Rationalizing Child-Support Decisions

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We provide a framework within which the child-support compliance decisions of noncustodial fathers and the child-support awards set by institutional agents can be coherently interpreted. The model of child-support transfers is able to capture qualitatively the features of the monthly payment distribution. Estimated parental-decision rules are used to infer the implicit weights given by institutional agents to the postdivorce welfare of parents and children. We find that the weight attached to the combined welfare of the custodial mother and child is significantly less than the weight given to the father's welfare in most sample cases. (JEL D10, K40)

When a married couple with children obtains a divorce, at least four agents with differing objectives and resources are immediately involved: children, fathers, mothers, and institutional agents. Children typically have little in the way of resources and explicit legal rights. Divorced mothers and fathers, considered as two separate groups of agents, must be viewed as having diverse objectives and resources following a divorce (and at least to some extent within marriages). Fathers most often have significantly greater financial resources than mothers at the time of and following the divorce (Gregory Duncan and Saul Hoffman, 1985; Robert Weiss, 1984) although the mother may garner a greater amount of loyalty from the children if she has served as their primary caretaker during the marriage. 

Finally, the legal and social system, which defines the rules under which the outcome is determined and, more importantly, has implicit or explicit valuations of those outcomes, must be viewed as a fourth agent. What makes determination of child custody and child support such a controversial social issue and such a difficult analytical problem is the fact that the

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Current research in household consumption decisions has stressed the role of differences in preferences and resources between members of intact households in accounting for within-household consumption allocations (see Marilyn Manser and Murray Brown, 1980; Marjorie McElroy and Mary Horney, 1981; Pierre-Andre Chiappori, 1988). In order to compare behavior within and outside the marriage, Yoram Weiss and Robert Willis (1985, 1993) have posited invariant preferences for mothers and fathers, with pre- and postdivorce behavior differing due to changes in resource allocations (income and custody rights) and bargaining strategies. In this paper we take the divorce as a given and therefore need assume nothing about the relationship between pre- and postdivorce preferences and behavior of mothers and fathers.

This argument is often advanced as a reason for awarding the mother physical custody under the “best interest of the child” rationale (see Lenore Weitzman, 1985 Ch. 8).

Robert Mnookin and Lewis Kornhauser (1979) analyze the role of legal institutions in determining final divorce orders through the differential bargaining power given to the contestants. Jon Elster (1989) examines the extent to which legal institutions can and should use rational decision rules in adjudicating custody cases. Judith Cassetty (1978) and the papers in Cassetty (1983) look at the role of public policy in defining and enforcing custody and child-support orders.
four agents involved are so diverse in terms of objectives, resources, and information sets.

In this paper we examine the effect of child-support orders and transfers on the postdivorce welfare levels of these four groups of agents. Throughout we will treat the postdivorce own-income levels of the parents as exogenous, and we will assume that the divorced parents behave in a noncooperative manner. We begin by specifying the preferences of the parents, which are defined by their own consumption and that of the child. In this view, after a divorce, consumption by the child continues to be a public good, just as it was during the marriage (see Weiss and Willis, 1985, 1989); what changes is the manner in which child-expenditure decisions are made. We adopt an expenditure-coordination mechanism that is consistent with the pattern of child-support transfers observed in the data.

The institutional agent takes the equilibrium responses of the parents into account when determining the child-support order, so that the model has a Stackelberg structure. The institutional agent’s preferences are represented by a linear function of the expected welfare of children, mothers, and fathers. The sole policy instrument available to this agent is the child-support order. Our modeling assumptions will allow us to recover the weights attached to the expected welfare levels of custodial mothers, noncustodial fathers, and their children from the observed child-support orders.

Institutions also play a prominent role in the theoretical and empirical analysis of divorce settlements conducted by Weiss and Willis (1985, 1993). In their 1985 paper, the institutional agent’s role was primarily to enforce divorce settlements. In their 1989 paper, Weiss and Willis focused on the role of the institutional agent in settling disputed cases when the mother and father could not come to an amicable agreement (the authors did not explicitly consider the problem of noncompliance in that analysis). The analysis we conduct here should be considered as complementary to theirs in that we focus primarily on parental choices regarding compliance with orders and the effects of divorce settlements on expenditures on children. We make no distinction between settlements reached amicably or adjudicated in an adversarial procedure. Instead we view all settlements as being reached within an environment of legal, political, and social institutions; these institutions, as well as the individuals functioning under their aegis, should collectively be viewed as the “institutional agent” referred to repeatedly in this paper.

The compliance decision is central to our analysis, since all behavioral parameters are estimated using only compliance information from a sample of individuals under court orders to make child-support payments. While a number of social scientists have investigated compliance empirically (e.g., David Chambers, 1979; Andrea Beller and John Graham, 1985; Philip Robins, 1986; Irwin Garfinkel and Daniel Oellerich, 1989), the focus of these studies is usually on the effects of noncompliance on the postdivorce income allocation between fathers and mothers and the enforcement problem per se. We have introduced a number of assumptions regarding the

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4 See Del Boca and Flinn (1994a) for a theoretical and empirical analysis of the child-support transfer decision when parents behave cooperatively. As is well known, cooperative solutions to the public-goods problem are efficient and so produce higher levels of welfare both for parents and for the child in comparison with those associated with Nash equilibria. However, the implementation of cooperative agreements is problematic, particularly within static frameworks like the one utilized here. It is primarily for this reason that we utilize Nash equilibria throughout this paper.

5 The model actually has a “double” Stackelberg structure in the sense that fathers condition on the child-support order and the expenditure behavior of the mother when making their transfer decision, while institutional agents condition on the expenditure behavior of the mother and the transfer decision rule of the father when determining the child-support award. This recursive structure is heavily exploited in our empirical analysis.

6 In an earlier version of this paper (Del Boca and Flinn, 1990) we also examined the custody decisions of institutional agents; in this paper we examine the choice of child-support orders by the judge and the transfer decision of

the father conditional on the fact that the mother has physical and legal custody of the child. This custody arrangement continues to be the predominant one throughout the United States.
preferences of fathers and mothers so as to understand better the behavioral motivation for noncompliance. With such an understanding, it may eventually be possible to consider how divorce arrangements could be structured so as to increase the welfare of all or of a subset of the agents involved in a divorce. We take a small step in this direction at the end of the paper.

