Child Support, Welfare Dependency, and Women's Labor Supply

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This study evaluates the potential effectiveness of alternative child support policies in reducing welfare program participation. Employing longitudinal data from the Panel Study of Income Dynamics, the analysis addresses the simultaneity of women's decisions regarding welfare participation, labor force participation, and annual hours of work following marital breakup. The estimation framework accounts for the endogeneity of child support payments with female labor supply and for the selection bias due to differential rates of remarriage among divorced/separated women. Results show that higher child support payments would (i) decrease AFDC participation and (ii) increase average hours of work. The empirical estimates are used to assess the potential effects of adopting alternative child support policies such as the Wisconsin child support assurance system. These results suggest that large potential AFDC cost savings are attainable but significant reductions in welfare participation rates would only be achieved through substantial improvements in child support enforcement or through government-assured child support payments.

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1. Introduction

Policy efforts to alleviate poverty among single-parent families have taken place along two lines: (i) defining and enforcing private child support obligations[1] and (ii) providing income support through an array of government-funded welfare programs including Aid to Families with Dependent Children (AFDC), Food Stamps, Supplemental Security Income, and General Assistance. Federal, state, and local governments have strong budgetary incentives to increase the proportion of income support for single-parent families coming from absent parents vis-a-vis the proportion of support coming from welfare programs. A large gap exists between court-awarded support payments and payments actually received by mothers: in 1989, $11 billion was paid to custodial mothers, while $16 billion was owed legally. In contrast, aggregate AFDC benefit payments were $16 billion in that year. Furthermore, the overlap between those families receiving AFDC benefits and those receiving child support payments is small -- fewer than one in five AFDC families receive private child support at the same time.[2] Public assistance is largely a *substitute* for, not a supplement to, private support payments.[3]

Interest in child support reform has increased because the failure of private individuals to provide income support increases the burden on public income transfer programs. A second major reason child support reform is desirable is that keeping women with children off of AFDC improves work incentives. The high benefit reduction rate (or the "claw-back" rate) of the AFDC program means that a woman on AFDC earning an extra dollar of income typically sees her total post-welfare

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[1] Child support obligations are obligations usually established following marital separation or divorce that require one parent to make cash support payments to the parent who has primary custody of the children. Support obligations may also be established in cases in which the parents were never married.

[2] Survey datasets may understate the extent of simultaneous receipt of child support and AFDC benefits because welfare recipients' child support checks are typically sent directly to the welfare agency. In such cases, the mothers may not know how much child support is being paid during the months they are on AFDC.

[3] In fact, AFDC program rules explicitly reduce benefits dollar-for-dollar with increases in child support payments, with the exception of a monthly $50 child support disregard in effect since 1984.

income rise by a small fraction of the extra dollar. If child support payments, combined with earnings and other sources of nonwelfare income, are sufficiently high to keep a woman off of the welfare rolls, her earnings are not implicitly taxed at such high rates. Thus, child support reform is desirable because it may both reduce public welfare expenditures and avoid the distortionary effects embedded in the AFDC benefit formula.

A few authors have provided insight into the connection between child support outcomes and welfare program participation (See Robins (1986), Bergmann and Roberts (1987), Graham and Beller (1989), Oellerich *et al.* (1989), Garfinkel *et al.* (1990), and Nixon (1994)). Others have estimated the impact of proposed reforms of the child support system on female labor supply (See Beller and Graham (1985), Graham and Beller (1989), Garfinkel *et al.* (1990), and Graham (1990)). With the exception of Graham and Beller (1989) and Graham (1990), all of these previous studies have disregarded the possibility that child support outcomes, labor supply, and welfare program participation are jointly determined. Unobserved heterogeneity across families introduces simultaneous-equations bias in conventional estimates of the effect of child support income on women's economic decisions. What is furthermore lacking in all of these studies is information on *both* parents' characteristics in a nationally representative sample. As explained in more detail later, the incomes of both parents are important determinants of how much child support income a custodial parent receives, and this in turn affects the behavior of interest -- female labor supply and welfare recipiency.[4]

In this study, I use data on matched pairs of husbands and wives from the Panel Study of Income Dynamics (PSID) who experience marital breakup to determine the potential effects of child support reforms on female labor supply and welfare recipiency. My empirical framework addresses

[4] Although the custodial parent may well be the father, such cases are still relatively rare and no datasets are large enough to study fathers receiving child support. Thus, in the rest of this study, I equate the custodial parent with the mother.

the endogeneity of child support payments in women's labor market decisions. This study also corrects for the selectivity bias in analyzing welfare participation and labor supply decisions over time due to the fact that remarriage rates among divorced/separated women may not be unrelated to factors affecting labor market choices. The statistical analysis recognizes the simultaneity of women's decisions regarding remarriage, welfare participation, labor force participation, and hours of work. In this way, I demonstrate that child support policies that increase support payments would (i) decrease AFDC participation and (ii) increase the proportion of divorced/separated mothers who work. Despite some reductions in hours of work among non-welfare mothers, the net effect on aggregate hours of work is positive--increases in child support income imply increases in average hours of work.

Finally, I assess the likely effects on female welfare participation and work behavior of alternative child support policies determining the level of support obligations. The use of data on matched ex-husbands and ex-wives allows more meaningful evaluations of alternative child support regimes than have been conducted by other researchers lacking such data. Results show that significant impacts on the fraction of women who work and on welfare participation are achievable only through improvements in child support collections for mothers who currently receive nothing or through government-assured support payments. Nevertheless, significant savings in welfare benefit payments may be achieved even without dramatic improvements in child support collections.

2. Child Support Policy[5]

Some attention by economists has been devoted to predicting the effects of adopting alternative guidelines for setting child support obligation amounts. The most prominent policy analyzed is the Wisconsin Child Support Assurance System, which incorporates a percentage-of-

[5] For detailed discussions of the history of federal child support policy, see Kahn and Kamerman (1988) and Committee on Ways and Means (1993).

income standard and a minimum, government-assured benefit for each family in case of non-payment. The empirical analysis conducted in this study allows one to predict the effects of adopting such a policy nationwide, allowing for simulated changes in both award levels and actual payments received by custodial parents.

Although changing award levels is clearly a primary method for affecting the well-being of single-mother families, other policy tools may be quite effective. In particular, the use of immediate wage withholding may both increase the amount of support payments collected from absent fathers and make the payments occur on a more regular, reliable basis. The timing of payments is important in two respects. First, a mother is better able to plan a family budget from month to month if child support payments do not vary wildly from month to month. This becomes especially important if the mother has few liquid assets to help offset swings in child support income. Second, the timing of payments affects the amount of AFDC benefits that a mother may collect. Suppose that a mother initially receives no child support payments and instead receives AFDC benefits for one month. If, in the second month, the father pays an amount equal to two months' support obligation, the mother may only receive the first $50 of this child support if she remains on AFDC. The remainder would be divided in the following way: (i) to offset current AFDC benefits, (ii) to pay the rest of the current month's support obligation to the mother, (iii) to offset past AFDC benefits, and (iv) to pay past months' support obligations to the mother. Assuming that AFDC benefit payments are sufficiently higher than each month's support obligation, the mother would receive only $50. If, on the other hand, the mother was on AFDC *and* received the monthly support obligation in each month, she would have kept $50 in child support *in each month*. Thus, even if the father pays the full obligation, a mother on AFDC may lose several months' $50 child support disregard due to the treatment of delinquent payments.

Although increasing the frequency of child support payments is clearly an important benefit of child support enforcement, an analysis of the effect of wage withholding on women's well-being is beyond the scope of this study. This analysis uses only annual information regarding child support payments. For examples of recent research regarding the effects of income withholding, see Garfinkel and Klawitter (1990), Danziger and Nichols-Casebolt (1990), Gordon (1992), Klawitter and Garfinkel (1992a), Meyer and Bartfeld (1992), and Garfinkel and Robins (1993). These studies suggest that income withholding has positive effects on child support collections (or collection rates), although there is a large variance in the estimated magnitude of these effects. Reduced-form econometric work (Klawitter and Garfinkel (1992b) and Maritato and Robins (1992)) suggests little systematic relationship between routine income withholding, AFDC participation, and labor supply of custodial parents.

Many other policy tools beyond the award structure and wage withholding are available and may in fact have substantial impacts on child support outcomes. For instance, the Family Support Act's requirement that social security numbers of both parents be taken when the birth certificate is issued may result in long-run improvements in the ability to locate absent fathers and collect child support obligations. Alternatively, moves toward more frequent updating of child support awards may result in increased payments if fathers tend to undergo earnings increases over time. Updating of awards may also be desirable if fathers experience earnings declines, so that child support obligations would be adjusted to reflect the fathers' reduced ability to pay; fathers may be more willing to pay obligations they perceive to be fair. From the point of view of enforcement activities, little is known about what types of expenditures result in the best improvements in child support collections. For instance, state agencies have the option of investing money in legal staff to help obtain support obligations or in detectives to help locate absent parents, but the relative cost-effectiveness of these strategies is not well understood. Indeed, merely changing the administrative jurisdiction of child support activities may make a difference; some children's rights advocates favor a system in which all child support collections are made through the state or federal income tax authorities, rather than letting the obligees pay privately, through court clerks, or through welfare agencies.

3. Theoretical Effects of Child Support on AFDC Participation and Labor Supply

This section describes the various effects of child support on welfare participation and labor supply suggested by economic theory. Theory suggests that increases in child support income will (i) decrease welfare participation, (ii) increase the likelihood of working, and (iii) have an ambiguous effect on total hours of work. This discussion serves to motivate the statistical model presented in the following section of the paper. The usual consumption-leisure diagram is the most convenient way to demonstrate women's decisions regarding welfare and work. While utility maximizing behavior is assumed, one does not need to postulate a specific utility function in order to illustrate the effects of interest. Moreover, the non-convexity of the budget set in the presence of AFDC makes a rigorous mathematical analysis using either a utility function or a labor supply function needlessly complex.

3.1 Graphical Analysis

Figure 1 shows the effects of an increase in child support income on a divorced mother's budget constraint. For simplicity, the woman is assumed to have no non-labor income initially and the AFDC earnings disregards for work expenses and child care are ignored. In the absence of AFDC, her opportunities are represented by the line OBX, the slope of which is equal to (minus) the wage rate. The AFDC budget constraint is represented by OGBX. The length of the segment OG is the guarantee level and point B is the breakeven point; the slope between G and B is $-(1-t)W$ where t is the AFDC benefit reduction rate. Suppose the woman receives an increase in child support payments equal to the length of OC. The woman who is initially at point 1 -- off AFDC and working positive hours -- will decrease her hours of work by moving to point 2, assuming leisure is a normal good. This is a typical negative income effect on hours of work. Most AFDC recipients are located at point G -- on welfare and working zero hours. If child support payments are large enough, it is possible for a woman's choice of work hours to jump discontinuously from point G to point 2. For such a woman, child support income has three effects: it increases her income opportunities, leads her to leave the welfare rolls, and induces her to start working in the labor market. It should be noted that the change in AFDC participation has two components. First, the increase in child support payments reduces the breakeven point from B to B′. This may be called a "mechanical" effect following the terminology of Ashenfelter (1983), because it reduces AFDC eligibility and hence participation without any change in economic behavior. Indeed, child support payments combined with other non-labor income may become large enough that the woman becomes ineligible for any AFDC benefits, even if she works zero hours. Second, child support payments lead to an overall steepening of the budget constraint; the increase in the effective hourly wage rate increases welfare mothers' incentive to work.

