.3373		59.76	
Standard Deviation	.4601		41.87		.4728		50.50	

*significant at .01 level

Source: AFDC 1977 survey data.

the mother has an award. If the location of the absent parent is unknown, the mother's probability of having an award is reduced by .13.

In addition to the variables characterizing the mother we introduced a series of dummy variables for states, in order to assess whether the likelihood of having a child support award varies significantly between states, after we have controlled for compositional differences in the AFDC population. Because Michigan can be identified as a state with one of the most efficient child support collection systems (Chambers, 1980; U.S. DHEW, 1980), it was used as a reference category in the equation for award status. The 51 dummy variables for other jurisdictions (Puerto Rico is included) add a significant 2.6% to the explained variation in award status. We find 11 states are similar to Michigan, and one better, while fewer percentages of women in the remaining 39 states have a child support award. The mean difference between this group of states and Michigan is 16%, with a range of 7% to 25%. These differences are relatively large in light of the fact that the range of variation in the dependent variable is between 0 and 1. In the state with the lowest proportion of women with a child support award, the percentage of women with an award is fully 25% below the Michigan level.

The Amount of Child Support Awarded

The child support award per child per month is the dependent variable in the second model estimated in Table 6. The model is estimated for women who have been awarded child support. We expect the father's ability to pay to be an important factor in the determination of child support awards, but the custodial parent's need for support should also be expected to have an influence. The estimates reported in Table 6 lend

some support to these hypotheses. Black women and women with fewer than 12 years of schooling are awarded less child support than other women, and women who never married the child's father also have lower awards. It is reasonable to view these results as evidence of the importance of the absent father's ability to pay in the determination of child support awards. Women with little schooling, black women, and never-married women would on the average be expected to have partners with lower income than other groups of women. At the same time, these groups of women are those where the need for support may be greater; if that is indeed the case, the ability to pay dominates the need for support when child support is awarded.

The negative effect of the number of children on child support awards reflects the well-known fact that the award per child decreases with the number of children. This partly reflects the assumption that the cost of the first child is higher than costs of subsequent children, but it presumably also is a function of the absent parent's ability to pay.

The negative effect that the age of the youngest child exercises on awards probably just reflects the fact that many awards are not indexed. The older the youngest child is, the lower the average award. This effect is small though, only 86 cents per year. In other words, a woman with a child of 12 would get about 8 dollars less per child per month than a woman with a child 2 years old.

In this equation we again introduce a set of dummy variables for states, after all the variables characterizing the custodial parent have been introduced. The reference category is Michigan. The addition of the 51 state dummies to the model increases the explained variation by 2.5%; an increase that is significantly different from zero. In contrast

to the model for award status, we find that the vast majority of states are similar to Michigan; that is, the amount of child support awarded per child does not vary among these states after we have controlled for the custodial parent's characteristics. In 7 states, however, the average award is significantly lower; there, the mean is $21 below that for Michigan; in the worst state, it is fully $40 per child per month below Michigan and most other states—bear in mind that these differences are net of any compositional differences in the population of custodial parents.

A Model for Recipiency Status

Once a woman has been awarded child support, the question becomes whether she collects any of the money awarded. In the third model, we predict whether a woman with a child support award receives any payments under it. The dependent variable is a dummy variable taking the value of 1 if the woman or the IV-D agency received some payments during the survey month. The most remarkable feature of this model is that it is not very successful at predicting who, among women with child support awards, actually will receive payments at a given point in time. This, of course, is consistent with the small variation in the recipiency status of subgroups of women that we observed in Table 2. Somewhat surprisingly, never-married women with a child support award are more likely to collect payments than other women. The more children a woman has, the more likely she is to collect, and if the absent parent's location is unknown, the likelihood of collecting is dramatically lower. None of the other variables in the model have any effect on recipiency status. There are no racial differences in recipiency rates, net of the other variables

in the model, and the amount of support awarded does not affect the probability of receiving payments.

The positive effect of 'never married' is difficult to interpret without additional data. It may mean that once the hurdle of obtaining an award is surpassed for the never-married mother, collecting it does not present a big problem. Or, we may speculate that the few never-married mothers who do get an award constitute a very select group of people whose partners for one reason or another are willing and able to pay child support. This may also explain the positive effect of number of children. A possible interpretation is that the custodial parent's need for support does prompt absent fathers who have agreed to pay child support actually to do so. That women who do not know where the absent parent is, are much less likely to receive payments, just goes to show that disappearance is one way to get out of paying child support.

Although these effects are significant, the variables characterizing the custodial parent together explain only 3.6% of the variation in recipiency status—less than the set of dummy variables for states, which add 4.4% to the explained variance. Seventeen of the states are similar to the reference category, Michigan, but in 34 states, women with a child support award are less likely to receive payments than Michigan women are. On the average, women who live in these states are 34% less likely to receive payments than women who live in Michigan. Given that we have controlled for the support award amount and the custodial parent's characteristics, this seems to suggest that some states are more efficient than others in enforcing child support awards, and that better state enforcement efforts may improve the situation of custodial parents considerably.

Determinants of Child Support Income

The last step in modeling the child support collection process is to look at the determinants of the actual payments received by the custodial parent or by the IV-D agency on her behalf. In this model, the payment received per child during the survey is the dependent variable. The model is estimated for women who have child support awards and who received some payment during the survey month. If child support awards were paid as stipulated, the only variable should be the amount of child support awarded. However, there are reasons to suspect that the world is not perfect, so we estimate the model including all the independent variables used in the previous models. The results are given in the last two columns of Table 6.

The most important variable in the model is, not unexpectedly, the amount of child support awarded, which explains 41% of the variation in payments. For every dollar awarded the payoff is 69 cents. After we have controlled for amount of support awarded, the characteristics of the custodial parents do not tell us much about how much they receive in child support. Legally separated women tend to get higher payments than other women, presumably because the award has not been in effect for a very long period of time. Women with many children tend to get less of their child support award, maybe because the total support obligation increases with the number of children, putting more of these fathers in a situation where they feel they cannot pay the full amount. It is noteworthy that neither race nor education of the custodial parent have any effect on the payments received.

In this model there are significant differences between states; the 51 dummy variables add 2.2% to the explained variation. Forty-four states are similar to Michigan; in 6 states, women who collect child support are paid less per dollar awarded than women living in the rest of the country. The difference is not trivial; in the worst state, women with the same child support award and the same individual characteristics received almost $34 less per child per month than women in Michigan and similar states.

5. SUMMARY AND DISCUSSION OF THE RESULTS

The results of the multivariate analysis have provided further support for many of the findings reported in earlier studies. The analysis has extended our understanding of the process of collecting child support by showing how important it is to distinguish between the two stages of that process—obtaining an award and enforcing it—and by suggesting that state enforcement efforts may well be significantly improved over present levels. Summarizing the results of the multivariate analyses, we first discuss the characteristics of the custodial and absent parents, and then the results for state differences at different stages of the child support collection process.