To motivate our analysis, we present empirical distributions of child-support awards and payments in the data utilized below, which are taken from a sample of divorce cases in Wisconsin over the period 1980–1982. These data refer to child-support awards and payments in the fifth month from the time of the original divorce decree. To be included in the sample, the couple must have had only one child, the mother must have been designated the custodial parent and received a child-support award, and the ordered frequency of payment must have been one month. Monetary amounts reported throughout the paper are in terms of 1980 dollars.

The average (pre-transfer) monthly income levels of divorced mothers and fathers are $556 and $1,146 in this sample. In Figure 1A we present the distribution of child-support awards: The average award is $225 per month, which is approximately 20 percent of the mean income of fathers. The distribution is relatively concentrated, with 63 percent of the sample in the interval [$100, $300].

Figure 1B contains the distribution of actual child-support transfers from the noncustodial father to the custodial mother in the fifth month of the order period. The most notable feature of this distribution is the spike at zero payments; 37 percent of all sample fathers made no transfer during this month though all were under orders to do so. The distribution of the ratio of payments to orders in the fifth month is presented in Figure 1C. This distribution is interesting in that while the spikes at 0 and 1 (corresponding to what we will refer to later as exact compliance) are its predominant feature, about 25 percent of the sample makes a nonzero monthly payment that is not

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7 While the large proportion of zero payments is to some extent an artifact of using only a one-month payment period, a significant proportion of noncustodial parents make no payments over periods as long as one year.
equal to the ordered amount (14 percent of the total sample make a transfer that is less than what is stipulated, whereas 11 percent pay more than the ordered amount). The model we describe and estimate below will be able to capture these qualitative features of the distribution in a parsimonious manner.

The plan of the paper is as follows. In Section I we provide an exposition of our modeling assumptions and characterize the equilibrium behavior of the divorced parents given the child-support order. Section II contains a discussion of the institutional agent’s optimization problem. In Section III we set out the econometric model used to obtain consistent estimates of the preferences of parents and institutional agents. We describe the data used and present all of the empirical results in Section IV, and in Section V we provide a brief conclusion.

I. Monetary Transfers between Divorced Parents

Many popular discussions of the problem of noncompliance with child-support orders stress the fact that a large proportion of noncustodial parents who are legally required to make monthly monetary transfers to their former spouses make no transfers whatsoever—a point that is illustrated in Figure 1B. Nonetheless, the majority of noncustodial parents under orders to make child-support payments do make some positive transfers to the other parent, although in some cases the amount paid is less than the ordered amount. A large proportion of noncustodial parents transfer the exact amount ordered, and a significant proportion transfer more than the stipulated amount. In this section, we develop a simple behavioral model of the interactions between divorced parents that is consistent with these empirical facts. In the following section, we will investigate the behavior of institutional agents who make policy choices which are constrained by the behavior of the divorced parents.

Throughout the analysis, we will assume that one parent is the custodial parent (the mother). We begin by examining the behavior of divorced parents in an environment without child-support orders. Although the divorced parents no longer inhabit the same household and are assumed to have access to two independent sources of income, denoted \( y_m \) and \( y_f \), their welfare levels remain jointly determined after the divorce due to the presence of a public good—the child. Let \( c_p \) denote the private consumption of parent \( p \), and let \( k \) denote the consumption of the child. We will assume that the utility function of parent \( p \) is Cobb-Douglas, so

\[
(1) \quad u_p = \delta_p \ln(c_p) + (1 - \delta_p) \ln(k)
\]

where \( \delta_p \) is the preference parameter of parent \( p \) and \( m \) and \( f \) denote the mother and the father.

A critical assumption concerns the manner in which the consumption level of the child is set. Because the mothers in the sample have both physical and legal custody, we assume that all “significant” expenditures on the child must be made or approved by her. We take the extreme position that the only way in which the father may augment the consumption level of the child is by transferring money to the mother. Given the father’s transfer and her own income, the mother freely allocates it on her own consumption and that of the child.9

9 While clearly not a general representation of preferences, the Cobb-Douglas assumption is employed here both because its limited number of parameters simplifies the identification of parental preferences from data on income, child-support orders, and transfers, and because it facilitates analysis of the institutional agent’s problem, due to the relatively simple parental decision rules implied in this context. These decision rules will be “inputs” into the institutional agent’s problem.

7 In a dynamic model, the mother’s choices in any period may elicit behavioral responses from the father in later periods which she would consider in setting current-period expenditure levels. In such a situation, we might observe different expenditure levels on child consumption by custodial mothers with the same total income but different amounts of child-support income. However, in a static model such as the one analyzed here, such feedback is ruled out, and mothers have no behavioral or legal reason for treating the two income sources differently in making expenditure decisions. For a discussion that touches on some of these points see Del Boca and Flinn (1994b).
Without loss of generality, we will normalize the price of the private consumption goods of the parents and the child to unity. Given her total income level \( Y_m + t \), where \( t \) is the transfer from the father, the mother then chooses a level of expenditure on the child equal to \( k^*(\delta_m, Y_m + t) = (1 - \delta_m)(Y_m + t) \). The father, taking the mother’s behavior as predetermined, chooses his transfer to the mother according to

\[
(2) \quad t^*(\delta_m, \delta_f, Y) = \arg \max_{t \in [0, Y_f]} \delta_f \ln(y_f - t) + (1 - \delta_f) \ln(1 - \delta_f)(Y_m + t)
\]

where \( y = (Y_m, y_f)' \). Due to the functional forms with which we are working, it is apparent that the optimal transfer of the father to the mother is independent of the value of the mother’s preference parameter, so \( t^*(\delta_f, Y) = t^*(\delta_m, \delta_f, Y) \) for all values of \( \delta_m \). The decision rule is then characterized by

\[
(3) \quad t^*(\delta_f, Y) = \begin{cases} 
  y_f - \delta_f y_f & \text{if } \delta_f < y_f/y_f \\
  0 & \text{if } \delta_f \geq y_f/y_f 
\end{cases}
\]

where \( y_f = Y_m + y_f \) is aggregate parental income.