Figure 2 illustrates the probable impact of child support payments for a woman who initially works positive hours and receives AFDC benefits. Starting at point 1, the woman can increase her total income without changing her work hours, because the new budget constraint lies above the AFDC budget constraint at those hours of work. However, the increase in her effective wage rate induces substitution away from leisure, so that the woman chooses to increase her hours of work to point 2. Like the case in which a woman moves from point G to point 2, this increase in hours of work is simultaneous with the woman's exit from the AFDC program. The difference is that the woman in Figure 2 does not move from a state of zero hours of work to positive hours.[6]

3.2 Labor Supply and Welfare Participation Model

The theoretical basis of the empirical analysis in this study is a woman's labor supply function $H^*=H^*(X,W,CS,Y)$, where H^* represents her desired hours of work, X is a vector of demographic characteristics, W is her pre-tax wage rate, CS is child support income, and Y is other non-labor income. As shown in Figures 1 and 2, AFDC participants face a different budget constraint from that faced by non-participants. Thus, one may expect women's observed responses to X, W, CS, and Y to differ between women on AFDC and women off AFDC.[7] Assuming a linear form for H^*:

$$\begin{aligned} H_A^* &= X\theta + \alpha_A W + \gamma_A CS + \delta_A Y + \xi_A \\ H_B^* &= X\theta + \alpha_B W + \gamma_B CS + \delta_B Y + \xi_B \end{aligned} \qquad (1)$$

H_A^* and H_B^* represent desired annual hours of work for women on and off AFDC, respectively.[8] α_A and α_B differ because AFDC program rules impose a high implicit tax rate on earnings. One would expect γ_A and γ_B to differ because AFDC benefits typically decline dollar-for-dollar with increases in non-labor income *while a woman is on AFDC*, while the tax rate on unearned income for women

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[6] In the above analysis, the $50 monthly child support disregard in the AFDC program rules since 1984 has been ignored. When the disregard is taken explicitly into account, a woman on AFDC and not working may have her after-welfare monthly income increase by $50 with no change in work hours, and the new breakeven level of hours would lie between B and B'. The same mechanical and behavioral effects may occur, although the discrete jump between points G and 2 is less likely to take place. In general, the likelihood of leaving AFDC depends positively on the amount of child support received. However, the magnitude of the concomitant increase in work hours depends negatively on the amount of support payments due to the negative income effect.

[7] Moreover, the use of annual data in this study means that women on AFDC may be switching between segments of the budget constraint from month to month. The estimation of two hours equations recognizes this possibility.

[8] It is important to note here that because the *observable* measures of wages and non-labor income are pre-tax measures, the labor supply function parameters incorporate the tax rates these women face. With non-linear tax schedules, these parameters will in reality not be fixed values.

off AFDC is much lower. Child support and other non-labor income are treated separately for three reasons: (i) AFDC rules incorporate a monthly \$50 disregard of child support income, while no disregard applies to other forms of non-labor income, (ii) child support income is usually not taxable income, and (iii) child support income is a more uncertain form of income for women. These two structural equations allow us to determine the average effect of increases in child support income on desired annual work hours for women on AFDC and women off AFDC. Furthermore, they allow us to measure the impact of support payments on the probability of working, as distinct from the amount of hours actually worked; equations (1) may be estimated as tobit equations, where $H^* \leq 0$ implies the woman does not work. The coefficients γ_A, γ_B, δ_A, and δ_B do not have usual interpretations as income effects on labor supply, because the equations incorporate (unobserved) features of the budget constraint.

Selection between the two labor supply equations may be summarized by a reduced form index function:

$$A^* = X_A \Pi_A + u_A \qquad (2)$$

where X_A includes measures of child support and other non-labor income. This equation reflects a woman's indirect utility from participating in AFDC. If $A^* > 0$, then she receives welfare benefits and chooses labor supply H_A^*. The error term u_A is expected to be correlated with the error terms in the hours-of-work equations.

As described above, the expected signs of the child support coefficients are $\gamma_A > 0$ and $\gamma_B < 0$. An important feature of this prediction is the fact that H_A is a measure of annual hours for women who are on AFDC at any time during the year. The use of annual aggregates means that a woman initially on AFDC who receives more child support income may decrease the number of months that she receives AFDC but still be classified as "on AFDC." The decrease in the number of months on AFDC is the basis for the expected increase in annual hours worked H_A. $\gamma_A > 0$ is the result of time-aggregation of the data and does not represent an underlying positive income effect on labor supply. If the same model were applied to monthly data, we would expect the coefficient γ_A to capture the negative income effect *along* the AFDC budget constraint.[9] The increase in labor supply associated with moving from point G to point 2 in Figure 1 would then be captured through a regime shift from H_A to H_B.

4. Empirical Framework

Because this study is interested primarily in income effects on hours of work, I substitute the exogenous determinants of W^{10} in equations (1) to obtain:

$$\begin{aligned} H_A^* &= X\beta_A + \gamma_A CS + \delta_A Y + \epsilon_A \\ H_B^* &= X\beta_B + \gamma_B CS + \delta_B Y + \epsilon_B \end{aligned} \quad (3)$$

Estimating equations (3) eliminates the need to predict offered wage rates for women who are not observed to work. (Identification of the wage rate coefficients α_A and α_B could be achieved through exclusion restrictions on the vector X or special functional form assumptions on the wage or hours equation.)

4.1 Endogeneity

In the above equations, the level of child support payments may be endogenous. The amount of support payments received by a woman is likely to be correlated with the error terms ϵ_A and ϵ_B. The method of determining the size of a child support award in many states incorporates information about the mother's past labor market earnings and future earnings prospects. Thus, unobserved factors that affect a woman's propensity to work after marital breakup may be correlated with the

[9] That is, this coefficient would represent the movement of AFDC recipients from positive hours to fewer hours as well as the null effect of women who continue to work zero hours after an increase in child support income.

[10] Such determinants include age, education, race, unemployment rates, and geographical dummy variables.

amount of child support she receives. This potential endogeneity of child support payments is addressed by an instrumental variables procedure, where the instruments include the women's and the fathers' characteristics and a series of child support policy variables that vary across states and over time.

The use of the father's characteristics as instruments may not be desirable if assortative mating is strong, i.e., if men and women with similar labor supply propensities and labor market prospects tend to marry each other. Assortative mating is also a potential source of endogeneity. Because child support awards are almost always a function of fathers' incomes, child support payments would be related to unobserved heterogeneity in the mothers' labor supply if husbands and wives tend to be very similar. This issue and its implications for my estimates are addressed more thoroughly in Section 6.

4.2 Selectivity

In order to obtain consistent estimates of the parameters β_A, β_B, γ_A, γ_B, δ_A, and δ_B, issues of selection bias must be addressed. First, women's choices of whether to receive AFDC benefits are likely to be correlated with their labor supply; this simultaneity is dealt with by estimating equation (2) jointly with the hours-of-work equations.

Second, this study analyzes the labor supply and welfare choices of *unmarried* women only. The set of women who are unmarried five years after divorce may be expected to differ from the set of ever-divorced women. These differences in remarriage rates may be systematically related to women's choices regarding both AFDC participation and labor supply. For instance, women with stronger career goals may tend to remarry less frequently. Although several authors have analyzed the dynamics of welfare participation using duration analysis, no studies have accounted empirically for the possibility that differential rates of remarriage alter the AFDC-eligible population over time and welfare spell duration. Not accounting for heterogeneity in remarriage may be important in that factors determining remarriage are likely to be related also to women's labor market behavior; estimating labor supply functions on a non-random sample of divorced women would yield inferences that cannot be generalized to the population at large. This study takes a theoretically simple approach to incorporate remarriage selection effects. One can expand the three-equation model for welfare participation and hours of work by adding the following equation:

$$M_t^* = X_{Mt}\Pi_{Mt} + u_{Mt} \tag{4}$$

where the woman chooses to remain unmarried during years *1* through *t* if $M_t^* > 0$. If the woman remains unmarried in year *t*, then we observe her choice of AFDC participation and her hours of work.[11] As in the hours-of-work equations, child support income enters as a regressor in the index functions for AFDC and remarriage probabilities, and it may be endogenous. This endogeneity is addressed by using the predicted value of support payments instead of actual child support income.

4.3 Empirical Specification

To summarize, we have the two structural equations defining desired hours of work for women on AFDC and women off AFDC, two selection equations determining whether a woman is unmarried in each year and whether she receives AFDC, and an equation to predict the level of child support payments in each year:

$$\begin{aligned} H_{At}^* &= X_t\beta_{At} + \gamma_{At}CS_t + \delta_{At}Y_t + \epsilon_{At} \\ H_{Bt}^* &= X_t\beta_{Bt} + \gamma_{Bt}CS_t + \delta_{Bt}Y_t + \epsilon_{Bt} \\ M_t^* &= X_{Mt}\Pi_{Mt} + u_{Mt} \\ A_t^* &= X_{At}\Pi_{At} + u_{At} \\ CS_t &= Z_t\alpha_t + \epsilon_{Ct} \end{aligned} \tag{5}$$

This system of equations is estimated for each year following marital breakup. That is, the estimation is performed first for women during the first year after breakup, then separately for

[11] For the most part, remarried women do not have the option of receiving AFDC benefits. Although one can still examine labor supply choices of remarried women, such women probably have different labor supply functions. Work behavior of remarried women is not analyzed in this study.

women during the second year following breakup, and so on for a total of five years.[12] In this way, several estimates of the labor supply parameters are generated. In principle, these parameters may be restricted to be invariant over time. In practice, if the estimates vary considerably over time, then one has reason to believe that the dynamics of female labor supply following marital separation depend on factors not controlled for in the remarriage and AFDC selection equations. Such factors may include a woman's recent (post-divorce) work experience or her enrollment in welfare-related training programs.

A two-step procedure is used to estimate equations (5). The child support payments equation is estimated first, and then the fitted values are substituted into the first four equations in (5). Joint maximum-likelihood estimation of these first four equations in (5) is performed using a semi-parametric approximation of the joint density of the error terms as presented by Mroz and Guilkey (1992). A brief summary of the procedure and the associated likelihood function for the model are presented in Appendix A. The error terms ϵ_A, ϵ_B, u_M, and u_A are allowed to be mutually correlated, and joint normality is not assumed. Mroz and Guilkey show that this method performs favorably relative to other estimation methods, including maximum likelihood assuming joint normality. In this particular model, the discrete factor parametrization is an attractive option because it is a flexible way of incorporating unobserved heterogeneity, which is the most important source of correlation among the error terms. The specified joint density is also more desirable than joint normality because the covariate vector in each equation includes a continuous-valued predictor of a censored variable (child support income). If the underlying error terms are multivariate normally distributed,

[12] The number of female heads of households observed five years after divorce is small -- less than 300 -- due to two factors: (i) no women are observed after the 1988 PSID interview, in which information regarding income in 1987 is collected, and (ii) a substantial fraction of women remarry within five years, as shown in Table 1.

then the composite error terms after substituting predicted for actual child support payments cannot be multivariate normal.[13]

5. Data

The data used for this analysis is extracted from the Panel Study of Income Dynamics (PSID), a longitudinal survey conducted annually since 1968. The survey provides detailed information regarding labor supply and earnings, unearned income, participation in welfare programs, and demographic characteristics for each household's head and spouse, as well as less detailed information on other household members. This dataset is particularly well-suited for this study because it allows one to correlate a woman's child support income with the characteristics of her ex-spouse.[14]

The sample used in this analysis is the set of women with children 18 years old or younger who experienced marital breakup[15] -- either divorce or separation -- and became heads of households between 1969 and 1987.[16] For women observed to divorce twice within the sample period, statistics refer to the most recent marital breakup. Table 1 presents summary statistics for the 665 women selected in this way with non-missing data for key variables.[17,18] All dollar amounts are deflated by

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[13] For instance, the error term in the AFDC participation equation becomes $u_A + \Pi_A \hat{\epsilon}_c$, where $\hat{\epsilon}_c$ is the prediction error from the child support payments regression and whose density has a mass point due to the fact that about half of the women in the sample receive exactly zero child support income.

[14] Income data for ex-husbands are available only for pre-divorce years, because the PSID does not follow both husband and wife after marital breakup unless they were married at the beginning of the survey in 1968.

[15] Although never-married mothers comprise a significant portion of the welfare rolls, fewer than one in five receive child support payments. Thus, the effect of child support income on welfare participation and labor supply are mainly in evidence among divorced and separated mothers. Furthermore, information on the partners of never-married mothers are not available.

[16] The sample also includes women who ended cohabitation with a male partner. For several of the sample years, the survey classified female cohabitors as wives after the first year of cohabitation.