Characteristics of the Parents

Previous studies of child support collection (Jones et al., 1976; Cassetty, 1978) have shown that child support income varies greatly with the custodial mother's characteristics and with indicators of the absent father's ability and willingness to pay child support. Jones et al. did

attempt to distinguish between the process of obtaining and of enforcing an award, but they had to rely on a very crude indicator of award status, namely whether the mother had ever received child support. In this paper, we had data which allowed us to distinguish clearly between the two. As suggested by Jones et al.'s tentative results, this turned out to be a very important distinction to make.

The analysis clearly shows that it is at the stage of awarding child support that the inequities of the current system are the greatest. Women who either had to locate the father or to establish paternity for the child were at a clear disadvantage in getting a child support award. This is of course not surprising, but it does point out that the women who most need the support of child support enforcement agencies are the never married and those who have been deserted by their husbands. It was also evident from the analysis that there are nontrivial race differentials in award status, and that these cannot be explained by the fact that a larger proportion of nonwhite women are never married. The most straightforward interpretation of this effect is that nonwhite women not only have fewer resources of their own, and maybe less support by institutions such as the child support collection agencies and the courts, in getting a child support award; they are also more likely to have former husbands or partners who are unable to provide any support for the child, a fact which may discourage attempts to get a support order or may make judges hesitant to impose one.

The analysis also showed the custodial parent's characteristics to be of some importance for the amount of support awarded. Awards made by the courts or by voluntary agreement are determined by the absent father's ability to pay and by the custodial parent's need for support (Chambers,

1980). The fact that women with few years of schooling, nonwhite women, and women who never married the child's father have lower child support awards lends support to the hypothesis that the absent father's ability to pay is an important determinant of how much he is legally obliged to pay. The data do not provide any support for the contention that the custodial parent's need also enters into the setting of child support levels. This is probably because we have to rely on very crude and indirect indicators of both the absent father's ability to pay and the custodial parent's need for support.

When we examine recipiency status and actual child support income, we find them to be virtually independent of the custodial parent's characteristics. The model for whether women with a child support award receive any payments explains a very low proportion of the variance, and only two of the variables characterizing the mother have significant and positive effects—number of children and being a never-married woman with a support award.

The actual child support income obtained by women who do receive some payments is primarily determined by the amount of support awarded, and there are few and small differences among the returns to subgroups of women.

It is of interest to note that there are no race differentials in recipiency status nor in the amount of child support actually collected for each dollar awarded. Nonwhite women are less likely to have a child support award, and they are awarded less child support per child, but once they have an award, they receive payments as frequently as white women do, and they collect the same proportion of each dollar awarded.

Differences Between States

In addition to variables characterizing the parents of the child eligible for child support, we also introduced a series of dummy variables for states in the regression analysis that allowed us to compare Michigan (the left-out category) to the 51 other states and jurisdictions in the sample. We have ascertained that there are indeed differences among states, net of compositional differences in the AFDC population, though we have no information about the sources of these differences. It is fairly well established that some states put more effort into the child support collection process than others (U.S. Department of Health and Human Services, 1980), so this finding of differences among states supports the hypothesis that public policy interventions may indeed be successful.

There are significant differences between states at each stage of the collection process; there always are some states which are significantly worse off than Michigan. In fully 39 of 51 states women demographically eligible for child support were less likely to have been awarded support than women in Michigan and the remaining 12 states. For those women who did have a support award, the state in which they lived did not make much difference in setting the amount of support, since only 7 set lower awards than Michigan. This may suggest that the courts, despite the lack of common rules, set child support in similar ways.

We also found, that once child support had been awarded, the probability of collecting any of the award varied significantly by state. The difference was quite large; it is clearly possible to improve collection of awarded child support. Once some payment is received, however, the

payment on each dollar awarded does not differ much from state to state, except for 6 states, where on the average women receive 24 dollars less per month per child than women living in other states who have been awarded the same amount of child support.

This simple analysis of state differences in the child support collection process has convinced us that state policies of public intervention do indeed have an impact on the child support income received by custodial mothers, and that these policies matter most at the stages of helping women obtain a child support award and of locating the absent father. We have no direct evidence that differences observed between states actually reflect differences in state policies, but we believe that our interpretation is a reasonable one.

We should also emphasize that the multivariate analysis is based on data for women receiving AFDC. We suspect that the pattern of effects will be quite similar for the general population of women given the similarities in simple tabulations based on the CPS and AFDC data (see Table 2). The fact that our results based on AFDC data are consistent with those based on the Panel Survey of Income Dynamics data (Jones et al., 1976; Cassetty, 1978) lends some support to this expectation.

6. FUTURE STUDIES OF CHILD SUPPORT

In our analysis of child support in the United States in the 1970s, we have used data on AFDC mothers and a national sample of mothers, demographically eligible for child support, to attempt to answer the question posed in the title of the paper: Who pays what to whom?

It should be clear by now that we can give only a very partial answer to that question, because none of the recently collected data on

child support allow us to say much about the absent father who is supposed to pay child support. We know much more about who, among potentially eligible women, have child support income. This paper has, therefore, been limited almost exclusively to analyses of the situation faced by the mother with custody of the child. We believe that this is insufficient for a clear understanding of the processes of child support collection. The almost total lack of knowledge about the absent father's ability to pay and his reasons for not paying makes it difficult, if not impossible, to assess whether the current child support system is equitable once a child support award has been made. It is clear that a great many inequities arise because so many women never become legally eligible for child support. We can say next to nothing about the extent to which the inequities would continue should this problem be solved.

Future studies of the child support problem should therefore be concerned with this particular problem. There is very little else to be learned from additional studies of the custodial mother's situation, unless it can be seen in the context of the absent father's ability and willingness to provide support for his children.

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Behavioral Responses to Better Child Support:

A Family Impact Analysis

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A social child support program that establishes minimum payment standards and collects payments more effectively would change how fathers, mothers and children are affected by family instability. This paper analyzes the proposed new program in terms of its economic advantages and disadvantages for affected parties, to assess how these might change their economic behavior and personal relationships. Available empirical evidence about the influence of government income transfers on family stability is applied, and there are comments about implications for taxpayers. The new program is compared to the current situation, such that its marginal effects are considered.

I. How Social Child Support Would Affect Men, Versus Women

To assess behavioral responses to the new child support program it is first necessary to characterize how its essential elements affect men and women. (Men more often become absent parents liable for child support and women more often become custodial parents. To facilitate discussion, "men" and "absent parents" are understood to be synonymous, as are "women" and "custodial parents.")