The assumption that only mothers can directly make expenditures on “child goods” leads to the prediction that we could observe positive transfers from fathers to mothers even in the absence of child-support awards. Because the amount of the child-support award appears nowhere in the optimization problem of either parent, this model of transfers leads to no interesting implications regarding compliance behavior. To remedy this situation, we modify the preferences of the father as follows:

\[
(4) \quad u_f = \delta_f \ln(c_f) + (1 - \delta_f) \ln(k) - \theta I[t < s]
\]

where \( s \) is the amount of the child support order and \( I[\cdot] \) is the indicator function. A father pays a fixed cost of \( \theta \) denominated in utils if he does not fully comply with the order.\(^{10}\) The cost is avoided if his transfer to the mother meets or exceeds the court order \( s \).\(^{11}\)

In order to examine the father’s behavior under the utility specification (4), it will be useful to define his utility levels in the states of “exact” compliance with the order and his utility when the transfer \( t^*(\delta_f, Y) \) defined in (3) is made. (In the sequel we will often drop the explicit conditioning on the income distribution for notational simplicity.) We denote these two utility levels by \( V_c(\delta_m, \delta_f) = \delta_f \ln(y_f - s) + (1 - \delta_f) \ln(1 - \delta_f)(Y_m + s) + (1 - \delta_f) \ln(1 - \delta_m) \) and \( V_n(\delta_m, \delta_f, \theta) = \delta_f \ln(y_f - t^*(\delta_f)) + (1 - \delta_f) \ln(1 - \delta_f) + \theta I[t^*(\delta_f) < s] \). Whether “exact” compliance occurs or not depends solely on the sign of the difference \( V_n(\delta_m, \delta_f, \theta) - V_c(\delta_m, \delta_f) \). We proceed to examine this difference as a function of the values of the father’s preference parameters \( \delta_f \) and \( \theta \). For ease of reference, all of the cases are fully described in Table 1.

We first consider the case in which the father has a relatively low preference weight associated with his private consumption. From (3) we have observed that whenever the father’s value of \( \delta_f \) is less than \( y_f/y_f \) he will make a positive transfer to the mother. If in addition the father’s voluntary transfer \( t^*(\delta_f) \) is greater than or equal to \( s \), the order will not constrain his behavior. In the situation in which the father’s voluntary transfer equals or exceeds the order, we will say that he “overcomplies.”\(^{12}\)
For a noncustodial father to overcomply, it must be the case that

\[ t^*(\delta_f) \geq s \]

\[ \Rightarrow y_f - \delta_1 y_T \geq s \]

\[ \Rightarrow (y_i - s)/y_T \geq \delta_f. \]

When \( \delta_f \leq (y_i - s)/y_T \), the observed transfer will be equal to \( t^*(\delta_f) \) for all values of the cost of noncompliance parameter \( \vartheta \) since compliance is assured. Thus a father with values of \( \delta_f \in [0, (y_i - s)/y_T] \) and \( \vartheta \in [0, \infty] \) will overcomply with respect to the order \( s \).

Next consider the case in which a father with order \( s \) would voluntarily make a transfer to the mother, but for less than the ordered amount. The fact that a transfer would voluntarily be made implies that \( \delta_f < y_i/y_T \), while we know that the voluntary transfer will be less than the order when \( \delta_f > (y_i - s)/y_T \), so \( \delta_f \in ((y_i - s)/y_T, y_i/y_T) \). For this set of fathers, the value of noncompliance is \( \delta_f \ln(\delta_f) + (1 - \delta_f) \ln(1 - \delta_f) + \ln(y_T) - \delta_f \ln(y_f - s) - (1 - \delta_f) \ln(y_m + s) \). Then a father will exactly comply with the order when \( \delta_f \geq D_1(\delta_f), \) where \( D_1(\delta_f) = \delta_f \ln(\delta_f) + (1 - \delta_f) \ln(1 - \delta_f) + \ln(y_T) - \delta_f \ln(y_f - s) - (1 - \delta_f) \ln(y_m + s) \). Thus we have that fathers with \( \delta_f \in ((y_i - s)/y_T, y_i/y_T) \) and \( \vartheta \in [0, D_1(\delta_f)] \) will partially comply with the order. The term partial compliance will refer to the state in which the father makes a child-support transfer to the mother, but for less than the ordered amount. Strictly speaking, of course, such a father is not complying with the order, no matter how small the difference between the payment and the ordered amount.

Finally, consider the case in which the father would voluntarily make no transfer to the mother, so \( \delta_f \in [y_i/y_T, 1] \). The value of noncompliance for such a father is then \( \delta_f \ln(y_i) + (1 - \delta_f) \ln(1 - \delta_f) + \ln(y_T) - \vartheta \), and the value of compliance is \( \delta_f \ln(y_i - s) + (1 - \delta_f) \ln(1 - \delta_f) + \ln(y_m + s) \). Then a father will exactly comply with the order when \( \vartheta \geq D_0(\delta_f), \) where \( D_0(\delta_f) = \delta_f \ln(y_i) + (1 - \delta_f) \ln(1 - \delta_f) + \ln(y_T) - \delta_f \ln(y_i - s) - (1 - \delta_f) \ln(y_m + s) \). For fathers making no distribution of \((y_i - s)/y_T\) is absolutely continuous and if orders are set by institutional agents without knowledge of a given father's value of \( \delta_f \). Both of these conditions are satisfied in the model developed and estimated here.
transfer to the mother $\delta_t \in [y_t/y_T, 1]$ and $\vartheta \in [0, D_\delta(\delta_t)]$. Fathers with $\delta_t \in [y_t/y_T, 1]$ and $\vartheta \in [D_\delta(\delta_t), \infty)$ will exactly comply with the order.

We will assume that the random variables $\vartheta$ and $\delta_t$ are independently distributed throughout the remainder of the paper in order to make the estimation of the econometric model more tractable. This condition and the conditions that the support of the distribution of $\vartheta$ is $[0, \infty)$, that the support of $\delta_t$ is $[0, 1]$, and that both random variables are continuously distributed in the population of divorced fathers are sufficient to guarantee that this simple behavioral model is consistent with the payment behavior displayed in Figure 1. Specifically, this model is capable of generating the mass points observed in Figure 1C at the values of the payment/order ratio equal to 0 and 1, as well as the continuous distribution of this ratio in the intervals $(0, 1)$ and greater than 1.

II. The Determination of Child-Support Orders

In this section we attempt to “rationalize” the pattern of child-support awards observed in our data using a social-welfare-function approach (although the institutional agent’s objective function need not be strictly interpretable as a social-welfare function, it will be useful to employ this analogy often in what follows). Most of our empirical analysis will be devoted to solving the inverse optimum problem (as it is known in the public economics literature), good explications and applications of which are contained in Vidar Christiansen and Eilev Jansen (1978) and Entisham-Uddin Ahmad and Nicholas Stern (1984).13 Our general approach is to consider the child-support awards as solutions to an institutional agent’s first-order condition associated with his or her utility-maximization problem. Using the first-order condition, preference weights can be uniquely determined after specifying the institutional agent’s expectations about parental postdivorce behavior. We will also compute optimal awards under a specific assumption regarding the distribution of welfare weights among institutional agents for purposes of comparing them with the observed orders. Finally, we will use the institutional agent’s weights in conducting a comparative-statics exercise that looks at the effects of shifts in the distribution of noncompliance costs on expected child-support transfers.