[17] Three observations with very high father's earnings and high child support/alimony payments were omitted because they had a large influence on the child support payments equations.

the Consumer Price Index to represent constant 1992 dollars. "Year 1" refers to the first year in which the woman is a head of household, "year 2" statistics are for women who remain unmarried for at least two years, and so on; thus, across these rows indexed by year, the composition of women changes. In this table and in all subsequent statistics, the data are weighted by PSID sample weights to compensate for the non-randomness of the PSID sample in each survey year. Figure 3 shows the (weighted) frequency distribution of child support payments among those women who received payments in the first year following marital breakup; this chart excludes the 48 percent of mothers who received no child support in the first year. A woman is classified as an AFDC participant if she reported receiving more than $500 of AFDC benefits in a given year. Additionally, if the woman received more than $500 of "other welfare" income in a given year and more than $500 of AFDC benefits in another year, then the other welfare income is classified as AFDC benefits. This definition is similar to Bane and Ellwood's (1983) definition of AFDC participation, which uses $250 (1978 dollars) as the cutoff. This definition counts only women who received a substantial amount of AFDC benefits and recognizes potential misreporting of AFDC benefits as other welfare income. Finally, data on unemployment rates and maximum AFDC benefits for a family of four for each state and each sample year were matched with each woman's state of residence in each year.[19]

Table 2 compares women who received some child support income[20] with women who received no support payments during the first year after marital breakup. Women who received some support payments were more highly educated, were more likely to work, had higher earnings, and were less likely to receive AFDC benefits. Moreover, the ex-husbands of women receiving child

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[18] Appendix B provides comparisons of this uniquely selected PSID sample with cross-section data from the Current Population Survey and the Survey of Income and Program Participation.

[19] These last data were generously provided by Hilary Hoynes. The AFDC benefit data were compiled by Robert Moffitt, and the state unemployment rates were compiled from Bureau of Labor Statistics data.

[20] In this study, I include alimony payments with child support. For several years of the PSID, child support and alimony income are not reported separately. Analysis for years in which they are reported separately shows that using child support income alone does not significantly change the results.

support earned approximately $10,000 more per year before divorce than the ex-husbands of women receiving no support payments. Total family income in year 1 for women receiving child support was $7,400 more than for women not receiving child support.

The importance of selection bias due to heterogeneity in remarriage rates can be judged in a coarse way by analyzing summary statistics. Table 1 shows that female heads in the first year following marital breakup worked an average of 1311 hours per year. These are women who may have remarried either in year 2 or many years later. In contrast, women who remained single heads of households for the full five years of analysis worked an average of 1385 hours during their first year as head of household. The selectivity in AFDC participation rates can also be seen: women who remained unmarried for five years had a 26 percent participation rate in AFDC during the first year, while all female heads in the first year had a rate of 21 percent. Thus, women who remain single mothers for a longer period of time both tended to work more and were more likely to receive AFDC benefits. Of course, at least some of the differences are due to differences in *observable* characteristics like education and number of children; the importance of selectivity for inferences about the effects of child support will be evaluated in the next section.

6. Empirical Results

This section describes the estimates of the equations set forth in Section 4. As described earlier, the equations for predicted child support payments, welfare participation, labor supply, and remarriage are estimated for each of the first five years following marital breakup. All standard errors in Appendix Tables 3 through 6 are corrected for the fact that the child support variable is an estimated quantity (See Newey (1984) for a brief discussion.). Tests of endogeneity are discussed in Section 6.5, and results from alternative empirical models are presented to evaluate the robustness of the central inferences of this study.

6.1 Instruments for Child Support Payments

F-statistics for the first-stage regressors are shown in Table 3. Full results are reported in Appendix Table 2. The F-tests show that the father's characteristics (age, education, and pre-divorce earnings) are always jointly significant (at five percent significance). Following the work of Garfinkel and Robins (1993), variables describing individual states' child support regulations over time were also used as instruments for child support income. These variables indicate whether a state had adopted guidelines for support orders, whether a state enforcement agency charged a fee for services for non-AFDC clients, whether a state allowed paternity to be established until a child's eighteenth birthday, whether a state required wage withholding upon delinquency, and whether a state agency was required to petition for health insurance with cash support orders. The child support policy variables are jointly significant at the ten percent level for the first two years following marital breakup.

The use of the father's characteristics--especially earnings--as instruments is not strictly valid if assortative mating is present. Suppose, in the extreme, that husbands and wives had identical labor market earnings. Then using the father's pre-divorce earnings as an instrument for child support payments would re-introduce endogeneity in the remarriage, AFDC, and labor supply equations. The degree to which this is a problem depends on the strength of assortative mating. Some evidence suggests that my procedure does not introduce significant bias in the estimates of equations (5). Mroz (1987), in a study of married women, found that measures of non-wife income (including husband's earnings) were not endogenous in the wife's labor supply equation. Moving from these findings to a sample of divorced women in which the ex-husband's earnings enters as an instrument for child support, it is unlikely that assortative mating results in significant bias in this study's estimates. The direction of bias is unambiguous for the AFDC and labor supply equations. Recall that ex-husband's earnings enters with a positive coefficient in the child support equation. In the

AFDC equation, the child support coefficient would be biased negatively, because AFDC participation and propensity to work are negatively related. Thus, this coefficient is an overestimate; given that we find a small estimated effect, the presence of bias would only reinforce the qualitative finding. In the labor supply equation for AFDC women, child support income is expected to have a positive effect; positive assortative mating means that the estimate is biased positively, again implying an overestimate. In the labor supply equation for non-AFDC women, the direction of bias is again positive, implying that the negative income effect is ***understated***.

Table 4 summarizes the estimated coefficients on child support income in the remarriage, AFDC and work equations. Although the estimated equations provide unconditional estimates of the labor supply parameters, we are also interested in evaluating the effects of child support conditional upon marital status and AFDC participation. Moreover, we are interested in analyzing changes in observed work hours, not merely desired work hours H^*. The statistics in Table 4 report the set of relevant conditional effects. Appendix C provides a detailed description of each of these measures. Child support income has a minute effect on remarriage probabilities. A $1,000 increase in annual child support payments is estimated to decrease AFDC participation by 3 to 4 percentage points on average, and to increase overall hours of work by between 9 and 53 hours per year. Large hours-of-work responses are estimated for AFDC recipients, which is likely due to women continuing to receive AFDC at some point during the year but being self-sufficient (working) for a greater fraction of the year.

6.2 Remarriage Selection Effects

The remarriage index equation estimates are presented in Appendix Table 3. Other researchers (Sawhill et al. (1975); Hannan, Tuma, and Groeneveld (1977); Bahr (1979); Hutchens (1979); Mott and Moore (1983)) examining rates of remarriage have found that AFDC participation is negatively related to remarriage probabilities. However, this work does not recognize the potential endogeneity of work, welfare participation, and remarriage that is outlined in Section 4. Hoffman and Duncan (1988) found that state AFDC benefit levels do not seem to affect remarriage decisions significantly. The specification used in this study excludes from the remarriage equation endogenous variables indicating whether the woman worked or received AFDC either before or after divorce. The unemployment rate and maximum AFDC benefits had insignificant estimated effects on remarriage; thus, no evidence is found to suggest that economic opportunities such as the employment rate of marital prospects or the generosity of public assistance programs significantly affects remarriage decisions.

The effect of non-labor income on remarriage can be thought of as an amalgamation of two separate and opposite effects. First, higher income may increase a woman's ability to live independently and hence decrease her desire to remarry. This is especially true for "non-portable" forms of income, such as alimony and to some extent child support[21], that tend to decrease or cease altogether when the woman remarries. On the other hand, higher unearned income may make a woman a more attractive marital partner. In particular, increases in child support income may decrease welfare participation and induce increased labor supply, which in turn means increased earnings and better marital prospects. The estimated coefficient on child support income was statistically insignificant in each year, and the estimated magnitudes were small. Beller and Graham (1993) similarly found that receipt of child support typically reduced the probability of remarriage but that this effect is negligible. This evidence suggests that the "independence" effect outweighs the "attractiveness" effect. Other non-labor income, on the other hand, was found to be associated with women remarrying more quickly after marital breakup. The difference between the effect of child support and the effect of other non-labor income is consistent with the interpretation that child

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[21] That is, ex-spouses may seek to reduce or eliminate child support obligations if the mother marries another man.

support is less "portable" and hence has a stronger independence effect. Given this interpretation, we would expect child support income to have a less positive effect on remarriage probability than other forms of non-labor income. This expectation is borne out in Appendix Table 3's estimates.

6.3 AFDC Participation

Regressors in the AFDC participation equation include the woman's demographic characteristics; the state's maximum monthly AFDC benefit for a family of four; the state unemployment rate; predicted child support income; and other non-labor, non-welfare income. Estimated coefficients are reported in detail in Appendix Table 4. Child support income was found to decrease AFDC participation in each year. These effects were statistically significant but not large in magnitude. In the first year after marital breakup, an additional $1,000 of child support income for all women would reduce the probability of being on AFDC, conditional upon being unmarried, by about 3 percentage points. Other forms of non-labor income also had negative effects of the same order of magnitude as child support income on the probability of AFDC participation.

As noted in Section 3, at least part of the effect of child support income on AFDC participation is likely to be a mechanical effect due to changing eligibility. The empirical framework used in this study does not allow a direct evaluation of the relative sizes of the mechanical and behavioral impacts. However, an indirect approach can give an indication of the relative sizes. Referring back to Figure 1, it can be seen that the behavioral effect on AFDC participation is a movement from point G to point 2 in response to an increase in child support income. If the indifference curves are L-shaped, then it can be seen that this behavioral effect cannot occur; all changes in participation would be due to women initially along the segment between B and B′ leaving AFDC because they became ineligible at their initial hours of work. This suggests that if all participation decisions were mechanical, then all the observed variation across individuals in participation decisions would be due to variation in eligibility. Then a regression of AFDC *eligibility* (at observed hours of work for each woman) on a vector of characteristics and non-labor income would yield the same coefficient on non-labor income as a regression of AFDC *participation* on the same covariates. The extent to which these coefficients differ indicates the size of the behavioral effect on welfare participation. To perform this comparison in a straightforward way, the data for all women for the first five years of analysis were pooled, so that the number of times each woman appears in the pooled sample equals the number of years she remains unmarried.[22] AFDC eligibility is imputed according to whether the woman's annual earnings, child support and other non-labor income are less than or more than 1.85 times the (annual) maximum benefit.[23] Using the 2,224 pooled observations, a least-squares regression[24] of AFDC *participation* on the same variables as in Appendix Table 4 yields an estimated coefficient on predicted child support income of -3.83e-05 (t=-7.30), while a regression of imputed AFDC *eligibility* on the same variables yields a coefficient estimate of -2.34e-05 (t=-3.47). This suggests roughly that the mechanical effect is 61 percent of the total effect, or equivalently that the mechanical effect is 1.6 times as large as the behavioral effect.

6.4 Hours of Work

Estimates of the labor supply equations for AFDC participants are presented in detail in Appendix Table 5. Regressors include the same variables used in the AFDC participation equation. The child support coefficient is consistently positive and sometimes statistically significant, which is contrary to the typical negative income effect, but accords with the positive effect described in

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[22] Although this sample results in 2,224 non-independent observations, least squares still provides consistent parameter estimates as a basis for comparison, assuming no remarriage selection bias.

[23] This imputation of eligibility ignores the facts that women may have benefits fall to zero even without reaching the gross income limitation, that the gross income limitation has been 1.85 times the need standard only since 1984, and that family sizes are not equal to 4 in all cases. In addition, annual income aggregates are used, whereas month-to-month variation may be important.

[24] Least squares rather than a probit or logit was used in order to make the comparison of probability derivatives more straightforward.

Section 3. An increase in annual hours H_A may be the result of a reduction in the number of months on AFDC during the year with a concomitant increase in the number of months at full-time work. Thus, it is more appropriate to think of this measured effect as another effect of child support income on AFDC participation rather than as a preference parameter.

Estimates of the labor supply equations for non-AFDC participants are presented in Appendix Table 6. The coefficients on child support income are typically negative as expected, but usually statistically insignificant. Other non-labor income also has the expected negative effect on labor supply. Overall, the parameters of both labor supply equations accord with the theory outlined in Section 3.

The use of non-labor income as a regressor in labor supply equations has been a subject of some concern in many authors' work, even without the recognition of the endogeneity of the child support and alimony component. Ideally, the coefficient on non-labor income should represent a woman's response to an *exogenous* shock to unearned income. Because current non-labor income reflects past savings and past earnings, including such measures of income may introduce bias in labor supply equations (See Smith (1980) for a fuller discussion of the role of unearned income and assets in female labor supply.). An indication of how important this bias may be in this model can be gleaned by treating other non-labor income as endogenous. A simple way to do this is to include exogenous determinants of wealth accumulation (such as age, education, number of children, race, etc.) instead of the explicit measure of other non-labor income in each of the first four equations in (5). Estimating this model, which is equivalent to merely dropping other non-labor income from the four equations, results in almost no change in the estimates of the coefficients on child support income and similarly small changes in the conditional effects reported in Table 4. This suggests that the theoretical endogeneity of other non-labor income with labor supply is not a large influence on the main coefficients of interest.