Relative to the current situation most but not all men can expect to pay more child support under the new program. Many men would be assigned higher support obligations. Support obligations would also be collected more effectively, such that even some men who might obtain reduced obligations from the new program may pay more support because they would be forced to pay more regularly. On the other hand, men who would pay their support regularly in any event may also have their

obligations reduced, which would be financially advantageous for these men. Nevertheless it is generally the case that men lose under the new program in the sense that they would pay more child support. Behavioral incentives to work less or reduce their Wisconsin income tax liability in other ways would arise as a means of avoiding part or all of the child support surtax. Section V considers these incentives and concludes that the extent to which most absent parents would be able to avoid the surtax is limited.

There are two necessary conditions for social child support to be advantageous for a woman. The first of these has been implied already--she would have had to receive less child support before the new program.

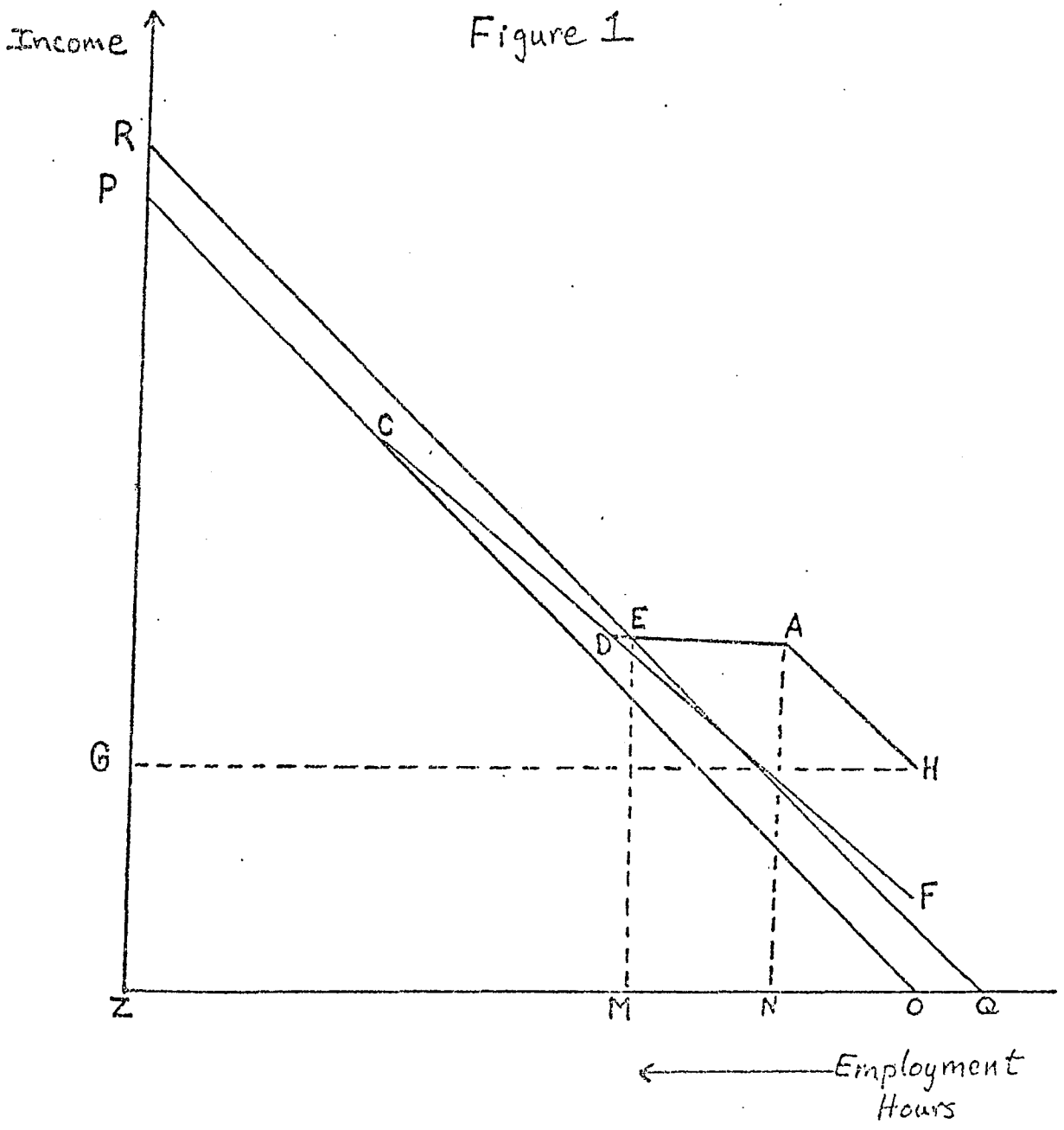
The second condition stems from how social child support would interact differently with welfare programs than in the current system. The woman must also be able and willing to combine her earnings and other income with child support to an extent that makes this combination more attractive than less employment and welfare recipiency, which includes medicaid and food stamp benefits. The relevance of welfare is that AFDC regulations specify that every dollar of child support reduces AFDC payments by a corresponding dollar. To gain from the new program a woman who would receive more child support because of it must avoid AFDC. This would be accomplished more easily were it not for the fact that AFDC pays a custodial parent's benefit, while the new program would not. The new program's guarantee (i.e., benefit available when there is no other income) is substantially less than AFDC provides. However AFDC also reduce benefits a dollar for every dollar of earnings above a newly restrictive earnings

disregard, while in most cases the benefits from the new child support program would not vary with respect to earnings. Hence custodial parents who can and will work enough hours in the labor market would not prefer to get AFDC, but would rely instead on their earnings, any other non-welfare income and child support.

Under the new program, if the surtax collected from the absent parent is not sufficient to pay the entire child support benefit a subsidy from the state would cover the difference. However custodial parents receiving the subsidy would repay part of it in the form of a custodial parent tax, levied annually. In this fashion child support benefits would be reduced as the earnings of some custodial parents not on AFDC increased.

Figure 1 illustrates how social child support and welfare would interact when the absent father pays all of the social child support benefit. The figure shows how employment hours (read from right to left on the horizontal axis) generate earnings and government benefits for a given wage rate. Point 0 corresponds to zero employment hours. Line OP represents earned income opportunities when no welfare or child support is avilable. The maximum income available from earnings is represented by ZP. A woman entitled to RP (or OQ) in child support would receive ZR in total income under the new program if she worked a maximum amount of hours. ZG depicts the maximum income available to a woman who is unable or unwilling to become employed; this corresponds to the income available from AFDC, food stamps and medicaid (insurance value) accounting for the fact that her child support would reduce AFDC and food stamps. The line FDC represents income available from food stamps and earnings.