We begin by endowing institutional agents with an objective function which bears a close resemblance to a Benthamite social-welfare function, namely,

\[
W(s, y, \omega) = \tau_m V_m(s, y, \omega) + \tau_k V_k(s, y, \omega) + \tau_i \tilde{V}(s, y, \omega)
\]

where $V_m$ and $V_k$ denote the indirect utility functions for the mother and child respectively, while $\tilde{V}(s, y, \omega) = \delta_t \ln(y_t - t***(s, y, \omega')) + (1 - \delta_t) \ln(1 - \delta_m) + (1 - \delta_f) \ln(y_m + t***(s, y, \omega'))$. The random variable $\omega$ represents the vector $(\delta_m, \delta_f, \vartheta)$ while the subvector $\omega'$ contains only $(\delta_f, \vartheta)$. The function $t***(s, y, \omega')$ is the child-support transfer function (recall that the child-support transfer is independent of $\delta_m$). The function $\tilde{V}$ is not equal to the father’s indirect utility function, since it does not include the cost of noncompliance should the father not comply with the order (i.e., $-W(t***(s, y, \omega') < s)$).14 The “welfare weights” $\tau_i$ are normalized to sum to unity; in general there is no requirement that each weight be nonnegative. To complete the specification of the institutional agent’s problem, we assume that the child’s utility is equal to the logarithm of the

13 Both papers address the issue of determining the social preferences implicit in value-added tax systems, one paper dealing with the case of Norway (Christiansen and Jansen) and the other the case of India (Ahmad and Stern). argument can be made either way with respect to whether the institutional agent should consider the direct cost of noncompliance to the noncustodial parent when setting orders. The question is analogous to whether punishments for criminal activity should be set taking into account the value of committing criminal acts to their perpetrators. We feel that it is slightly more reasonable to assume that institutional agents do not consider these direct costs of noncompliance when setting orders.
expenditures on her or him, so that \( V_k(s, y, \omega) = \ln((1 - \delta_m)(y_m + t^{**}(s, y, \omega'))) \).

Given (5), the behavior of the divorced parents that was described in the previous section and the information set of the institutional agent that is given by \( F_f \), the institutional agent sets the order so as to maximize the expected value of (5) with respect to \( F_f \). Under our assumptions regarding the institutional agent’s information set (see below), the expected value of (5) is continuously differentiable with respect to the order. Then the optimal order \( s^* \) satisfies the first-order condition

\[
0 = \tau_m \frac{\partial E V_m(s^*, y, \omega)}{\partial s} + \tau_k \frac{\partial E V_k(s^*, y, \omega)}{\partial s} + \tau_f \frac{\partial E \tilde{V}_f(s^*, y, \omega)}{\partial s}.
\]

Given the form of the indirect utility functions, the partial derivatives in (6) can be written as

\[
\begin{align*}
\frac{\partial E V_m(s^*, y, \omega)}{\partial s} &= \frac{\partial E \ln(y_m + t^{**}(s^*, y, \omega'))}{\partial s} = A_m, \\
\frac{\partial E V_k(s^*, y, \omega)}{\partial s} &= \frac{\partial E \ln(y_m + t^{**}(s^*, y, \omega'))}{\partial s} = A_k, \\
\frac{\partial E \tilde{V}_f(s^*, y, \omega)}{\partial s} &= \frac{\partial E}{\partial s} \left\{ \delta_i \ln(y_i - t^{**}(s^*, y, \omega')) + (1 - \delta_i) \ln(y_m + t^{**}(s^*, y, \omega')) \right\} = A_f.
\end{align*}
\]

Since \( A_m = A_k \), we have

\[
(8) \quad 0 = (\tau_m + \tau_k)A_m + \tau_f A_f \\
\Rightarrow \tau^* = \frac{A_f}{A_f - A_m}
\]

where \( \tau^* \) is the sum of the institutional agent’s weights given to the mother’s and the child’s expected welfare.\(^\text{15}\) To compute the welfare weight \( \tau^* \) for a given case, from (7) and (8) it is clear that we need to have access to the institutional agent’s information set regarding \( \delta_i \) and \( \vartheta \) (the institutional agent’s choice of the order is independent of \( \delta_m \), as is the father’s choice of the transfer) and the state variables \( y \) and \( s \) (=\( s^* \) under this interpretation of the order-setting process).

The solutions to the inverse optimum problem considered are obtained under the assumption that each judge treats parents as identical in the sense of being random draws from the joint distribution of \( (\delta_m, \delta_i, \vartheta) \); this assumption implies that no information concerning these parameter values can be credibly transmitted to the institutional agent at the time of adjudication of the case. We have already noted that the mother’s preference parameter cannot affect the judge’s allocation decision in any manner, so pre-order information concerning \( \delta_m \) is of no value to the judge in determining \( s \) (unless it can be used to infer values of \( \delta_i \) and \( \vartheta \)). We find it reasonable to assume that the parameter \( \vartheta \) is not known by any agent (including the father) prior to the setting of the order.\(^\text{16}\) The question remains as

\(^{15}\) While the Cobb-Douglas assumption regarding parental preferences and our assumption concerning the form of the child’s direct utility function are responsible for our being able only to identify the sum of \( \tau_m \) and \( \tau_f \), it is clear that, no matter what our assumptions are concerning the preferences of the parents and child, a fundamental identification problem will always exist. This is because there is only one first-order condition, so that at most only one free parameter can be uniquely determined. The Cobb-Douglas assumption at least resolves this identification problem in an easily interpretable manner.

\(^{16}\) While the institutional agent, and even the parents, may know the proscribed legal penalties for failure to
to whether information regarding $\delta_i$ can be credibly conveyed.