6.5 Specification Tests and Robustness

Child support income was found to be endogenous in women's labor supply equations by Graham and Beller (1989). In order to test the endogeneity of child support payments in the equations for remarriage, AFDC participation, and labor supply, I estimated the model first treating child support payments as endogenous and then treating child support payments as exogenous. A specification test was then performed to test the equality of the four coefficients on child support payments in these two models.[25] A chi-square statistic rejected the null hypothesis of exogeneity at the five percent significance level for years 1 through 3 and failed to reject for years 4 and 5. Furthermore, the estimated coefficients on child support income when this variable was not instrumented were very different and often of different sign in the four equations for remarriage, AFDC participation, and hours of work on and off AFDC (see Appendix Table 7).

The reported coefficient estimates do not provide much insight regarding the importance of controlling for remarriage and AFDC participation selection. Moreover, the tobit specification for labor supply places restrictions on the effects of any variable on the decision of whether to work at all and the decision of how many hours to work. Alternative empirical specifications can be used to gauge the role of selection effects and functional form assumptions in arriving at the economic inferences described above.

First, the equations in (5) may be estimated without controlling for remarriage selection. In this case, the sample in each year t is the set of women who remain unmarried through year t, rather than the set of ever-divorced women observed in that year. This procedure results in very similar coefficient estimates (not reported for brevity). However, the differences in the AFDC and labor supply parameters over the five years I consider still remain, suggesting that there are important shortcomings to the static labor supply model. Thus, it would be premature to conclude that analysis

[25] These specification tests follow those proposed by Durbin (1954), Wu (1973), and Hausman (1978) and account for the estimation error in predicted child support payments.

using cross-sections of currently divorced or separated women does not lead to selection-biased estimates.

Next, one can judge the importance of controlling for selection into AFDC status. In order to simplify this comparison, the data are pooled over all five years of analysis. Thus, the number of times each woman appears in this pooled sample equals the number of years she remains an unmarried mother with children younger than 18 years old. The first column of Table 5 presents the estimated coefficients on (predicted) child support income when the data are pooled and the remarriage selection equation is dropped. This set of coefficients is estimated using the discrete factor approximation and is analogous to a random effects model. The second, third, and fourth columns present estimates for models in which both remarriage selection and AFDC selection are ignored. The second column presents estimates of the coefficients in independent tobits for hours on AFDC and hours off AFDC, using the pooled sample. The third column presents estimates of labor supply coefficients when the work participation decision is analyzed alone; this model is a linear two-stage least squares regression with the dependent variable equalling one if the woman works. Finally, the fourth column presents two-stage least-squares coefficients for regressions of annual hours (including zeroes) for women on and off AFDC. The covariates used in all four models are the same as those in Appendix Tables 5 and 6.

Comparing across columns shows only moderate differences in estimated effects across specifications. Jointly modelling AFDC participation with labor supply and differentiating between work participation and hours of work seem not to be essential for the labor supply inferences. Moreover, the linear models in the third and fourth columns yield fairly similar insights (as far as average effects are concerned) to the highly nonlinear models.

An alternative method of addressing the endogeneity of child support payments is to use fixed-effects or random-effects models. Such models ("within" estimators) make explicit use of the longitudinal nature of the data, and measure the effect of *changes* in child support payments on *changes* in welfare participation or labor supply. The fixed or random effects can be expected to measure individual women's "innate" propensity to use welfare or to work. Given the heterogeneity-based arguments for endogeneity of child support income offered in Section 4, it is hoped that these models would purge the estimates of simultaneous-equations bias. The results are shown in Table 6, along with comparable linear models (both least squares and two-stage least squares) for AFDC participation and labor supply.[26] For each dependent variable, the OLS estimate of the effect of child support income is bracketed by the fixed-effect and the random-effect estimates. The 2SLS estimates are similar to the random-effect estimates, suggesting that the instruments are reasonably effective at purging the simultaneity bias and providing explanatory power at the same time. Thus, the use of the father's characteristics as instruments does not lead us seriously astray. (The instrumental-variables procedure tends to yield the largest estimated child support effects. Since the IV estimates are small in magnitude, we can be confident that the effects of child support income are in fact modest.)

7. Policy Evaluations

The previous section described the average effects of child support on remarriage, welfare participation and labor supply. However, those estimates do not provide sufficient information to evaluate the effects of alternative child support reforms. Most proposed child support policy alternatives would give different amounts of child support to different women, rather than increase each woman's child support by the same amount. Comparing predicted values of AFDC participation probabilities, work probabilities, and work hours provides a convenient way to assess the likely impacts of proposed alternative child support policies. Using the estimates in this study,

[26] This class of models does not allow us to distinguish labor supply effects for on-AFDC and off-AFDC women.

one can predict the effects of policies under which child support payments depend on characteristics of the mother, of the children, or of the father. However, these results cannot be used to evaluate policy changes under which support payments depend explicitly on endogenous variables such as the mother's labor supply, earnings, or welfare participation, nor can they be used to consider changes in AFDC program rules. Furthermore, this study's results provide no insight into the effects of enforcement tools such as immediate wage withholding.

The specific alternatives analyzed in this study are variations of the Wisconsin Child Support Assurance System (CSAS). The CSAS sets the child support award equal to 17 percent of the non-custodial parent's income for one child, 25 percent for two children, 29 percent for three children, 31 percent for four children, and 34 percent for five or more children. In these calculations, the ex-spouse's pre-divorce annual earnings is used as a proxy for total income; this tends to understate the level of child support awards that would result from applying the Wisconsin standard. In addition, this procedure assumes that fathers' earnings do not change in response to changing child support orders.[27]

Predicting the effects of changes in child support outcomes given the estimates presented in this study involves some complication. Although remarriage decisions are explicitly incorporated into the statistical model, I have not analyzed the labor supply decisions of remarried women. Without explicit analysis of the labor supply of remarried women, one cannot predict the effect of policy changes on total labor supply of ever-divorced women. Thus, the effects to be described below are calculated conditional on a woman being unmarried. The formulas used to predict AFDC and work probabilities and expected hours of work are shown in Appendix C; all quantities are conditioned on remaining unmarried.

The alternative policies considered are as follows:

[27] Given that most empirical studies of male labor supply find very small wage elasticities, the assumption of no response is unlikely to be a serious problem.

- Baseline: Calculate estimates of AFDC and work probabilities and expected hours of work, using actual child support income for each woman and the estimated coefficients from equations (5). Table 7 shows the weighted average of these quantities over the set of ever-divorced women observed in each year.
- Scenario A: For those women who actually received child support payments, set support payments equal to the level implied by the Wisconsin standard. For those women in the sample who received no payments, maintain support payments at zero. Then predict welfare and work probabilities and average hours of work.
- Scenario B: Apply the Wisconsin standard to calculate child support payments for women who received payments. For women who received none, set payments equal to 20 percent of the Wisconsin award level.
- Scenario C: Apply the Wisconsin standard to calculate child support payments for women who received payments. All women are given at least a $2,000 per year minimum assured child support payment.[28]
- Scenario D: Apply the Wisconsin standard to calculate child support awards. Assume perfect compliance by absent fathers. This represents an upper bound on the effects of this child support reform on AFDC participation and labor supply.

Changes in AFDC benefit payments may also be estimated under these alternative policies. The method used here is to calculate expected AFDC payments for each woman as the probability of being on AFDC multiplied by expected payments, $B=G-tWH$. G is the maximum benefit payment for a family of four for each woman; t is the benefit reduction rate (set to unity); W is a predicted wage rate based on a selection-corrected regression of log-wages on age, age squared, education

[28] The Wisconsin CSAS includes an assured benefit but also imposes a surtax, such that the government's benefit is reduced by $0.25 for every $1 of the mother's income. This benefit reduction is not incorporated in the simulation for simplicity. Furthermore, the assured benefit is assumed to be invariant to the number of children.

dummies, race, unemployment rate, and region and SMSA indicators; and H is the expected hours on AFDC.[29]

7.1 Predicted Effects of Policy Changes

The predicted outcomes under these alternative policies are reported in Table 7. The most striking feature of these results is that applying the Wisconsin standard would likely give women substantially more child support income. Women in the PSID sample received far less from ex-spouses than is considered appropriate under the Wisconsin standard. The difference in average support payments between the baseline and Scenario A -- which assumes no change in whether women receive payments -- is well over $1,000 per year for each of the first five years following divorce. Moving to Scenario D, which assumes fathers comply perfectly with support orders, average support payments received would rise substantially more.

The predicted effects of Scenario A on AFDC and work participation are small. In this scenario, AFDC participation probabilities decline by approximately 2 to 3 percentage points, while the fraction of women who work rises only slightly. The modest effects on AFDC participation accord with previous work using different methods and data sources. (See Klawitter and Garfinkel (1992b) for a brief review of these results. The notable exception is Nixon (1994), who finds that a $1000 increase in child support would decrease AFDC participation by as much as 20 percentage points.) Similarly, previous studies have found modest effects on the probability of working (Beller and Graham (1985) and Garfinkel *et al.* (1990)).

The net effect of these hypothetical increases in child support income is to increase average hours of work. The increase in H_A^* plus the decreased likelihood of receiving AFDC benefits (and hence the shift of hours from H_A^* to $H_B^* > H_A^*$) overshadows the negative effect on hours of work for

[29] If B was negative, benefits were set to zero. While the application of this formula to annual aggregates is highly questionable, the formula reproduces average benefits for observed AFDC recipients fairly well when actual earnings are used in place of WH. The implied AFDC cost changes are not very sensitive to using an alternative benefit reduction rate such as 67 percent.

off-AFDC women. Studies by Graham and Beller (1989) and Graham (1990) found that child support income decreases hours of work; however, these studies did not distinguish the opposite labor supply effects for on- and off-AFDC women. Garfinkel *et al.* (1990) used simulation methods to find that implementation of the Wisconsin standard with other features such as a minimum state-assured benefit and a wage subsidy would increase hours of work for AFDC women and decrease hours of work for non-AFDC women. This study's results are broadly consistent with these latter findings.

7.2 Evaluation of Policy

Although Scenario A reflects little reduction in welfare participation probabilities, actual child support reforms may be particularly effective if they increase child support income for women who currently do not receive any support payments. Scenarios B and C simulate moderate changes in the composition of women who receive positive payments, and the implied effects on welfare recipiency are more substantial. These effects suggest that AFDC expenditures may be substantially lowered by increasing collections for women who currently receive no payments at all. A more detailed decomposition of average child support payments shows that in Scenario C, almost all of the women affected by the minimum assured benefit were receiving zero child support payments. Thus, the minimum benefit is equivalent to giving almost exactly $2,000 per year to women without child support payments from the fathers. In this sense, the minimum benefit is another form of public assistance and it should not be surprising that instituting such a policy would have significant effects on participation in other welfare programs.[30] Moreover, the minimum benefit's gross cost to the government budget is clear--a lower bound is found by multiplying the number of women with no child support payments by $2,000 per year. For approximately 40 percent of divorced and separated women with no child support payments, the costs are at least partially offset by reduced AFDC

[30] Of course, the minimum assured benefit payments would also be received by remarried mothers--a group which is not for the most part entitled to AFDC benefits.

expenditures. An issue from the point of view of state policy, then, is whether it is desirable to increase state expenditures through the assured child support benefit in order to reduce joint federal-state expenditures through the AFDC program.[31]

The estimates of AFDC cost savings point to substantial fiscal incentives for governments to increase child support collections. For instance, the Year 1 estimates under Scenario A indicate a savings of $120 per woman (ignoring administrative costs), or an equivalent of $500 million given that there were about 4.3 million divorced/separated mothers in 1988 according to the Current Population Survey (U.S. Department of Commerce, 1990). The minimum assured benefit is the only policy among those considered here which seems to increase net costs, because the assured benefit costs an average of $1,000 to $1,200 per unmarried mother (As noted before, the assured benefit is roughly the same as giving $2,000 to all those women who received no private support payments.).