Figure 1



Now consider how incomes between ZG and ZR might be achieved with and without the new child support program. Without the program the income opportunities are HAEDC. These are expanded for employment hours above M after social child support, represented by HAER. The woman can retain all her AFDC benefits until her earnings exceeds the restricted amount that AFDC ignores, but above this (corresponding to N employment hours) AFDC is reduced one dollar for every dollar of earnings. There is no incentive under the current system for an AFDC recipient to work more than N hours. If social child support were available, recipients could leave AFDC and Medicaid and rely instead on child support and earnings provided at least M hours of employment is feasible. AFDC eligible women who are unable or unwilling to work more than M hours are no better off under the new program relative to what they could achieve with AFDC. Again, unless the custodial parent can work enough to obtain earnings that exceed what she could get from remaining on AFDC, she is not made better off by the new program.

Many women may discount AFDC, Medicaid, and food stamps heavily in terms of their preferences for these benefits versus income from their own earnings or other sources. Such factors as welfare stigma and uncertainty about the generosity and permanence of welfare would tend to reduce the employment hours necessary for a woman to prefer social child support to relying on AFDC and related benefits.

The main findings thus far can be summarized to motivate some important implications of social child support for taxpayers.

Men would gain from this new program only if they would have paid more support regularly and the new program reduces their support obligations. Yet most absent parents will pay more support if the new program is enacted. The obvious implication for taxpayers is that public assistance costs will be reduced.

Women who would receive more child support benefits gain financially only if they can avoid AFDC, but the new program encourages employable women to leave AFDC because AFDC discourages employment, while the new program does not. Thus in addition to the reduced costs for payments to AFDC recipients already mentioned, taxpayers would benefit because social child support would tend to reduce the AFDC caseload.

Overall, the conclusion is what would be expected on the face of the matter. Men would bear more of the financial burden of children born out of wedlock or in previous marriages. What this implies about family stability is considered next, in terms of decisions about childbearing, marital disruption, and remarriage.

II. Childbearing and Marital Disruption

Marital disruption here refers to the end of a formal marriage or any other sexual relationship that could result in a child support obligation. It happens that much the same factors affect childbearing as affect marital disruption in the context of interest here. This speeds treatment of the childbearing decision after considering marital disruption. The approach is to analyze how economic risks of marital disruption or childbearing would be evaluated differently if there were a social child

support program. The economic risk of marital disruption is defined as the probability of a marital disruption, weighted (or multiplied) by the expected financial costs of disruption. The economic risk of childbearing is defined analogously. For childbearing the event of interest may be either a birth out of wedlock or one that occurs during a marriage; in either case the potential for a child support obligation or payment results. It is also understood that women would rarely plan to end a marriage or get pregnant solely because of the new program.

For men we argued that the costs of ending a marriage would usually increase because the new program would require absent parents to pay more child support. Although some women would not gain relative to the status quo many would, such that the new program reduces the costs of a divorce for these women. These changes affect the economic risk of any marital disruption directly, tending to increase it for men and reduce it for women, but this is not the whole story.

The changes in expected costs would also affect the probability of disruption. To see why requires some elementary concepts about what determines the probability of a marital disruption. Two concepts suffice. The first is that each couple has an implicit agreement about what constitutes accepted behavior. The second idea is that this agreement is subject to change but that unilateral changes or attempts to change the agreement can lead to irreconcilable differences that result in marital disruption. The decision of interest is thus seen as whether or not to violate an existing argument.

If a better child support program becomes available women would tend to be less willing and men would be more willing, to reconcile if their mate attempts to change their agreement. For women the reduced cost of a marital disruption implies they would be more able to end the agreement. For men the cost of ending the agreement would have increased, such that they would tend to be more willing to tolerate changes the women wanted.

The overall effect on the economic risk of disruption for men, including both the impact on costs and on the perceived probability of marital disruption is an increase. Under the new program men who attempt to change their agreement would find their mate less willing to change and the associated costs of disrupting would be greater. This would tend to limit disruptive behavior more than child support does now.

For women the overall effect on their economic risks is ambiguous. Women's expected costs of divorce are reduced because they would get more child support (unless disruption means they must rely on AFDC); this makes them more willing to end the relationship. On the other hand the probability of irreconcilable differences if they violated a marital agreement would be reduced because the man would tend to lose more than from the status quo. Another way to put this is that social child support would give women more power to influence agreements between parents. Women may take advantage of the new program to help reduce the costs of a disruption, or they may instead use the man's knowledge of his increased economic risk to attempt to change a relationship in ways that might make it more likely for a couple to remain together. In a word, the new program could either

increase or decrease family instability through its effects on marital relationships.

To simplify analysis for childbearing assume momentarily that contraception, abortion, and adoption are not available to break the link between sexual intercourse and potential child support income or obligations. Then the decision to analyze is whether or not to engage in sexual activity that could lead to a birth. With the new program men would face an increased economic risk of sexual activity and consequently they would more often avoid marriages as well as extramarital sex. Women might be either more or less willing to marry or to have sex outside marriage. On the one hand the costs of a disagreement that could make women single parents would be reduced. On the other, they may have to persuade their potential mate to bear the increased risk of sexual activity he would face by granting concessions in other aspects of their relationship.

The same type of conclusions follow for real world decisions affecting contraception, abortion, and adoption. How effectively to contracept, whether abortion is a relevant choice, and whether or not to keep a child are all affected by how the new program would change the economic risks differently for men versus women. The reduced costs of a disruption would, if anything, tend to discourage contraception, abortion, and adoption among women. But to convince men to bear the greater risks they would have after the new program takes effect women may have to share the men's increased concern for contraception, or greater willingness to favor

adoption or abortion. The balance of power in the battle of the sexes would become somewhat different.

For both marital disruption and childbearing it is not possible, without further evidence, to predict what would happen to these aspects of family stability under social child support. After analyzing the potential impacts of the new program on remarriage, the evidence about government income transfer programs and family stability will be assessed for what it may contribute.

III. (Re)marriage

How the new child support program would affect the desirability of marriage and its likelihood is of interest here. The relevant decision may be either to remarry following a marital disruption, or to marry for the first time after a birth out of wedlock.

From a family economics perspective marriage is advantageous because it fosters a division of labor between spouses that increases each partner's total income, and because it leads to sharing in consumption and thereby reduces the costs of living. Obviously whether and when to marry depends on one's ability to find a suitable mate. Improved child support would affect men's and women's gains from marriage as well as their ability to find a mate.

For mothers, the new program relieves part of the economic pressure to remarry or to marry for the first time. For example, increased child support income could be used to hire babysitters to free up a single mother's tight time constraint. Currently, AFDC has the same influence, tending to inhibit marriage among its recipients.

However more child support income also makes single mothers more attractive marriage partners than the current situation permits. Better child support acts as a kind of dowry in that the mother is likely to share her support income, or the benefits of the extra opportunities it makes possible, with a new spouse.

This dowry effect is different than any that AFDC engenders. Currently an AFDC mother who marries loses her AFDC benefit, but AFDC may continue for her children provided her new husband does not adopt them. However part of the husband's resources are deemed available to the children even if he does not adopt them. When such deeming does not eliminate the children's AFDC benefits, there is a dowry for men who marry AFDC recipients. Yet the new program's dowry effect is more advantageous, for three reasons.