It may be reasonable to think that during the course of a marriage, whether ending in divorce or not, parents would acquire information about the value of their spouse’s preference parameter $\delta$. The question arises as to whether such private information can credibly be conveyed to the institutional agent. Consider the case in which $\tau^* = 1$; in this case the objectives of the mother and the institutional agent coincide. In such a situation it is optimal for the mother to reveal truthfully the father’s value of $\delta_i$ — misrepresentation only leads to a reduction in her expected welfare. Conversely, the father will have an incentive to misrepresent his value of $\delta_i$ in such a case. Only when $\tau^*$ is equal to 0 or 1 will the institutional agent’s objective correspond to those of one of the parents; in all other cases both parents will have an incentive to provide misleading information to the judge concerning the behavior of the father. Unless a mechanism can be found that ensures truth-telling on the part of the parents, the judge must discount parental claims regarding the value of $\delta_i$.\textsuperscript{17,18}

We compute the welfare weight $\tau^*$ pertaining to a given case under the assumption that the institutional agent holds rational beliefs regarding the distributions of $\delta_i$ and $\vartheta$, consistent estimates of which are obtained by us in the course of estimating the father’s child-support transfer decision. In this case it is not generally true that the imputed weights will lie in the unit interval, so certain observed orders and income distributions may imply that the institutional agent attaches a negative weight to the expected welfare of the mother and child or of the father. Since the objective function of the institutional agent (5) need not be strictly interpreted as a social-welfare function, negative weights are still consistent with the assumption of utility maximization. In practice, we find that all but one estimated $\tau^*$ lie in the unit interval, so that this issue is not particularly germane in this application.

### III. Econometric Model of Child-Support Decisions

In this section we develop the econometric model of child-support transfers used to retrieve estimates of the structural parameters of the model. Recall that under the Cobb-Douglas assumption on parental preferences and the mechanism for determining expenditures on the public good, the father’s transfer is not a function of the mother’s preference parameter $\delta_m$. Furthermore, the institutional agent’s decision rule for selecting the order is also independent of $\delta_m$, so that this parameter cannot be identified, whether one is using data on $t$, $s$, or both. Therefore the structural parameters of the model are the population distributions of $\delta_i$, $\vartheta$, and the institutional agent’s welfare weight, $\tau^*$. We make parametric assumptions for the distributions of $\delta_i$ and $\vartheta$ and estimate the parameters characterizing these distributions using standard parametric maximum-likelihood (ML) estimators. We then estimate the distribution of $\tau^*$

comply, we view these penalties as relatively minor components of $\vartheta$. Indeed, it is typically up to the custodial parent to initiate legal proceedings to punish a noncustodial parent for failure to comply with the child-support order, and there is marked variability in the propensity of custodial mothers to do so. Also, failure to comply with an order may result in the withholding of visitation privileges or other extralegal sanctions which cannot be foreseen by the institutional agent when the final stipulation is made.

\textsuperscript{17} Another justification for treating all fathers as random draws from a fixed distribution may be that when changing status from that of a father in an intact household to that of a noncustodial parent, the father’s own preference weight may change in a partially unpredictable manner. In such a situation, either parent’s predivorce information regarding $\delta_i$, even if truthfully revealed, may be of limited value to the institutional agent.

\textsuperscript{18} This entire problem is related to the standard issue in public economics of the elicitation of truthful valuations of a public good. For example, if residents of a community are to be taxed in proportion to their utility gain from the provision of a public good, they have an incentive to underreport their valuation of the public good. The case examined here is a bit more complicated since the institutional agent’s welfare is defined over the agent’s consumption of both private and public goods. Depending on the welfare weight $\tau^*$ and $\vartheta$, a parent may have an incentive to overreport or underreport his or her valuation of expenditures made on the child.
nonparametrically conditional on the ML estimates of the distributions of \( \delta_i \) and \( \vartheta \). The consistency properties of these estimators are briefly discussed below.

The sample can profitably be thought of as comprising four groups of individuals: G1, those fathers making no payment in the month, or \( t = 0 \); G2, those fathers "partially complying," or \( 0 < t < s \); G3, those fathers making a payment exactly equal to the stipulated amount, or \( t = s \); and G4, those fathers "overcomplying," or \( t > s \). The model can most easily be understood by referring to Table 1, where the group to which a given type of father is assigned appears in the second column. We now briefly construct the contribution of each group to the likelihood function.

**G1: No Transfer.**—From Table 1 we know that no transfer is observed only when \( \delta_i \in [y_i/y_T, 1] \) and \( \vartheta \in [0, D_0(\delta_i, y, s)] \), where we have explicitly noted the dependence of \( D_0 \) (and \( D_i \); see below) on the state variables \( y \) and \( s \). Then conditional on \( \delta_i \), the probability of no transfer is

\[
P(t = 0 | \delta_i, \delta_i \in [y_i/y_T, 1], y, s)
= P(\vartheta \leq D_0(\delta_i, y, s))
= G(D_0(\delta_i, y, s); \Xi_G)
\]

where \( \Xi_G \) is a finite-dimensional parameter vector that completely characterizes the distribution function \( G \) of the random variable \( \vartheta \). With \( H \) denoting the distribution function of the preference parameter \( \delta_i \) in the population of noncustodial fathers, and with \( \Xi_H \) denoting the finite-dimensional parameter vector that completely characterizes \( H \), we have that the probability of a zero payment for a father with state variables \( (y, s) \) is

\[
P(t = 0 | y, s)
= \int_{y_i/y_T} G(D_0(\delta_i, y, s); \Xi_G) \, dH(\delta_i; \Xi_H).
\]

This probability represents the contribution of a member of G1 to the sample likelihood, which we denote by \( L_{G1} \).

**G2: Partial Compliance.**—For an individual to comply partially with an order, we have seen that \( \delta_i \in ((y_i - s)/y_T, y_i/y_T) \) and \( \vartheta \in [0, D_i((\delta_i, y, s)) \). Conditional on \( \delta_i \), the probability that such an individual will not comply with the order is given by \( G(D_i((\delta_i, y, s)); \Xi_G) \). For an individual who partially complies, we can impute the value of his preference parameter since we observe his transfer and the income distribution of the parents. Then

\[
t = y_i - \delta_i y_T
\]

\[
\Rightarrow \delta_i = (y_i - t)/y_T.
\]

The probability-density function for the transfer among this group of fathers is given by

\[
\hat{h}(t; y, \Xi_H) = h((y_i - t)/y_T; \Xi_H) |\partial \delta_i/\partial t|
= h((y_i - t)/y_T; \Xi_H)/y_T.
\]

The contribution to the sample likelihood of an individual who partially complies is then equal to the product of the probability-density function of the transfer and the probability that the noncompliance cost is sufficiently low given the preference parameter of the father, or

\[
L_{G2} = G(D_i((y_i - t)/y_T, y, s); \Xi_G) \hat{h}(t; y, \Xi_H).
\]