If the goal of child support policy is to keep women off AFDC with minimum public expenditures, then the minimum assured benefit is not particularly target-efficient. Although half of single mothers receive no child support from the fathers, a smaller fraction actually participate in public assistance programs. Further work should examine the effectiveness of child support reform in "target" populations that are especially at risk of becoming dependent on welfare. As a whole, the set of recently divorced mothers has a low (20 to 25 percent) probability of being on AFDC. However, child support reform may aim to improve support payments for women with higher probabilities of being on welfare.

8. Summary and Conclusions

[31] A minimum assured benefit may be defined such that it is paid only to those mothers who have legal child support awards. This would provide an incentive for women to seek such awards, and in particular it would encourage never-married mothers to identify the fathers, facilitating long-term child support collections.

This study's results provide several insights relevant to the current debate regarding child support reform. Policies that increase child support awards should not be expected to induce substantial changes in women's behavior. Giving women more child support payments would decrease AFDC participation and increase labor supply, but by small amounts unless one substitutes government-assured child support benefits for existing welfare benefits or states make improvements in collections for women who currently receive no support payments from the absent fathers.

This study empirically confirms the notion that child support income is endogenous with women's welfare and work choices. Furthermore, characteristics of women's ex-spouses are significant determinants of the amount of child support payments received. Studies which fail to recognize and address these facts may lead to incorrect conclusions regarding the effects of child support income on economic behavior. In a broader sense, the endogeneity of child support income has implications for most studies of female labor supply and welfare participation. Most such studies use some measure of non-labor income which includes child support income, and these studies assume non-labor income is exogenously determined.

While the average changes in behavior resulting from simulated changes in child support award standards may be modest in size, their importance should not be dismissed. Larger child support awards are an effective means of substituting payments by absent fathers for government-paid welfare benefits. This study's estimates of changes in AFDC benefit payments suggest that substantial fiscal savings are achievable. Great reductions in AFDC participation may be achieved through an assured minimum benefit, but this policy alternative is not an effective way to reduce the total public fiscal burden. Child support reform may be quite effective in reducing welfare rolls if it increases payments to women who are most at risk of being on welfare.

Appendix A

Mroz and Guilkey (1992) present a simple method for estimating systems of equations in which one or more dependent variables may be censored or discrete. This appendix provides a brief description of the method and its application to the model presented in Section 4. The discrete factor approximation parallels the model of heterogeneity in hazard rate models presented by Heckman and Singer (1984). If one has two equations, the error terms may be written as

$$\begin{aligned} \epsilon_1 &= u_1 + \rho_1 v \\ \epsilon_2 &= u_2 + \rho_2 v \end{aligned} \tag{6}$$

where u_1, u_2, and v have zero means and are mutually independent. Assuming that u_1 and u_2 are normally distributed, one can write the conditional density as

$$f(\epsilon_1,\epsilon_2|v) = \frac{1}{\sigma_1}\phi\left[\frac{\epsilon_1-\rho_1 v}{\sigma_1}\right]\frac{1}{\sigma_2}\phi\left[\frac{\epsilon_2-\rho_2 v}{\sigma_2}\right] \tag{7}$$

where $\phi(\cdot)$ is the standard normal density function. Suppose one approximates the distribution of the common factor v by the discrete distribution

$$Prob(v=\eta_k)=p_k;\ k=1,\ldots,K;\ where\ p_k \geq 0\ and\ \sum_{k=1}^{K} p_k=1 \tag{8}$$

v thus takes on the discrete values $\eta_1,\ldots,\eta_K$ with probabilities $p_1,\ldots,p_K$. The unconditional joint density of the original error terms becomes

$$f(\epsilon_1,\epsilon_2) = \sum_{k=1}^{K} p_k \frac{1}{\sigma_1}\phi\left[\frac{\epsilon_1-\rho_1\eta_k}{\sigma_1}\right]\frac{1}{\sigma_2}\phi\left[\frac{\epsilon_2-\rho_2\eta_k}{\sigma_2}\right] \tag{9}$$

Integration of this density function over ranges of ϵ_1 or ϵ_2 is a simple task, and a maximum likelihood procedure can estimate the points of support of v, the relative probabilities, the coefficients ρ_1 and

ρ_2, and the variances σ_1 and σ_2. The procedure can be generalized to include more than one factor v, and the number of points of support may be large.

Mroz and Guilkey (1992) provide Monte Carlo evidence of several different simultaneous equations models to show that this estimation technique performs well relative to other methods, including maximum likelihood estimation assuming multivariate normality of the error terms, especially when the true distribution of the error terms is not multivariate normal. In this study, I employ one discrete factor with three points of support to jointly estimate the system of four equations for each year. The method allows arbitrary correlations among the four error terms in equations (5); no independence assumptions are made.

For the model estimated in this study, the discrete factor has two interpretations. First, it represents unobservable heterogeneity across individuals in their propensities to remarry, be on welfare, and work. These three economic decisions are correlated to the extent that people differ in systematic but unobservable ways; this underlying heterogeneity implies that the error terms are correlated in a cross-sectional analysis. A second interpretation of the discrete factor arises in this particular model because predicted child support payments is used as a regressor. Since the true economic model includes actual child support payments, the empirical specification includes an error term which includes the prediction error in the child support payments equation. Thus, when predicted child support payments is a regressor, the error terms in the four equations of the model are *necessarily* correlated for a cross-section of individuals, unless the coefficient on child support is zero. Thus, the estimated parameters of the discrete factor's distribution (η_k and p_k) and the associated factor loadings (ρ_k) do not have a simple, economically meaningful interpretation. In particular, the estimated factor loadings do not indicate the correlations caused by unobserved heterogeneity among the four equations of the model.

The log-likelihood function for each observation for the model is:

$$
\begin{aligned}
l(\theta) = {} & (1-d_M)\ \log\sum_{k=1}^{3} p_k \Phi(-X_M\Pi_M - \rho_1\eta_k) \\
& + d_M d_A d_H\ \log\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M + \rho_1\eta_k)\Phi(X_A\Pi_A + \rho_2\eta_k)\frac{1}{\sigma_A}\phi\left[\frac{H - X\beta_A - \rho_3\eta_k}{\sigma_A}\right] \\
& + d_M d_A (1-d_H)\ \log\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M + \rho_1\eta_k)\Phi(X_A\Pi_A + \rho_2\eta_k)\Phi\left[\frac{-X\beta_A - \rho_3\eta_k}{\sigma_A}\right] \qquad (10) \\
& + d_M(1-d_A)d_H\ \log\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M + \rho_1\eta_k)\Phi(-X_A\Pi_A - \rho_2\eta_k)\frac{1}{\sigma_B}\phi\left[\frac{H - X\beta_B - \rho_4\eta_k}{\sigma_B}\right] \\
& + d_M(1-d_A)(1-d_H)\ \log\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M + \rho_1\eta_k)\Phi(-X_A\Pi_A - \rho_2\eta_k)\Phi\left[\frac{-X\beta_B - \rho_4\eta_k}{\sigma_B}\right]
\end{aligned}
$$

where $\theta=(\Pi_M, \Pi_A, \beta_A, \beta_B, \sigma_A, \sigma_B, \rho_1, \rho_2, \rho_3, \rho_4, p_1, p_2, p_3, \eta_1, \eta_2, \eta_3)$and the indicator variables d_M, d_A, and d_H indicate whether a woman is unmarried, whether she receives AFDC benefits, and whether she works, respectively. ρ_4 is normalized to equal one, the probabilities p_k are constrained to sum to one, and the points of support η_k are constrained such that the discrete factor has a mean of zero. (For simplicity, $X\beta_A$ and $X\beta_B$ here include the terms $\gamma_A CS+\delta_A Y$ and $\gamma_B CS+\delta_B Y$ in equations (5).)

Appendix B

There is a possibility that selecting a sample of newly divorced or separated mothers over a twenty-year span is quite different from selecting a sample of currently divorced or separated mothers from a single point in time. To determine the importance of this sample selection difference, we can consider similar descriptive statistics from the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP). Appendix Table 1 presents summary statistics describing divorced and separated women with children younger than 21 years of age, compiled from the April 1988 CPS and the 1986 Panel (Wave 6) of the SIPP. The CPS data represent annual totals or percentages, while the SIPP data provide data both for the previous year and for the previous four months. All dollar amounts are reported in 1992 dollars. The fractions of women receiving child support during the year are similar to the fractions in the PSID sample. The average amounts of child support received in the CPS and SIPP samples are lower than the amount of combined child support and alimony reported in the PSID sample. However, average combined child support and alimony in the SIPP sample is $4,505, which is within the range of average child support and alimony payments ($3,849 to $5,213) for PSID women in the first five years following marital breakup. Similarly, the fraction of total family income comprised by child support payments is similar across the three data sources; among mothers receiving support payments, these payments make up approximately one-fifth of family income. AFDC participation (during the four months prior to the interview) as reported in the SIPP is 20 percent, slightly lower than the annual participation measure reported in Table 1. When AFDC participation is considered separately for child support recipients and non-recipients, the pattern is somewhat different in the SIPP data than in the PSID sample. Women receiving child support in the previous four months had less than a 10 percent AFDC participation rate during the same period according to the SIPP; this fraction is similar to the fractions reported in Table 2. For women not receiving child support payments, participation in AFDC was 29 percent according to the SIPP but nearly 40 percent in the PSID sample. This difference may be attributed at least partially to the fact that the SIPP data measure joint receipt of child support and AFDC benefits within a four-month period, rather than over an entire year. Overall, the slight differences between the characteristics of the PSID sample and the characteristics of the CPS and SIPP samples can be explained by differences in the degree of time aggregation or by the fact that the women in the PSID sample were more recently divorced or separated (relative to the year in which the data were collected).

The use of annual data in analyzing the effects of child support on welfare and work is subject to some limitations. Because we observe only annual totals of child support income, we cannot distinguish between a woman who receives a modest payment every month and a woman who receives large monthly payments on an irregular basis. One might expect that a woman who receives irregular payments would tend to work more hours as a form of insurance against the child support income uncertainty. A second limitation of annual data is that they do not allow one to distinguish between part-year and full-year AFDC recipients.

A further caveat to this study's results is that no information is available indicating whether a woman had a legal child support award and how much the awarded amount was. Cross-section data suggest that approximately one-fourth of women who are supposed to receive child support payments receive positive payments that are less than the full amount awarded (U.S. Department of Commerce, 1990). In my analysis, partial payment cannot be distinguished from full payment of small dollar amounts. This limitation has relevance mainly for the policy predictions in Section 7. An increase in award levels will be simulated by increasing the expected level of payments; this approach will tend to overstate payments to the extent that absent fathers comply only partially with higher support orders.

Another characteristic for which no data are available from the PSID is whether a woman received a property settlement with her legal divorce. This information has some relationship to the amount of child support and alimony paid following divorce, and it may be an important determinant of post-divorce non-labor income. For this reason, child support income and other non-labor income are to some extent jointly determined.[32] The greater a property settlement that transfers cash or property to the woman, the greater will her non-labor income be during the time-frame of this analysis. The CPS provides some clue as to the nature of property settlements. In 1988, 32 percent of ever-divorced women reported that they received a property settlement. Of those, 70 percent involved no cash payments, and 27 percent involved one-time payments of cash only.[33] It is likely that interest-bearing cash settlements would provide the greatest increment to post-divorce non-labor income. The fraction of divorces including cash is not large, implying that the correlation between child support and other non-labor income is unlikely to be large. (However, the CPS data do not give us information about the average size of one-time cash settlements.)

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[32] In a cross-section of individuals, child support and other non-labor income may be correlated due purely to heterogeneity. For instance, women who have saved more may tend to have unobserved characteristics that lead them to have higher child support payments.

[33] Non-cash settlements typically include real estate, cars, or furniture.