First, the new program encourages the woman to work more hours in the labor market, increasing the income that a husband might share in. The earnings of a remarried AFDC woman are counted against any AFDC the children might get, but with social child support a woman who can work enough hours could avoid AFDC and retain all her earnings.

Second if the woman is not on AFDC she retains every dollar of any child support income she receives instead of having this support count dollar for dollar against AFDC.

Third, the new program's dowry is portable outside Wisconsin, while any AFDC dowry is less so. A former AFDC mother who leaves Wisconsin would usually have her children's benefits reduced because

AFDC is less generous in most other states. The new child support program would continue to pay the same amount, wherever the mother resides.

Vis a vis now, the new program also has a twofold remarriage incentive effect for men. Paying more child support would increase the pressure to marry to gain its economic advantages. Yet an absent parent's chances in the marriage market would be reduced because his increased support obligation makes him a less attractive mate.

Again the various effects can be considered together for a summary. Custodial parents would become more attractive marriage partners if a better child support program became available but the new program also relieves part of any need to remarry for economic reasons. Absent parents would become less attractive as potential mates but they would also be more eager to marry. Whether the net effect is more "ships passing in the night" or increased marriage is difficult to predict. Presumably women would be better able to dictate the circumstances that constitute an appropriate marriage match.

IV. Applying Some Empirical Evidence

The studies available from the empirical literature about the effects of government transfer programs on family stability are not very appropriate for understanding how social child support would affect childbearing, marital disruption, and marriage. The reason for the disjuncture between what these studies tell us and what we would like to know is that social child support would require men to pay a greater part of the income transfers to support

children than they did when the studies were conducted. In other words, men would act differently after the new program than they do now. Nevertheless the available studies are relevant because they help to gauge the degree to which government transfer programs affect family stability, if at all.

Two types of family stability studies have been conducted. The effects of the generosity and availability of AFDC benefits have been analyzed. In addition income maintenance experiments sponsored by the federal government have provided the opportunity to observe how a guaranteed income for all types of families would affect family stability. These studies have been reviewed in detail by MacDonald and Sawhill (1978) and their implications have been explored further by Bishop (1980).

Although there is some disagreement among the conclusions of good studies of AFDC effects on childbearing and marital disruption, it is generally agreed that AFDC has very little effect on these decisions, especially for births out of wedlock. By contrast the evidence from the Seattle-Denver income maintenance experiments (SIME-DIME) is that there were increases in marital disruption among couples who received the experimental payments. This increase in disruption was much lower for couples with children. Still these experiments provide the strongest evidence that income transfer payments can affect family stability.

Studies of remarriage have also found that income transfers affect this decision, for both AFDC and experimental payments. The most robust

evidence about AFDC and family stability is that it tends to defer marriage somewhat, although other factors influence marriage to a much greater extent.

With respect to the new child support program, SIME-DIME comes close to offering appropriate evidence about the likely impact on remarriage. During the experiment single mothers had a dowry somewhat like that which better child support would provide, because unlike AFDC, SIME-DIME payments did not cease when a woman enrolled in the experiment married. Among whites there was no difference in the rate of remarriage between experimentals and controls. Chicana experimentals delayed remarriage and Black single mothers married more quickly than their control group counterparts. Extending the findings for Whites would imply that there would be little effect of better child support on remarriage in Wisconsin. However such a prediction is not entirely trustworthy because men in the Seattle-Denver area did not finance the experimental "dowries", while Wisconsin men would have to pay more support after the new program takes effect.

What has been learned is that income transfer programs do have detectable family stability effects, but these are not large. Similarly the new child support program is likely to have some effect on childbearing, marital disruption, and marriage. Available empirical evidence offers little guidance for predicting the direction of these effects because social child support would affect men in ways that the programs studied did not. Social child support might increase or decrease family instability somewhat.

V. Can Men Avoid Paying More Support?

This section addresses the issues of whether the new program might cause men to reduce their labor supply, hide or misreport their income to the Department of Revenue, or leave Wisconsin, all to avoid paying more child support. Certainly some men will use one or more of these options. The real question is how widespread these avoidance activities might become.

Under-reporting of income to evade taxation occurs already, but there is no particular reason to think that those disposed to cheat would respond differently to the new program than they would for any other increase in their tax liability. Whenever taxes are increased the prospects of increased evasion must be faced with available measures to ferret it out and punish offenders accordingly.

Similarly men subject to what they view as excessive Wisconsin tax liabilities already leave for States that impose a lower tax burden on them. However because Wisconsin would be the only state to impose a special child support surtax more absent parents may get the idea that migration out of state is the best way to avoid their child support obligation. Offsetting this is the legal fact that the new program imposes statutory obligations that cannot be modified by the courts in other states. In addition Wisconsin is relatively effective in obtaining current support obligations from absent fathers out of state under its IV-D program. The availability of a better support collection system is likely to free some IV-D resources that could be applied to the

rigorous prosecution of out migrants who fail to meet their new support obligations.

Men may work less when the net gain from working is reduced by the child support tax. However if the new program is perceived as fair in that it establishes a reasonable obligation with a convenient payment mechanism more men may not view the child support surtax as a reduction in their own gain from employment. That is, child support may more often be perceived as part of men's own consumption, and thus would not be expected to induce any change in their work effort.

VI. Potential Impacts on Family Relationships

How social child support would affect personal relationships between men and women or among custodial or absent parents and their children depends greatly on how the new program is perceived. If received favorably by all affected parties it might improve interpersonal relations. The new program could end an important source of tension between the absent and custodial parents because it would reduce the amount of discretion available to the absent parent vis a vis child support payments. This might help by increasing the certainty of the outcome of the child support issue. Men who know what to expect about their support obligation may become more comfortable in dealing with their ex-mates and children. More contact between the absent parent and his children might result, leading perhaps to more harmonious relationships. Custodial parents who view the new program favorably might be relieved to know that their

actions are less likely to influence the absent parent's support payment performance; this could also help to reduce any tension between ex-mates. To the extent that the new program has these beneficial effects for parents, their children would also benefit. Presumably more relaxed relationships between ex-spouses would permit more attention to be devoted to the children.

It is more difficult to analyze what might happen if the new program is viewed unfavorably by those it affects most. For organization, it helps to consider personal interactions that may be associated with childbearing, marital disruption, and remarriage.

Some influences of better child support on relationships surrounding childbearing were suggested earlier for birth control, abortion, and adoption. All of these possibilities have more potential for friction if men feel threatened by the new program. Consequently the ease with which couples can develop a sexual relationship might be reduced. Conservatives might find this to be an advantage of the new program--it may force couples to confront important issues affecting their long term viability together. "Romantics" might disagree, possibly viewing the new program as one more of a rising number of impediments to closer relationships.