**G3: Exact Compliance.**—As can be seen from Table 1, it is necessary to distinguish between two distinct types (in terms of \( \delta_i \)) of fathers belonging to this group. One subgroup consists of those who would not make a positive transfer if not ordered to do so; these fathers have values of the preference parameter contained in the interval \( [y_i/y_T, 1] \). The other subgroup consists of fathers who would make positive transfers even if not required to do so, but less than the amount ordered; these fathers have values of the preference parameter which lie in the interval \( ((y_i - s)/y_T, y_i/y_T) \). The probability that a member of the first set of fathers exactly complies with the order is given by

\[
P(t = s | \delta_i, \delta_i \in [y_i/y_T, 1], y, s)
= 1 - G(D_0(\delta_i, y, s); \Xi_G)
\]
whereas the probability that a member from the second set of fathers exactly complies is given by

$$P (t = s | \delta_t, \delta_t \in ((y_t - s)/(y_t', y_t, y_t'), y_t, s)) = 1 - G(D_t(\delta_t, y_t, s)).$$

The unconditional probability of exact compliance, which is the likelihood contribution \(L_{G4}\), is then

$$P (t = s | y, s) = \int_{y_t \leq y} \left[ 1 - G(D_t(\delta_t, y_t, s); \Xi_G) \right] dH(\delta_t; \Xi_H) + \int_{y_t > y} \left[ 1 - G(D_t(\delta_t, y_t, s); \Xi_G) \right] dH(\delta_t; \Xi_H).$$

**G4: Overcompliance.**—When a father transfers more than is stipulated, we are able to discern his exact value of \(\delta_t\), as was true in the partial-compliance case. Unlike the partial-compliance case, we learn nothing about the distribution of \(\theta\) from individuals who overcomply, since the probability of overcompliance depends only on the father’s value of \(\delta_t\) and the state variables \(y\) and \(s\). Thus the likelihood contribution for members of this group is simply

$$L_{G4} = \hat{h}(t; y, \Xi_H).$$

With all the required components defined, the sample log-likelihood function is then given by

$$\mathcal{L}(\Xi_G, \Xi_H) = \sum_{t = 0} \ln(1 - G(D_t; \Xi_G)) + \sum_{0 < t < s} \ln(1 - G(D_t; \Xi_G)) + \sum_{t = s} \ln(1 - G(D_t; \Xi_G)) + \sum_{t > s} \ln(1 - G(D_t; \Xi_G)).$$

The model is completely characterized by the parameters that describe the distributions of the father’s preference parameter and the direct cost of noncompliance. Let \(\Xi = (\Xi_G, \Xi_H)\). Then the maximum-likelihood estimator of the parameter vector \(\Xi\) is given by \(\hat{\Xi} = \text{arg sup}_{\Xi \in \Omega} \mathcal{L}(\Xi)\), where \(\Omega\) is the parameter space, the characteristics of which are determined by the functional forms of the distribution functions \(G\) and \(H\).

For the econometric model to be logically consistent, we must restrict our choice of \(G\), the distribution of the direct cost of noncompliance, to those parametric distributions that have support on the positive real line. Similarly, our choice of \(H\) must come from the set of parametric distributions that have support on the unit interval. Realistically speaking, the distributions we choose must be characterized by a very low-dimensional parameter vector if we are to have any hope of precisely estimating the parameter vectors characterizing the distributions. This condition is especially true with respect to the distribution of \(\theta\), since this random variable is never directly observed. In the case of the random variable \(\delta_t\), its value is directly imputable for the portion of the sample which partially or overcomplies; for this reason, we can expect precise estimation of \(\Xi_H\) to be an easier task than precise estimation of \(\Xi_G\) when \(\Xi_G\) and \(\Xi_H\) are similarly dimensioned.

We have estimated the econometric model of transfers assuming that \(G\) is Weibull and have utilized a beta distribution for \(H\). The cumulative distribution function associated with \(\delta_t\) is then given by

$$H(x; \Xi_H) = B(\xi_1, \xi_2)^{-1} \int_0^x \nu^{(1-1)}(1 - \nu)^{(\xi_2 - 1)} d\nu \quad \xi_1 > 0 \quad \xi_2 > 0 \quad x \in [0, 1]$$

where the normalizing constant \(B(\xi_1, \xi_2) = \int_0^1 \nu^{(1-1)}(1 - \nu)^{(\xi_2 - 1)} d\nu\) is the beta function. The beta is a very flexible distribution and is capable of generating one or two modes (in the latter case at the values 0 and 1) and symmetric or highly skewed distributions on its support \([0, 1]\). The Weibull is also a two-parameter distribution and has support \([0, \infty]\). The Weibull cumulative distribution function is given by

$$G(x; \Xi_G) = 1 - \exp\{-(\xi_3 x)^{\xi_4}\}.$$
parametric assumptions made, we have estimated the model under more restrictive assumptions as well. In particular, we have sometimes restricted $\xi_2$ to equal 1 (in which case the beta distribution becomes the power-function distribution) and sometimes restricted $\xi_4$ to equal 1 (in which case the Weibull distribution becomes the negative exponential distribution). We were interested in determining to what extent the estimates of one particular distribution were sensitive to the assumed functional form of the other.

Under these distributional assumptions, the log-likelihood function $L$ is characterized by (at most) four parameters. $L$ is continuously differentiable over the interior of the parameter space, and all standard regularity conditions for consistency and asymptotic normality of the ML estimator of $\Xi$ are satisfied provided that the true parameter vector $\Xi_0$ is an interior point of $Q$. While we have not shown that $L(\Xi)$ is globally concave over $Q$, we found that the ML estimates reported below were attained no matter which of many trial points in $Q$ was used as a starting value in the optimization algorithm.19

We used the consistent estimates of the distributions $G$ and $H$ to solve (8) for the preference weights of the institutional agents. Since the terms $A_m$ and $A_t$ are consistently estimated for each case in the sample when consistent estimates of $G$ and $H$ are used, the value of $\tau^*$ is consistently estimated as well. Our estimate of the distribution of $\tau^*$ is the empirical distribution function of the case-specific $\tau^*$’s. This empirical distribution is a consistent estimator of the population distribution of welfare weights of institutional agents as long as our sample of divorce cases generates a random sample of institutional agents.