Appendix C

The discrete factor specification of the joint density of the error terms in (5) greatly facilitates the calculation of probabilities and expectations, either conditional or unconditional, because no multiple integration is involved. Below are shown the various measures which are calculated in the policy evaluations in Table 7. Also shown are formulae for the probabilities and expectations whose derivatives are calculated in Table 4. These quantities are conditioned on marital status because this analysis does not predict the labor supply of remarried women.

$$P_M \equiv Prob(unmarried) = \int_{-X_M\Pi_M}^{\infty} f(u_M)du_M = \sum_{k=1}^{3} p_k \Phi(X_M\Pi_M+\rho_1\eta_k)$$

$$P_A \equiv Prob(on\ AFDC \mid unmarried) = \frac{\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M+\rho_1\eta_k)\Phi(X_A\Pi_A+\rho_2\eta_k)}{P_M}$$

$$PW_A \equiv Prob(H>0 \mid on\ AFDC,\ unmarried) = \frac{\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M+\rho_1\eta_k)\Phi(X_A\Pi_A+\rho_2\eta_k)\Phi(X\beta_A+\rho_3\eta_k)}{P_M P_A}$$

$$PW_B \equiv Prob(H>0 \mid off\ AFDC,\ unmarried) = \frac{\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M+\rho_1\eta_k)\Phi(-X_A\Pi_A-\rho_2\eta_k)\Phi(X\beta_B+\rho_4\eta_k)}{P_M(1-P_A)}$$

$$PW \equiv Prob(H>0 \mid unmarried) = P_A PW_A + (1-P_A)PW_B$$

$$E_A \equiv E(Hours \mid on\ AFDC,\ unmarried)$$

$$= E(X\beta_A+\epsilon_A \mid M^*>0,\ A^*>0,\ H_A^*>0)\cdot P(\epsilon_A > -X\beta_A \mid M^*>0,\ A^*>0)$$

$$= \frac{\sum_{k=1}^{3} p_k \Phi(X_M\Pi_M+\rho_1\eta_k)\Phi(X_A\Pi_A+\rho_2\eta_k)\left[(X\beta_A+\rho_3\eta_k)\Phi((X\beta_A+\rho_3\eta_k)/\sigma_A)+\sigma_A\phi((X\beta_A+\rho_3\eta_k)/\sigma_A)\right]}{P_M P_A}$$

$E_B \equiv E(\mathit{Hours}\,|\,\mathit{off\ AFDC,\ unmarried})$

$$= E(X\beta_B + \epsilon_B \,|\, M^* > 0,\ A^* \leq 0,\ H_B^* > 0) \cdot P(\epsilon_B > -X\beta_B \,|\, M^* > 0,\ A^* \leq 0)$$

$$= \frac{\sum_{k=1}^{3} p_k \Phi(X_M \Pi_M + \rho_1 \eta_k) \Phi(-X_A \Pi_A - \rho_2 \eta_k) \left[(X\beta_B + \rho_4 \eta_k) \Phi((X\beta_B + \rho_4 \eta_k)/\sigma_B) + \sigma_B \phi((X\beta_B + \rho_4 \eta_k)/\sigma_B) \right]}{P_M (1 - P_A)}$$

$$EH \equiv E(\mathit{Hours}\,|\,\mathit{unmarried}) = P_A E_A + (1 - P_A) E_B$$

Note that the total derivatives of PW_A, PW_B, E_A, and E_B with respect to child support income do not necessarily have the same sign as the corresponding labor supply parameters β_A or β_B, because the total derivatives involve partial derivatives with respect to the probabilities of being on AFDC and unmarried. This "sign reversal" is apparent in the fourth row of Table 4.

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Figure 1
Effect of Increases in Child Support Income
Working AFDC Non-Participants and Nonemployed AFDC Participants

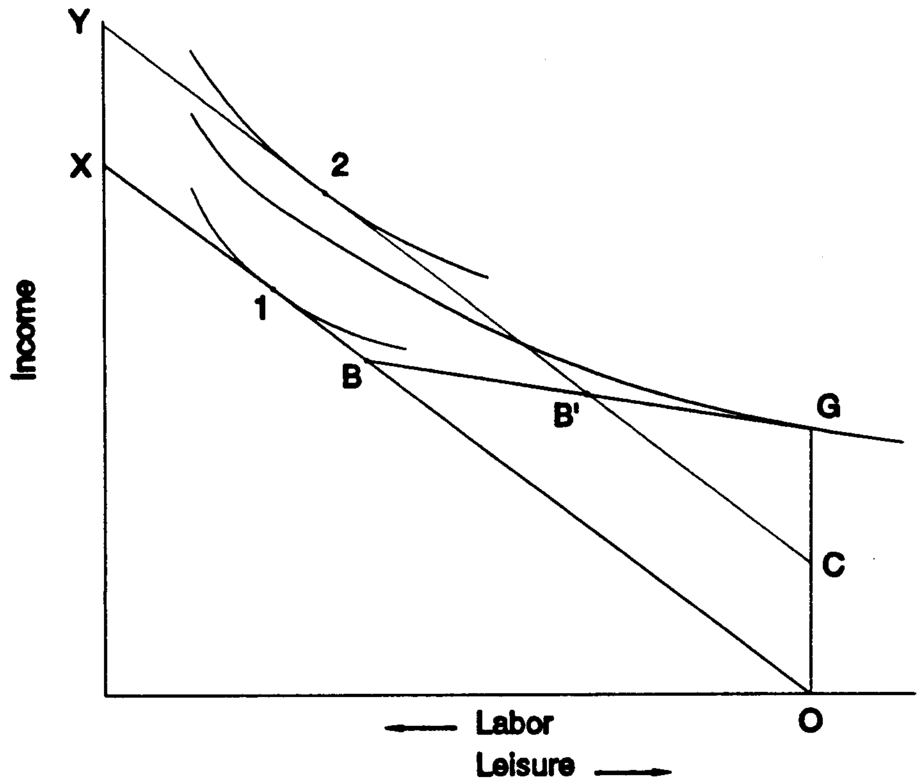

Figure 2
Effect of Increases in Child Support Income
Working AFDC Participants

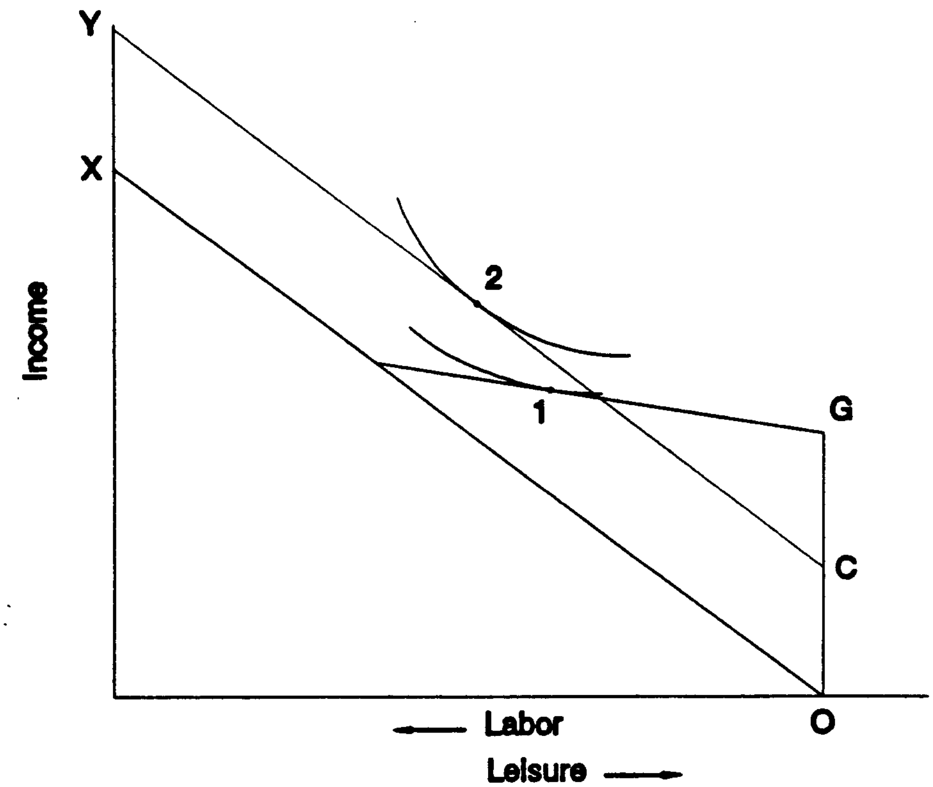

Figure 3
Frequency Distribution of Child Support Payments
(Payments for Year 1, excluding zeroes)

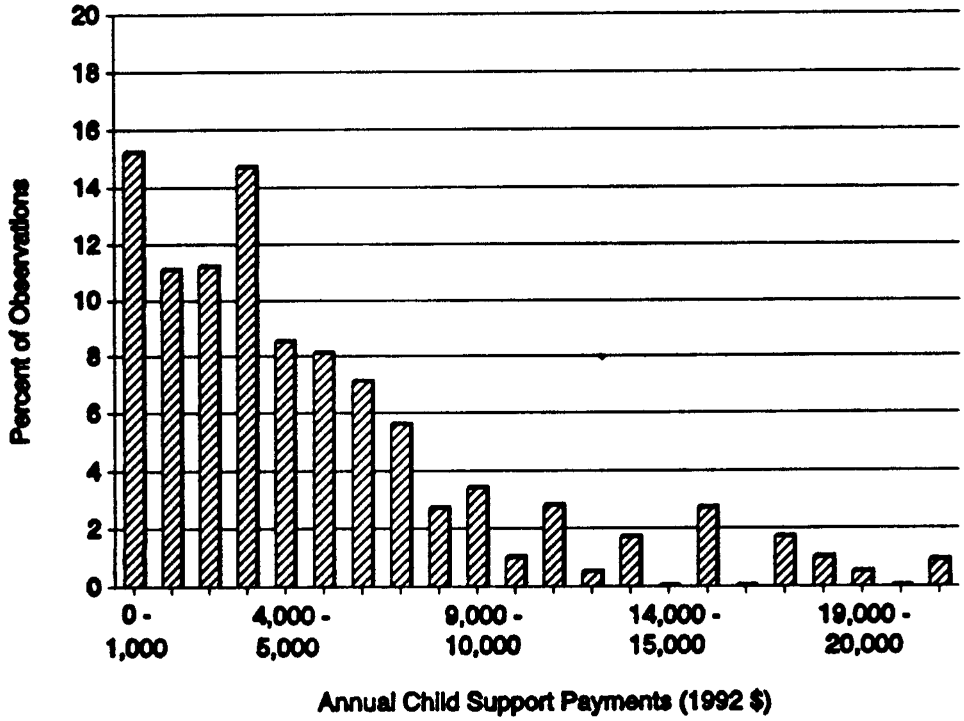

Table 1
Summary Statistics

Variable	Mean	Standard Deviation
Age of woman	31.59	7.8056
Race = nonwhite	0.1652	0.3713
Years married	8.83	7.4992
Number of children	1.8648	0.9285
Education of woman		
Less than H.S.	0.2790	0.4485
H.S. graduate	0.4505	0.4976
Some college	0.1665	0.3726
College graduate	0.1040	0.3053
Age of ex-spouse	33.99	8.5587
Education of ex-spouse		
Less than H.S.	0.2772	0.4476
H.S. graduate	0.4263	0.4946
Some college	0.1899	0.3923
College graduate	0.1065	0.3085
Earnings of ex-spouse ($)	27543	16723
Woman remarried between years 1 and 2	0.1244	0.3301
Woman remarried between years 2 and 3	0.1358	0.3426
Woman remarried between years 3 and 4	0.1467	0.3538
Woman remarried between years 4 and 5	0.0958	0.2943
Received child support in year 1	0.5179	0.4997
Received child support in year 2	0.5275	0.4993
Received child support in year 3	0.5272	0.4993
Received child support in year 4	0.4770	0.4995
Received child support in year 5	0.4491	0.4975
Child support income in year 1 (no zeroes)	5213	4554
Child support income in year 2	4854	4518
Child support income in year 3	5193	3924
Child support income in year 4	4375	3109
Child support income in year 5	3849	2264
On AFDC in year 1	0.2059	0.4044
On AFDC in year 2	0.2228	0.4161
On AFDC in year 3	0.2307	0.4213
On AFDC in year 4	0.2264	0.4185
On AFDC in year 5	0.2271	0.4190

Table 1 (cont'd)

AFDC benefits in year 1 (no zeroes)	5301	3158
AFDC benefits in year 2	5256	3092
AFDC benefits in year 3	5414	3613
AFDC benefits in year 4	5558	3392
AFDC benefits in year 5	5043	3206
Working before breakup	0.7418	0.4377
Working in year 1	0.8382	0.3682
Working in year 2	0.8204	0.3839
Working in year 3	0.8556	0.3515
Working in year 4	0.8359	0.3704
Working in year 5	0.7993	0.4005
Annual hours worked before breakup	1017	870
Annual hours worked in year 1	1311	890
Annual hours worked in year 2	1367	911
Annual hours worked in year 3	1454	831
Annual hours worked in year 4	1483	899
Annual hours worked in year 5	1476	934
Earnings before breakup	9246	10967
Earnings in year 1	12403	12773
Earnings in year 2	13037	11989
Earnings in year 3	13969	12061
Earnings in year 4	14220	11552
Earnings in year 5	14330	11215
Family income in year 1	21993	16087
Family income in year 2	21769	14634
Family income in year 3	23337	16367
Family income in year 4	21579	13493
Family income in year 5	21742	12324
Child support / family income in year 1	0.2530	0.2265
Child support / family income in year 2	0.2313	0.2208
Child support / family income in year 3	0.2211	0.1830
Child support / family income in year 4	0.1919	0.1713
Child support / family income in year 5	0.1945	0.1639

Notes: Number of observations in years 1 through 5 are 665, 528, 336, and 276, respectively. Earnings of ex-spouse and pre-breakup variables correspond to the calendar year two years prior to year as head of household. Child support per family income is ratio among recipients only.