In instances of a birth out of wedlock the prospects of paying more child support may lead some men to contest paternity who would not otherwise. Whether or not contesting paternity succeeds, such action certainly does not endear the absent parent to the mother.

As may also occur after marital disruption, absent parents may threaten reprisals against a mother and her children if she files for the new child support benefits. Current practice exempts mothers from their obligation to help obtain child support if it can be demonstrated that not helping is in the children's best interest, and this would continue. However relative to the present system the new program would operate much more automatically and impersonally. Hence some men who might otherwise be disposed toward violence might decide that such reprisal would be futile. For most custodial parents the new system ends any need for them to go to court or the IV-D agency to get help in collecting child support, which should get them "off the hook."

A variety of other contingencies that arise from marital disruption can affect how well ex-mates relate to one another and the children. Some absent parents who find the new program disadvantageous may retaliate by attempting to drive harder bargains about custody of children, visitation rights, and any alimony or property settlements. Social child support may change how these get settled. Each of them is a difficult issue and mandatory minimum support obligations could potentially foster greater struggle about them.

It is likely that some men may try to offset any financial loss that they attribute to social child support by attempting to obtain what the custodial parent would view as an unacceptable property or alimony settlement. Custodial parents who believe they are at a relative disadvantage in terms of their access to legal assistance may become embittered by this prospect.

Similarly, disgruntled absent parents could become more recalcitrant or unreasonable about what is in the best interests of children in regard to custody or visitation rights. Upset by what they may consider unduly expensive support responsibilities, more men may attempt to get custody of their children. Mothers who would rather not be the custodial parent would benefit from this, as would some children who might prefer having the father as a custodial parent. Potential problems could also arise from any new tendency for fathers to want custody. Children might prefer the father's custody for financial reasons, which may lead to some estrangement between them and their mothers. And, of course, mothers who want custody would be alarmed if men became less willing to assent to this without a legal battle. In cases where the woman is financially disadvantaged relative to the man, this could cause some women to lose their children.

More abduction of children could also stem from any strife that occurs because of the new child support program. However it is probably just as likely that less abduction would occur, provided the new support law somehow promotes more amicable divorce settlements.

Parents for whom the new law assigns a greater support liability may also want to preserve their parental rights by striking joint custody agreements. These agreements must entail an active role in parenting by both the mother and the father if they are to benefit the children substantially. The danger is that some parents might obtain joint custody to reduce their statutory support liability and then fail to provide either

the financial or emotional support expected in lieu of a reduced child support surtax.

Just as paying more support may provoke increased interest in custody it might be expected that absent parents would want to visit their children more often after the new law becomes effective. Again the idea is that a greater financial obligation may draw attention to the children and achieve other positive results for them. Conversely if the new support law is perceived to be onerous more absent parents may come to resent their children and consequently visit them less often, or merely go through the motions during whatever visits do occur. Perhaps the current child support system is worse, in that more visits are difficult because the absent parent more often fails to meet support obligations, or because the greater discretion the courts now have causes more perceptions of inequity about support obligations among custodial parents and their children.

It is with respect to remarriage that it seems most probable that the new program could generally help to promote better family relations. Because social child support would set mandatory obligations and collect and pay them regularly the new spouse and any children residing with her and the absent father she has married may take the remarried absent parent's support obligation for granted more than they do now. With the current system a new spouse may encourage or even pressure a remarried parent to pay less child support. This source of trouble may be alleviated by the new law in that it eliminates much of the discretion absent parents now have about whether and how much child support to pay. Similarly remarried custodial parents

who now feel pressure from their new spouse due to difficulty obtaining child support income will have this alleviated to some extent. However it should be understood that the new program does not eliminate the possibility of negotiating support payments above the mandatory obligations. Paying and receiving such negotiated payments may continue to be a source of strain for remarried parents.

A recurring theme of this section has been that social child support may promote better personal relationships because it substantially limits the amount of discretion that absent and custodial parents can exercise in paying or obtaining child support. If the State takes increased responsibility for child support individual parents will be viewed as less responsible, personally, for any discomfort that child support causes. An opposing idea is that men who would feel unfairly treated by the new law may vent their feelings by obstructing transitions that ordinarily occur after family instability. Yet over the long run the program would probably become widely accepted, such that it would usually improve post-divorce relationships.

More generally, those who feel victimized by family instability are not likely to alter their basic feelings toward those persons they hold responsible, whatever the child support laws are. For better or worse social child support will affect personal and family relationships only marginally.

VII. Summary

If Wisconsin enacts a social child support program custodial parents would gain more than absent parents because some absent parents would have greater support obligations, while many others would have to pay child support more regularly. For the most part attempts to avoid the new child support surtax would be futile. Tax evasion is effectively countered by existing methods, the IV-D program can recoup child support tax liabilities from men who leave Wisconsin, and, although there is reason to expect intentional reduction in work effort to reduce the surtax, this tendency is offset by the expectation that many absent parents may come to view their support obligations as part of their own consumption. Still, unless custodial parents avoid AFDC they cannot benefit financially from the new program because AFDC benefits are reduced one dollar for every dollar of child support income. However relative to AFDC the new program encourages employment, which would permit more custodial parents to rely instead on child support and their own earnings. Taxpayers would benefit from the new program because it requires and encourages parents who experience family stability to pay for the subsequent support of their children.

Corresponding to these economic consequences there would be incentives to change behavior that affects family instability and interpersonal relationships.

The main conclusion for births and marital disruption was that women would be better able to use men's increased awareness of the economic risks

of these events to either reduce the costs of ending an unsatisfactory relationship or as leverage for change that could renew the relationship. For women remarriage would be discouraged by reduced economic pressure to remarrry, but increased child support income would also have an offsetting dowry effect. And vice-versa for men. Hence, overall, the symmetry of the new program's incentives for men versus women makes it very difficult to predict what the net effect on family stability would be. Unfortunately available empirical evidence is also of limited help because no investigation has observed anything like the expected effects of increased support payments by absent fathers. Instead it is only possible to say that there is evidence that government transfer programs appear to affect family stability somewhat.

Relationships among ex-mates and their children may become less awkward in that social child support would reduce both their uncertainty and their discretion about the payment and collection of child support. This would tend to facilitate adjustments to family instability, perhaps helping to forge agreements about paternity or property and alimony settlements. Enforcing support obligations more effectively might also generate a greater desire for custody of children among men, or for joint custody agreements. At least, children might benefit from more visits with absent parents if the new program helps to focus attention on continuing parental responsibilities. Upon remarriage, the new program would also tend to reduce the potential for strife among new couples about child support income or payment. On the other hand, the advantages of the new program are not likely to

impress those who feel especially disgruntled about either the end of a family relationship or its particular child support implications.