IV. Data Description and Empirical Results

A. Data and Descriptive Statistics

The data used in this paper are gathered from court and payment records of divorce, separation, annulment, and paternity cases in 18 counties in Wisconsin. The original sample was drawn from the population of all family-court cases involving a child under 18 years of age. In each of the 18 counties, between 150 and 200 cases from the period 1980–1986 were randomly selected, with approximately equal numbers of cases being selected each year. The source of almost all information available in the survey is administrative records; consequently, there is extensive information regarding child-support order and payment amounts (on a monthly basis) and court appearances, and very little regarding the demographic characteristics of the former household members.

In the empirical work reported below, we use a relatively small subset of the original sample. Naturally, we restrict our sample to divorce cases, since divorce is a basic premise of the model. Furthermore, only cases in which mothers were awarded sole physical and legal custody were selected,20 and all cases are from the years 1980–1982, when “mandatory guidelines” regarding the setting of child-support orders were not operative. Only cases in which the father was ordered to make monthly payments were included. The reason for this restriction is that payment data are available only on a monthly basis, thereby making it impossible to accurately determine compliance for any other ordered payment frequencies. To increase within-sample homogeneity for purposes of conducting the behavioral analysis, only divorced parents with one child were chosen for inclusion in our sample.

Due to the extensive amount of missing data on the few demographic variables available, the empirical analysis utilizes only information on the incomes of the parents at the time of the divorce order, the size of the monthly support order, and the actual payment made in the fifth month from the beginning of the child-support obligation period.21 The selec-

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19 For each of the four specifications of the structural model that were estimated, between five and ten different starting values were used.

20 Of the total sample of divorce cases from the 1980–1982 period involving one child, approximately 85 percent stipulated a custody arrangement of this type.

21 In previous empirical analyses of the compliance de-
tion of the fifth month was largely arbitrary, but not entirely so. We wanted to choose a period that was not too close to the start-up date (so as to preclude the procedural problems faced by parents and institutions at the initiation of this process from influencing behavioral inferences) and not too distant from the onset of obligations (so that the history of the payment process would not be the dominant determinant of the payments made in the reference month). We also excluded cases in which the father transferred more than three times the amount owed in the fifth month of the obligation period. This final inclusion condition resulted in the loss of three cases from the prior total of 225.

22 The final sample consists of 222 cases. As previously mentioned all monetary amounts are expressed in terms of 1980 dollars. Each parent who reported a monthly income of less than $280 dollars at the time of the divorce settlement was assigned a monthly income equal to $280 under the rationale that potential welfare payments or minimum wage earnings were available which had at least that value. The assignment of $280 was made for 21.6 percent of the mothers and for 1.3 percent of the fathers in the final sample.

As should be clear from the discussion of the econometric model for child-support transfers, the proportion of fathers who exactly comply with their child-support order is a key piece of identifying information. In examining the raw monthly data on child-support payments, a not untypical pattern is to see no transfer in a month followed by a payment of twice the order in the next. If this pattern is not produced by recording errors on the part of the administrators, and if the father does not pay in the fifth month of the order period (or pays twice as much in the fifth month, in which case he would be considered to be an “over-complier”), it is argued here that he should not be considered an “exact complier” with the order. However, it is entirely possible that recording error or payments made a few days late (or early) are mainly responsible for these patterns. In recognition of this problem we chose to classify fathers in our sample as being in “exact” compliance if any of the following conditions on their payment histories over the fourth, fifth, and sixth months after commencement of the order were satisfied (tj and sj denote the recorded payments and orders in the jth month): (i) t5 = s5; (ii) t4 + t5 = s4 + s5; (iii) t5 + t6 = s5 + s6; or (iv) t4 + t5 + t6 = s4 + s5 + s6. Condition (i) was met by 75 fathers, while nine additional fathers were classified as exact compliers under conditions (ii)–(iv). Thus of the 84 individuals in this group, only 10.7 percent did not exactly comply with the order in the fifth month.

We now turn to a description of the data. Table 2 contains some summary statistics for the total sample and for four groupings of sample members defined in terms of the relationship between the amount transferred and the amount owed by the father. In the sample, the average pretransfer income of fathers is over twice as high as the average pretransfer income of mothers. Average child-support payments are only 65.7 percent of average child-support orders. There is more dispersion in the distribution of child-support transfers than in the distribution of orders, primarily because of the large number of sample members (37.4 percent) who make no transfer in the reference month. There is substantially more dispersion in the distribution of fathers’ incomes than in mothers’.

23 Variations in this figure of plus or minus $50 had no substantial effect on any behavioral inferences drawn in the analysis.

24 We found that the inferences drawn from the empirical work did not change markedly when these nine sample members were assigned their compliance states based on their fifth-month payment only.
Table 2—Descriptive Statistics (in 100’s of 1980 Dollars)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (N = 222):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(t)</td>
<td>1.478</td>
<td>1.695</td>
<td>0.000</td>
<td>8.281</td>
</tr>
<tr>
<td>(s)</td>
<td>2.251</td>
<td>1.486</td>
<td>0.207</td>
<td>8.537</td>
</tr>
<tr>
<td>(y_m)</td>
<td>5.556</td>
<td>2.557</td>
<td>2.800</td>
<td>15.076</td>
</tr>
<tr>
<td>(y_t)</td>
<td>11.463</td>
<td>8.762</td>
<td>2.800</td>
<td>99.000</td>
</tr>
<tr>
<td>(t = 0 \ [N = 83]):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(s)</td>
<td>2.120</td>
<td>1.544</td>
<td>0.207</td>
<td>8.537</td>
</tr>
<tr>
<td>(y_m)</td>
<td>5.359</td>
<td>2.241</td>
<td>2.800</td>
<td>11.320</td>
</tr>
<tr>
<td>(y_t)</td>
<td>11.252</td>
<td>7.684</td>
<td>2.800</td>
<td>57.985</td>
</tr>
<tr>
<td>(0 &lt; t &lt; s \ [N = 31]):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(t)</td>
<td>1.982</td>
<td>1.446</td>
<td>0.256</td>
<td>7.444</td>
</tr>
<tr>
<td>(s)</td>
<td>2.572</td>
<td>1.530</td>
<td>0.471</td>
<td>7.857</td>
</tr>
<tr>
<td>(y_m)</td>
<td>5.166</td>
<td>2.508</td>
<td>2.800</td>
<td>15.076</td>
</tr>
<tr>
<td>(y_t)</td>
<td>10.384</td>
<td>3.894</td>
<td>3.800</td>
<td>21.504</td>
</tr>
<tr>
<td>(t = s \ [N = 84]):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(t = s)</td>
<td>2.301</td>
<td>1.479</td>
<td>0.367</td>
<td>8.281</td>
</tr>
<tr>
<td>(y_m)</td>
<td>5.943</td>
<td>2.862</td>
<td>2.800</td>
<td>15.076</td>
</tr>
<tr>
<td>(y_t)</td>
<td>11.706</td>
<td>6.586</td>
<td>5.164</td>
<td>52.105</td>
</tr>
<tr>
<td>(t &gt; s \ [N = 24]):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(t)</td>
<td>3.056</td>
<td>1.921</td>
<td>0.662</td>
<td>7.692</td>
</tr>
<tr>
<td>(s)</td>
<td>2.111</td>
<td>1.238</td>
<td>0.620</td>
<td>4.721</td>
</tr>
<tr>
<td>(y_m)</td>
<td>5.382</td>
<td>2.496</td>
<td>2.800</td>
<td>11.017</td>
</tr>
<tr>
<td>(y_t)</td>
<td>12.739</td>
<td>18.634</td>
<td>4.490</td>
<td>99.000</td>
</tr>
</tbody>
</table>