Table 2
Summary Statistics by Child Support Recipiency

Variable	Received CS in Year 1 Mean	Received CS in Year 1 Standard Deviation	No CS in Year 1 Mean	No CS in Year 1 Standard Deviation
Age of woman	32.11	7.0979	31.03	8.4649
Race = nonwhite	0.0950	0.2932	0.2405	0.4274
Years married	10.42	7.3505	7.13	7.2826
Number of children	1.8767	0.9182	1.8520	0.9394
Education of woman				
Less than H.S.	0.1876	0.3904	0.3772	0.4847
H.S. graduate	0.4740	0.4994	0.4252	0.4944
Some college	0.1846	0.3880	0.1471	0.3542
College graduate	0.1538	0.3608	0.0505	0.2190
Age of ex-spouse	34.11	7.3439	33.86	9.6944
Education of ex-spouse				
Less than H.S.	0.2134	0.4098	0.3457	0.4756
H.S. graduate	0.4036	0.4907	0.4507	0.4976
Some college	0.2264	0.4185	0.1508	0.3579
College graduate	0.1566	0.3634	0.0528	0.2236
Earnings of ex-spouse ($)	32431	15706	22294	16184
Received child support in year 1	1.0000	0.0000	0.0000	0.0000
Received child support in year 2	0.8398	0.3669	0.1303	0.3367
Received child support in year 3	0.7722	0.4194	0.1900	0.3924
Received child support in year 4	0.7322	0.4429	0.1959	0.3970
Received child support in year 5	0.7014	0.4578	0.1889	0.3915
Child support income in year 1 ($) (no zeroes)	5213	4554	0	0
Child support income in year 2	5202	4610	2001	2098
Child support income in year 3	5400	3782	4038	4470
Child support income in year 4	4446	2960	4081	3648
Child support income in year 5	4032	2191	3149	2404
On AFDC in year 1	0.0808	0.2725	0.3403	0.4738
On AFDC in year 2	0.0802	0.2717	0.4041	0.4908
On AFDC in year 3	0.0734	0.2608	0.4472	0.4973
On AFDC in year 4	0.0837	0.2770	0.3835	0.4863
On AFDC in year 5	0.0985	0.2981	0.3596	0.4800

Table 2 (cont'd)

AFDC benefits in year 1 ($) (no zeroes)	4813	3214	5426	3132
AFDC benefits in year 2	4144	2152	5536	3228
AFDC benefits in year 3	3900	4007	5756	3428
AFDC benefits in year 4	3107	2410	6148	3330
AFDC benefits in year 5	4444	2606	5213	3339
Working before breakup	0.7576	0.4286	0.7248	0.4466
Working in year 1	0.9050	0.2932	0.7665	0.4231
Working in year 2	0.9042	0.2943	0.7137	0.4521
Working in year 3	0.9273	0.2596	0.7569	0.4290
Working in year 4	0.9122	0.2830	0.7514	0.4323
Working in year 5	0.9035	0.2954	0.6920	0.4618
Annual hours worked before breakup	1047	852	985	888
Annual hours worked in year 1	1504	818	1103	918
Annual hours worked in year 2	1578	816	1098	953
Annual hours worked in year 3	1680	716	1143	876
Annual hours worked in year 4	1709	757	1234	975
Annual hours worked in year 5	1719	800	1226	995
Earnings before breakup ($)	10883	12498	7488	8704
Earnings in year 1	15163	13675	9439	10982
Earnings in year 2	15548	11784	9843	11477
Earnings in year 3	16782	12129	10098	10834
Earnings in year 4	17159	11059	10966	11211
Earnings in year 5	17177	10392	11394	11278
Family income in year 1 ($)	25191	16079	17755	15089
Family income in year 2	25383	14290	17112	13729
Family income in year 3	27425	15647	18284	15819
Family income in year 4	24781	13199	18139	12951
Family income in year 5	24642	12359	18421	11416
Child support / family income in year 1*	0.2530	0.2265	0.0000	0.0000
Child support / family income in year 2	0.2435	0.2208	0.1265	0.1917
Child support / family income in year 3	0.2243	0.1664	0.2044	0.2505
Child support / family income in year 4	0.1937	0.1635	0.1843	0.2017
Child support / family income in year 5	0.1965	0.1441	0.1848	0.2374

* Among those who receive any child support income.

Table 3

F-statistics for First-Stage Regressors Predicting Child Support Income

	Year 1	Year 2	Year 3	Year 4	Year 5
Father's characteristics	6.85	5.95	4.10	2.70	3.39
degrees of freedom	(5,637)	(5,503)	(5,394)	(5,308)	(5,251)
Child support policy variables	1.96	2.40	1.44	0.14	1.19
degrees of freedom	(5,637)	(5,503)	(5,394)	(5,308)	(5,251)
Model F-statistic	14.73	14.98	11.38	8.43	6.690
degrees of freedom	(27,637)	(24,503)	(24,394)	(27,308)	(24,251)

Note: Regressions for years 2, 3 and 5 have fewer parameters because insignificant time trend polynomials were omitted.

Table 4
Conditional Effects of Child Support
(Average derivatives with respect to CS)

Quantity	Year 1	Year 2	Year 3	Year 4	Year 5
Prob (unmarried)	NA	-4.18e-06	2.96e-06	2.64e-05	-1.29e-05
Prob (on AFDC|unmarried)	-2.94e-05	-3.30e-05	-4.09e-05	-3.13e-05	-3.51e-05
E(Hours|on AFDC, unmarried)	0.141	0.027	0.216	0.192	0.151
E(Hours|off AFDC, unmarried)	-0.007	0.009	-0.020	0.027	0.010
E(Hours|unmarried)	0.020	0.009	0.022	0.053	0.027

Table 5
Sensitivity of Estimated Child Support Effects to Alternative Specifications

	Model 1	Model 2	Model 3	Model 4
$dP(H_A>0 \mid \text{on AFDC})/dCS$	4.45e-05	4.16e-05	3.32e-05	
$dP(H_B>0 \mid \text{off AFDC})/dCS$	-3.14e-06	-2.28e-06	-1.80e-06	
$dE(H_A \mid \text{on AFDC})/dCS$	0.0898	0.0639		0.0688
$dE(H_B \mid \text{off AFDC})/dCS$	-0.0331	-0.0300		-0.0300

Note: See text for description of models. Table entries are derivatives are with respect to predicted child support income, averaged across observations.

Table 6
Fixed Effects and Random Effects Coefficients

	OLS	2SLS	Fixed Effects	Random Effects
AFDC Participation	-2.50e-05	-3.34e-05	-1.83e-05	-2.99e-05
	3.16e-06	5.15e-06	3.64e-06	3.09e-06
Probability of Working	6.68e-06	1.34e-05	2.55e-06	1.01e-05
	3.00e-06	4.95e-06	3.91e-06	3.16e-06
Annual Hours of Work	0.00545	0.0162	-0.00916	0.00678
	0.00720	0.0126	0.00752	0.00645

Note: All models are run on pooled sample of 2089 women-years, omitting women for whom only one year of data are available. OLS and 2SLS regressions control for same characteristics as in equation (5); fixed effect and random effect models omit age, education, race, region, and SMSA variables. Standard errors are in small font.

Table 7
Predicted Effects of Policy Changes

	Baseline	Scenario A	Scenario B	Scenario C	Scenario D
Year 1					
Average Child Support Income	2699	3849	4330	4846	6255
Percent on AFDC	22.3	19.6	17.1	14.7	10.5
Percent Working	82.1	83.2	85.2	86.9	88.1
Average Annual Hours	1276	1300	1340	1375	1415
AFDC Savings per Woman ($)		120	452	-278	941
Year 2					
Average Child Support Income	2334	3626	4146	4692	6225
Percent on AFDC	24.7	21.6	18.5	15.9	11.1
Percent Working	80.2	81.7	82.9	83.8	85.5
Average Annual Hours	1334	1366	1399	1421	1465
AFDC Savings per Woman ($)		163	490	-337	1000
Year 3					
Average Child Support Income	2341	3553	4078	4668	6179
Percent on AFDC	25.8	23.6	19.9	16.2	10.5
Percent Working	83.9	84.2	88.4	91.7	91.9
Average Annual Hours	1366	1330	1405	1467	1467
AFDC Savings per Woman ($)		65	555	-178	1179
Year 4					
Average Child Support Income	1664	2956	3600	4172	6178
Percent on AFDC	23.5	21.3	18.1	15.7	11.3
Percent Working	83.5	84.3	87.4	90.3	92.5
Average Annual Hours	1477	1520	1593	1655	1749
AFDC Savings per Woman ($)		124	503	-417	1061
Year 5					
Average Child Support Income	1371	2498	3203	3769	6025
Percent on AFDC	24.2	22.4	18.3	15.5	10.0
Percent Working	78.0	78.3	81.4	84.1	85.7
Average Annual Hours	1417	1420	1488	1539	1575
AFDC Savings per Woman ($)		99	536	-427	1139

Note: See text for description of scenarios. All probabilities and hours are conditional on remaining unmarried. AFDC savings are relative to baseline. Scenario C estimated costs include assured benefit payments.

Appendix Table 1
Summary Statistics from Alternate Data Sources

	SIPP	CPS
Fraction with CS award	65.2	70.1
Fraction receiving CS	43.2 [50.2]	48.2
Average CS received	3816 [3379]	3705
Average CS & alimony	4505	NA
CS / total income	19.1	18.5
CS & alimony / total income	21.1	NA
Fraction on AFDC	20.4	NA
Fraction of CS recipients on AFDC	9.3	NA
Fraction of CS non-recipients on AFDC	28.9	NA

Notes: All statistics refer to divorced and separated mothers with children younger than 21 years old. Dollar amounts are 1992 dollars. SIPP figures in brackets represent data based on child support receipts during the prior calendar year, while other SIPP figures refer to income in the four months prior to the interview.