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DOCUMENTATION OF THE METHODOLOGY UNDERLYING THE COST ESTIMATES OF THE WISCONSIN CHILD SUPPORT PROGRAM

While the Wisconsin Child Support program has been described in the preceding chapters, it will be worthwhile to restate the major objectives and features of the program in order to highlight the problems in estimating the costs of this reform. The major objective of the Wisconsin Child Support program is twofold. First, the program is designed to standardize and formalize the responsibility the absent parent has to his/her children by proposing a uniform tax that is then paid to the children. Second, the program is designed to provide a minimum standard of living for children who are not living with both of their parents, by providing a minimum benefit to the children when the absent parent's tax liability (payment) falls short of the minimum. These two objectives comprise the two major components of the net costs of the program. On the outlay side of the account for this program, one has the payments being made to the children, while on the revenue side, one has the tax revenues from the absent parents. Since it was envisioned that for the population as a whole the benefits that would be paid out from this program would exceed the revenues from the tax on absent parents, two other sources of financing were envisioned. A second tax program was constructed that would tax the custodial parent in the case where the tax collected from the absent parent fell short of the minimum benefit paid to the child. The third source of financing the program was in the form of an offset in other government programs that would be achieved through the implementation of the Wisconsin Child Support program. Since the increased child support payments from the program would represent an increase in income available to the household, all means-tested transfer

programs should realize a net savings in outlays. However, the cost estimates that appear in this report reflect only the savings that would be realized in the Aid to Families with Dependent Children (AFDC) program. Finally, since there would be a drastic change in the method by which child support payments would be made and enforced, there would likely be a change in the costs of administering this program over the costs incurred by the current system. At this time, however, the cost estimates do not reflect any expected increase in administrative costs nor savings from the reform.

In summary, the implementation of the Wisconsin Child Support program can be thought of as consisting of four components, each of which would have major impact on the costs of implementation of the reform. These four components are:

- Payments made to children (B);
- A tax on absent parents (T_{AS});
- A tax on custodial parents (T_{CP}); and
- Savings in mean tested programs (S_{AFDC}).

These four components can be mathematically expressed for any household as the following:

$$B = MAX(MB, T_{AS})$$

$$T_{AS} = t_{AS} * MIN\left(MAX(0, Y_{AS} - EXMP_{AS}), YM_{AS}\right)$$

$$T_{CP} = MIN\left(MAX(0, MB-T_{AS}), t_{CP} * MIN(MAX(0, Y_{CP} - EXMP_{CP}), YM_{CP})\right)$$

$$S_{AFDC} = MAX\left(0, AFDC - (B - CS_{O})\right)$$

where

MB = the minimum benefit paid to the child,

t_{AS} = the tax rate on the absent parent,

t_{CP} = the tax rate on the custodial parent,

Y_{AS} = the taxable income of the absent parent,

Y_{CP} = taxable income of the custodial parent,

$EXMP_{AS}$ = income exemption for the absent parent,

$EXMP_{CP}$ = income exemption for the custodial parent,

YM_{AS} = the maximum amount of the absent parent's income to be taxed,

YM_{CP} = the maximum amount of the custodial parent's income to be taxed,

$AFDC$ = the AFDC benefit received before the reform, and

CS_o = the amount of child support received before the reform.

Once these four components have been estimated for all the eligible housholds and then aggregated across all eligible units, the net cost of the program (i.e., the amount of general revenues or public subsidy needed to finance the program's implementation) can be expressed simply as:

$$\text{Net Cost} = B - T_{AS} - T_{CP} - S_{AFDC}.$$

In the remainder of this appendix, we will discuss the methodology that we employed to estimate the cost implications of each of the above four components of the reform and the data base we have chosen to utilize.

The Data Base and Its Preparation

All estimates are based on data collected for the Survey of Income and Education (SIE), which contains demographic data for April of 1976 and income data for calendar year 1975. No demographic aging assumptions have yet been made to reflect population growth or change in the composition of families since 1976. All estimates are calculated for calendar year 1975 income data and inflated by the CPI to (Wisconsin) fiscal year 1980 dollars.

The SIE includes information on households, families, and persons in the entire United States. First, the records for only those families living in Wisconsin were extracted. Then, the family record had to be reconstructed to reflect the definition of the eligible filing unit. In the cases where there was only one adult with children and the adult was either divorced, separated, or never married, this nuclear family was simply broken off into a filing unit. Where there were two adults and only one adult had been previously divorced, eligibility was declared if the age of the child exceeded the length of time since the divorce. If both adults had been previously divorced and the age of the child exceeded the length of time since both divorces, the child was assigned to the woman unless the man reported that a child was living with him following the divorce and the woman reported that no children lived with her. All children from a previous marriage are assumed to have the same biological absent parent.

Weaknesses. The number of divorces and single parent families has been growing rapidly. These 1976 demographic figures underestimate the number of eligible children and thus underestimate both benefits and revenue.

CALCULATION OF THE TAX LIABILITY OF THE ABSENT PARENT (T_{AS})

As one can see upon examination of the mathematical expressions for the various components of the program, the crucial variable in all four components of the net cost of the program is the income of the absent parent. For once the parameters of the program are set, the absent parent's income will determine whether the child receives a benefit that exceeds the minimum, whether the custodial parent is liable for a tax, and the size of the AFDC savings. Unfortunately, the SIE and any other data source currently available does not contain information that ties the information about the children who would be eligible for the program with information about the absent parent. Thus in order to compute the costs of the reform, we needed to devise a statistical procedure by which we could "match" children/custodial parent data records with information about the absent parent. This matching of records was accomplished by first statistically describing the distribution of taxable income of the absent parents of a given set of characteristics. The second step of the "matching" process was to estimate the probability that a person of given characteristics would have been married to a person of another set of characteristics. Thus, once we know these distributions, we could take the characteristics of the custodial parent and "match" her/his record to series of distributions of taxable income that her/his absent spouse could be drawn from. At this point we had two options: one was to predict for the observation the expected value of the absent parent's income or, second, to keep the entire distribution and characterize the absent parent not only by a single point but by an entire distribution. We chose the second option, because of the large sample properties of doing

so and because of the nonlinearities of the various tax and benefit schedules.