Appendix Table 2
Least Squares Estimates of Child Support Payments Equations

Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Age of mother	-93.97	-256.9	-419.6	-22.05	-28.69
	188.0	200.4	239.9	182.2	156.7
Age of mother squared	1.477	4.375	5.861	-0.665	-0.153
	2.684	2.811	3.447	2.665	2.191
H.S. graduate	596.3	719.7	1300	581.6	1105
	403.3	367.7	444.0	360.0	369.3
Any college	1401	768.6	884.8	1192	982.1
	516.9	560.3	538.7	577.1	467.4
Race = nonwhite	-1392	-718.4	-1190	-1348	-778.8
	318.6	348.6	442.2	419.4	400.6
Number of children	743.0	654.6	827.1	702.0	478.3
	242.8	253.5	279.6	260.2	231.7
Children < 6 years old	-498.2	262.6	-874.1	-921.0	-151.6
	433.6	505.0	515.1	393.5	343.0
Years married	169.8	146.0	113.5	105.9	156.7
	31.23	34.88	38.15	32.53	27.08
Age of father	15.73	107.7	7.918	-34.93	-236.9
	127.1	213.7	180.9	170.5	159.9
Age of father squared	-1.247	-2.726	-0.650	0.432	2.709
	1.600	2.882	2.357	2.263	2.082
Father is H.S. graduate	208.7	-182.5	18.96	315.1	607.3
	442.4	445.6	523.4	473.3	410.5
Father has any college	-335.2	265.6	591.0	456.0	837.4
	547.6	529.0	548.3	447.8	432.3
Earnings of father	0.081	0.108	0.088	0.056	0.041
	0.018	0.023	0.022	0.019	0.015
State has CS award guidelines	-679.9	366.9	-366.8	-153.5	-497.0
	587.6	571.1	760.0	752.3	532.3
Paternity establishment until 18 yrs old	129.2	-706.4	-305.2	-143.6	661.1
	473.4	477.0	524.4	591.9	517.5
Wage withholding upon delinquency	-589.7	1106	734.4	-143.7	-37.66
	1106	624.6	729.9	1012	710.6
Fee for non-AFDC cases	-1001	1041	1360	410.9	746.2
	546.1	603.5	781.2	691.5	556.5
Medical insurance to be sought	1431	195.3	651.2	423.7	-102.8
with CS order	796.4	750.8	923.6	679.4	782.6

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Appendix Table 2 (continued)

Northeast	-63.84	-1130.6	356.8	-840.3	547.3
	729.2	744.8	811.1	731.8	569.6
North Central	-931.6	-1268.6	-313.8	-354.1	856.7
	604.4	823.1	851.7	749.2	612.9
South	-354.5	-1078	-425.2	-107.8	184.4
	572.0	639.3	701.9	682.7	523.4
SMSA	633.8	240.1	868.5	536.7	-220.0
	351.4	391.0	434.4	358.4	371.6
Changed state of residence	-452.1	-621.4	165.7	-804.5	-613.1
	530.1	425.2	543.2	581.9	565.4
Unemployment rate	-126.0	-102.8	-207.5	-112.4	-36.35
	97.17	82.68	96.09	94.34	80.52
Year - 1980	-270.0			-198.7	
	101.1			105.6	
(Year - 1980) squared	15.06			-0.732	
	16.26			18.08	
(Year - 1980) cubed	6.011			7.732	
	1.972			3.746	
Constant	798.2	1084	5734	892.0	3052
	2884	3157	3651	3019	2905

Note: Standard errors are in small font.

Appendix Table 3
Estimates for Probability of Remaining Unmarried - "Probit" Coefficients

Variable	Year 2	Year 3	Year 4	Year 5
Constant	1.240	0.327	0.410	-0.874
	1.250	0.731	0.759	0.736
Age - 30	0.119	0.087	0.046	0.066
	0.043	0.030	0.032	0.036
(Age - 30) squared	1.13e-03	5.19e-03	5.69e-03	2.30e-03
	1.77e-03	2.38e-03	2.38e-03	2.45e-03
H.S. graduate	0.011	-0.194	-0.330	-0.029
	0.248	0.263	0.273	0.307
Any college	0.251	-0.079	-0.428	0.050
	0.307	0.293	0.348	0.362
Race = nonwhite	0.293	0.179	0.449	0.408
	0.272	0.238	0.275	0.281
Number of children	0.188	0.074	0.013	0.088
	0.143	0.126	0.120	0.123
Children < 6 years old	0.093	0.040	0.271	0.482
	0.325	0.235	0.251	0.299
# other adults in household	-0.100	0.195	0.312	0.169
	0.125	0.109	0.156	0.128
Years married	-0.086	-0.083	-0.067	-0.051
	0.033	0.028	0.026	0.030
Unemployment rate	-0.041	0.006	-0.004	0.004
	0.044	0.044	0.050	0.043
Maximum AFDC benefit	2.61e-04	2.21e-04	-6.51e-04	3.34e-04
	7.58e-04	5.91e-04	6.65e-04	6.82e-04
Child support income	-4.03e-05	1.44e-05	1.09e-04	-4.69e-05
	6.17e-05	5.75e-05	8.56e-05	1.24e-04
Other non-labor income	-6.71e-05	-6.20e-05	-6.44e-05	-4.21e-05
	4.28e-05	3.88e-05	2.87e-05	3.81e-05
Northeast	0.666	0.290	0.678	0.675
	0.418	0.335	0.334	0.338
North Central	0.919	0.689	0.606	0.767
	0.378	0.301	0.336	0.340
South	0.171	0.337	-0.026	0.466
	0.424	0.327	0.358	0.389
SMSA	0.226	0.407	0.331	0.438
	0.231	0.201	0.206	0.209
Mean density $\phi(X_M\Pi_M+\rho_1\nu)$	0.104	0.206	0.241	0.274

Note: Standard errors corrected for first-stage estimation are in small font.

Appendix Table 4
Estimates for Probability of AFDC Participation - "Probit" Coefficients

Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Constant	-2.046	-5.025	-4.921	-5.721	-3.837
	0.785	32.778	1.609	1.949	2.335
Age - 30	-0.042	-0.064	-0.099	-0.146	-0.139
	0.021	0.035	0.038	0.046	0.041
(Age - 30) squared	8.90e-04	1.21e-03	4.12e-03	5.70e-03	7.00e-03
	1.14e-03	2.51e-03	1.92e-03	3.69e-03	2.42e-03
H.S. graduate	-0.704	-0.493	-0.976	-1.541	-1.498
	0.206	0.293	0.403	0.474	0.451
Any college	-0.597	-0.787	-1.256	-1.615	-1.152
	0.290	0.479	0.489	0.747	0.630
Race = nonwhite	0.000	0.320	0.214	0.120	0.135
	0.231	0.362	0.406	0.411	0.432
Number of children	0.547	0.769	0.684	0.641	0.482
	0.105	0.168	0.192	0.172	0.185
Children < 6 years old	0.118	0.101	0.468	-0.368	-0.310
	0.262	0.338	0.374	0.421	0.490
# other adults in household	0.205	0.175	-0.009	0.213	0.035
	0.118	0.185	0.188	0.218	0.179
Unemployment rate	0.019	0.044	0.135	0.246	0.170
	0.047	0.061	0.083	0.108	0.091
Maximum AFDC benefit	1.21e-03	1.59e-03	2.08e-03	6.07e-04	2.37e-03
	6.04e-04	7.56e-04	9.43e-04	1.35e-03	1.46e-03
Child support income	-2.05e-04	-2.82e-04	-3.60e-04	-2.68e-04	-3.04e-04
	5.59e-05	6.95e-05	8.74e-05	1.30e-04	1.79e-04
Other non-labor income	-1.64e-04	-1.51e-04	-3.90e-04	-2.94e-04	-1.44e-04
	1.18e-04	7.30e-05	6.82e-05	2.03e-04	1.50e-04
Northeast	0.152	0.469	1.694	1.543	1.276
	0.313	0.484	0.717	0.562	0.743
North Central	0.269	0.487	1.868	1.265	0.589
	0.271	0.424	0.585	0.681	0.611
South	-0.079	0.000	1.564	0.927	1.003
	0.385	0.552	0.732	0.815	0.899
SMSA	-0.121	-0.286	0.200	0.106	-0.082
	0.202	0.303	0.358	0.527	0.486
Mean density $\phi(X_A\Pi_A+\rho_2\nu)$	0.143	0.117	0.116	0.105	0.118

Note: Standard errors corrected for first-stage estimation are in small font.

Appendix Table 5
Labor Supply Equation for AFDC Participants - "Tobit" Coefficients

Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Constant	-46.83	5428	-35.00	-3159	-3263
	822.6	45906	1241	2193	2108
Age - 30	40.44	48.20	28.62	32.72	121.17
	21.79	26.10	34.01	73.66	46.00
(Age - 30) squared	-1.520	2.762	-4.339	0.151	-2.888
	1.237	1.945	3.479	6.219	2.829
H.S. graduate	-672.2	-573.9	-258.3	639.8	112.3
	267.0	288.1	400.0	674.7	484.6
Any college	2.450	933.9	212.2	99.38	69.71
	277.0	401.4	457.4	1343	588.3
Race = nonwhite	-5.317	278.9	186.1	312.1	430.7
	247.4	246.9	350.8	857.6	474.0
Number of children	-357.7	-568.5	-327.7	-138.0	-75.58
	105.8	140.3	160.3	238.6	134.3
Children < 6 years old	462.5	-105.5	567.0	416.7	1248
	247.8	318.6	372.5	797.6	475.3
# other adults in household	11.34	114.4	-260.3	-267.9	-469.3
	119.2	145.2	154.3	180.1	184.1
Unemployment rate	106.4	70.04	44.43	104.5	-83.04
	49.21	41.77	74.12	166.0	89.93
Maximum AFDC benefit	0.229	-1.303	0.526	2.636	3.726
	0.553	0.706	0.835	1.913	1.723
Child support income	0.248	0.104	0.355	0.366	0.267
	0.069	0.073	0.108	0.339	0.212
Other non-labor income	0.370	0.050	0.087	-0.145	0.130
	0.178	0.072	0.134	0.239	0.180
Northeast	489.8	-303.4	-370.8	179.8	155.9
	354.9	383.8	540.5	970.6	600.2
North Central	-278.5	-663.3	-166.5	727.2	231.9
	272.7	320.9	503.9	931.7	546.0
South	388.9	-754.9	124.8	1723	1427
	426.0	452.7	694.8	1341	1060
SMSA	-770.6	-97.32	-238.2	-876.9	-403.8
	221.0	351.6	395.9	871.0	706.5

Note: Standard errors corrected for first-stage estimation are in small font.

Appendix Table 6
Labor Supply Equation for non-AFDC Participants - "Tobit" Coefficients

Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Constant	1545	423.3	2179	1306	1860
	163.2	24627	243.6	276.5	305.5
Age - 30	20.48	32.25	8.559	18.83	-3.587
	6.031	11.50	11.23	14.71	19.84
(Age - 30) squared	-1.064	-1.706	-1.103	-0.387	-0.254
	0.302	0.591	0.626	0.917	1.149
H.S. graduate	-46.65	255.2	189.7	238.0	195.2
	62.97	100.5	112.2	128.7	159.1
Any college	68.22	158.5	436.8	86.94	266.8
	70.74	110.6	129.1	138.5	148.1
Race = nonwhite	17.97	-123.1	-362.2	-172.4	-173.5
	70.69	115.0	118.2	139.3	136.6
Number of children	-23.05	-58.67	-4.212	39.63	-72.43
	35.53	56.41	50.77	61.72	81.09
Children < 6 years old	4.458	122.3	-109.8	243.7	166.4
	74.88	114.0	120.2	127.0	143.8
# other adults in	0.271	-191.2	-15.86	65.13	96.80
	43.97	57.64	52.85	61.58	51.21
Unemployment rate	-14.75	-5.727	-40.45	17.33	-25.24
	14.34	21.40	22.69	24.71	29.93
Child support income	-1.05e-03	-1.50e-02	-5.37e-02	1.93e-02	-1.28e-02
	1.37e-02	2.11e-02	2.24e-02	4.11e-02	5.55e-02
Other non-labor income	-5.50e-02	-8.41e-02	-2.34e-03	-2.86e-02	-1.19e-03
	1.08e-02	2.07e-02	9.36e-03	1.35e-02	1.80e-02
Northeast	5.754	-251.9	-231.9	-136.9	234.6
	86.99	161.4	174.8	173.0	226.2
North Central	152.3	-258.7	-108.3	-9.731	92.93
	84.58	137.5	136.2	150.8	197.2
South	107.8	-72.94	-179.3	-128.0	52.79
	73.23	131.2	129.3	146.3	187.4
SMSA	70.64	72.93	135.4	-69.30	100.5
	57.40	98.39	81.72	100.8	114.7

Note: Standard errors corrected for first-stage estimation are in small font.

Appendix Table 7
Estimated Coefficients on Actual Child Support Payments

	Remarriage	AFDC	Hours on AFDC	Hours off AFDC
Year 1	NA	-3.00e-04	-0.145	8.03e-03
Year 2	1.69e-04	-6.09e-04	-0.011	-0.038
Year 3	1.62e-04	-3.17e-04	0.173	-0.013
Year 4	1.83e-04	-2.86e-04	-0.128	0.016
Year 5	1.71e-04	-2.23e-04	0.105	-3.71e-03