Method. The first step of estimating the tax revenues from the absent parent was to estimate the statistical distribution of absent parent income. We first assumed that the distribution of taxable income of absent parents could be described as a seven parameter cumulative distribution of the form:

PZ_k = the probability of having zero taxable income;

$$F(y) = y/\hat{y}_k + \sum_{i=2}^{6} a_{ik}(y^i - y\,\hat{y}^{i-1}) \text{ for } 0 < y \leq \hat{y}_k$$

= the probability of having taxable income less than $\hat{y}_k$ but greater than zero

where $\hat{y}_k$ is equal to the maximum amount of taxable income possible and PZ_k, $\hat{y}_k$, and the a_{ik}'s are the parameters of the distribution to be estimated. The subscript k is to denote the characteristics of the absent parent. For this report, we assumed that there were 32 types (4 age classifications, 4 education classifications, and 2 race classifications) of absent parents. The seven parameters of the distribution were estimated for each of the 32 classifications using the population of all males in the SIE. Once these seven parameters were estimated, the relevant pdf for the distribution of taxable income can be written as

$$f_k(y) = 1/\hat{y}_k + \sum_{i=2}^{6} a_{ik}(y^{i-1} - \hat{y}_k^{i-1}) \text{ for } 0 < y \leq \hat{y}_k$$

Once this distribution or pool of absent parents had been created, they needed to be "matched" to the records of the children and custodial parents. To accomplish this match, we estimated the probability that a custodial parent with a given set of characteristics would have "mated" with a person with another set of characteristics. Denoting this probability as PM_{jk} where j is the characteristics of the custodial parent and k is the characteristics of the absent parent, and utilizing the same 32 classifications as before, we then estimated the set of PM_{jk}'s on the basis of how married couples were observed to be mated on the SIE. It should be noted that

$$\sum_{k=1}^{32} PM_{jk} = 1.$$

Once these preliminary estimations have been performed, we can compute the expected tax revenue from the absent parent of a child whose custodial parent has characteristics j as

$$T_{AS} = \sum_{k=1}^{32} PM_{jk}(1 - PZ_k) \left[t_{AS} \int_{EXMP_{AS}}^{MIN(\hat{y}_k,\ YM_{AS})} (y - EXMP_{AS}) f_k(y)dy\right].$$

It should be noted that this calculation assumes that the absent parent can be located.

Weaknesses. All estimates assume full reporting of income. One plausible assumption is that there is a greater chance of underreporting of income by those with self-employment income, since the tax is to be administered through a wage withholding system. This has not yet been incorporated into the estimates.

No matching adjustment has been made for the female absent parents. Presently, each male custodial parent is matched with a distribution of income for females with the same characteristics. As a consequence, tax revenues from this group are overestimated. Since little revenue is raised from this group anyway, the overestimate is small.

Calculation of Benefits Paid to the Children (B)

Benefits are calculated for each filing unit, based on the number of eligible children in the unit and the expected tax liability of the absent parent. Then benefits for each unit are summed to give an estimate of total outlays. All eligible units are assumed to participate in the program.

Method. First, the minimum benefit for a filing unit is computed by summing the minimum benefit for the first child with an additional increment for each eligible child other than the first. The benefit to that family then equals the minimum benefit plus the expected absent parent tax liability in excess of the minimum times the possibility that the absent parent has income in excess of the minimum. This benefit is calculated for each category of absent parent, and then weighted by the probability that a person with those characteristics would be married to the custodial parent.

In summary, the benefit calculation can be expressed as

$$B = \sum_{k=1}^{32} PM_{jk}(1 - PZ_k)\Big[MB \int_{0}^{CY} f_k(y)dy + t_{AS} \int_{CY}^{LB} (y - EXMP_{AS})\, f_k(y)dy$$

$$+ MXB \int_{LB}^{\hat{y}_k} f_k(y)dy\Big]$$

where

$$CY = MB/t_{AS} + EXMP_{AS}$$

$$LB = MIN(\hat{y}_k, YM_{AS}), \text{ and}$$

$$MXB = t_{AS} \cdot YM_{AS}$$

Calculation of the Tax Liability of the Custodial Parent (T_{CP})

When revenue collected from the absent parent is less than the minimum benefit amount, the custodial parent is taxed on his personal income. The difference between the amount of revenue collected from the absent parent and the minimum benefit amount is the maximum tax liability of the custodial parent. Thus, the calculation of the tax liability of the custodial parent depends upon the minimum benefit amount and the distribution of income associated with the absent parent.

Method. The definition of taxable income is all wages and salaries of the adults and all nonincome-tested transfer income of the family. If the absent parent has no income, then the custodial parent is liable for the entire minimum benefit amount; if the absent parent's income times his tax rate exceeds the minimum benefit and he is paying at least the minimum benefit, then the tax liability of the custodial parent is zero; if the income of the absent parent is between these two extremes, then the custodial parent pays the difference between the minimum benefit amount and the tax revenue from the absent parent. Thus, the tax liability of the custodial parent is the probability that the absent spouse has no income, times the custodial parent's income times the tax rate, plus the probability that the absent parent has some income that, times his tax rate, is less than the minimum benefit, times the custodial

parent's income times the tax rate. The expected custodial tax liability is calculated for each category, then weighted by the probability that a person with the same characteristics as the custodial parent would be married to a peron with the characteristics defining the pool of absent parents.

In summary, the computation of the tax liability of custodial parent characteristics j is equal to:

$$T_{CP} = \sum_{k=1}^{32} PM_{jk} \left[MTX \left(PZ_k + (1 - PZ_k) \int_0^{EXMP_{AS}} f_k(y)\, dy \right) \right.$$

$$\left. + (1 - PZ_k) \int_{EXMP}^{CY} MIN(MXT,\ MB - t_{AS}(y - EXMP_{AS}))\, f_k(y) dy \right]$$

where

$$MTX = MIN(MB,\ t_{CP}\ MIN\ (YM_{CP},\ MAX(0,\ Y_{CP} - EXMP_{CP})))$$

$$CY = MB/t_{AS} + EXMP_{AS}.$$

Calculation of the Savings in Means Tested Programs (S_{AFDC})

The AFDC benefit amounts reported on the survey suffer from under-reporting and do not reflect changes in benefit levels (or eligibility rules) which have occurred since 1975. Thus, for each filing unit reporting receipt of AFDC benefits in 1975 the maximum benefit level for 1980 is assigned according to family size. Since child support payments are taxed 100% by AFDC rules, the savings resulting from the additional child support collections of this program would result in a dollar for dollar savings, up to the maximum AFDC benefit amount.

Method. For each filing unit reporting receipt of AFDC benefits, the reduction in AFDC benefits is calculated as the ratio of the child support benefit amount to the AFDC maximum benefit amount, times the child support benefit amount. The sum of these reductions across all units estimates potential AFDC savings. From this total is subtracted the $29.05 million in child support payments collected through Title IV-D.

Weaknesses. The number of families reporting receipt of AFDC benefits on the SIE is too low. If there were a control number for the number of families receiving any AFDC during the year, the weights could be adjusted accordingly. However the data presently available provide information on monthly caseload only. This problem results in a substantial underestimate of AFDC savings.

On the other hand assigning the maximum benefit amount of each family does not take into account reduced benefit levels for working recipients. This problem results in an overestimate of AFDC savings. The benefit reduction attributable to working parents would need be calculated by simulation of the AFDC program rules.