Table 2 shows the distribution of sample members in the four compliance states. The percentages of the sample in the no-transfer, partial-compliance, exact-compliance, and overcompliance states are 37.4, 14.0, 37.8, and 10.8, respectively. Thus, in terms of the compliance states, the largest numbers of sample members are at \(t = 0\) and \(t = s\). There are no major differences in the sample averages and standard deviations of the income and order variables for these two groups. For the smaller groups of partial compliers and overcompliers, we note that the incomes of fathers in the group of partial compliers is over $100 less per month than in the entire sample, whereas in the group of overcompliers the average income of fathers is over $100 more than in the entire sample. The mean and standard deviation of father’s income in the group of overcompliers are inflated due to the presence of an outlier whose income is reported as $9,900 per month.

More descriptive results are presented in Table 3, which contains ordinary least-squares coefficient estimates and Eicker-White heteroscedasticity-consistent standard errors for linear-regression specifications in which the transfer (or order in one case) is regressed on parental incomes and in some cases the order. In specification 1 the order is regressed on the parental incomes. We see that the order is a decreasing function of the mother’s income and an increasing function of the father’s. Both coefficients are significantly different from zero with probabilities approximately equal to 0.9. It is interesting to note that the “mandatory guidelines” imposed by the State of Wisconsin in the mid-1980’s expressly state that the order should not be a function of the mother’s income at the time of or following the divorce but should be based solely on the father’s “ability to pay.” During our sample period, this descriptive evidence suggests that institutional agents did consider...
the mother’s income in deciding child-support orders.

In specification 2 the transfer is regressed on the parental incomes but not the order. The transfer in this case is an increasing function of the father’s income and a decreasing function of the mother’s, as was the case in specification 1, but both coefficients are smaller in absolute value and not precisely estimated. In specification 3 we add the child-support order to the transfer regression. The order is by far the most important determinant of the transfer in this specification; the coefficient associated with the mother’s income is zero, while the coefficient on the father’s income switches sign (though the absolute value of the coefficient is less than its standard error). In specification 4 the regression specification in specification 3 is reestimated using the subsample of cases for which the father made a positive transfer. In this case, the coefficient associated with the child-support order is not significantly different from 1. The coefficients associated with both parental incomes are negative; the coefficient associated with the mother’s income is greater than its standard error in absolute value and is much larger in absolute value than the coefficient associated with the father’s income.

These regressions, while of some descriptive value, illustrate the difficulty of formulating easily interpretable econometric models that adequately capture the complex interactions between diverse agents at the time of and immediately following a divorce. We next describe the results of our attempts to estimate the parameters of simple behavioral models of transfers and orders.

**B. Behavioral Estimates of the Child-Support Transfer Decision**

Table 4 contains ML estimates of the parameters characterizing the distribution of the fathers’ preference parameters. The top panel contains estimates of the distribution of the father’s private consumption weight $b_f$, while the lower panel contains estimates of the distribution of the cost of noncompliance $\theta$. For ease of interpretation we have presented the mean and standard deviation of both of the random variables as determined under our alternative distributional assumptions. Our discussion will focus on the comparison of these moments across specifications.

Looking at the father’s Cobb-Douglas utility parameter, we see that the first two moments of the distribution are relatively stable across the four specifications estimated. The estimates also indicate that the restricted beta (i.e., the power-function distribution which corresponds to the case in which $\xi_2 = 1$), which appears in specifications 2 and 4, is not preferable to the unrestricted beta. The mean
value of the father’s preference weight on private consumption ranges from 0.756 to 0.796. Under specification 4, the preferred specification, 26 41.2 percent of fathers have a private consumption weight of at least 0.9, whereas only 10.2 percent place a higher weight on the child’s consumption than on their own.

For at least two reasons, one should not draw from these estimates the inference that divorced fathers are less concerned with the welfare of their children than are divorced mothers. First, the distribution estimated refers only to the population of noncustodial fathers. If the weight given to the child’s welfare by a divorced parent is an increasing function of the amount of time spent with the child, then all noncustodial parents would be expected to weight their own consumption more heavily than they would if they had custody of the child. 27 Therefore, this preference distribution cannot be viewed as representative of the distribution of preferences in the population of all divorced fathers and, more importantly, should really be thought of as being endogenously determined within a more general model in which custody decisions are also considered. 28 Second, since the distribution of the preferences of custodial mothers is not estimable within our model, there is no way to compare the weights given to the child’s welfare by custodial mothers and noncustodial fathers. For these reasons, one should not draw any inferences regarding relative concern for the welfare of the child on the part of divorced mothers and fathers solely from the evidence presented here.

Looking at the estimates of the noncompliance cost distribution which appear in the

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26 Specification 4 is preferred to the others in the sense that it nests all the others as special cases, and likelihood ratio tests indicate that the four-parameter model is required to adequately describe the data.

27 For an analysis of compliance decisions when parental preferences are partially determined by custody arrangements see Del Boca and Flinn (1990).

28 See Del Boca and Flinn (1990) for an early attempt to construct such a model.
bottom panel, we see that there is much less stability across specifications. In particular, when we allow the distribution to be Weibull (specifications 3 and 4) rather than exponential (specifications 1 and 2), there is a marked increase in the estimated mean and standard deviation of \( \delta \). The shifts in the mass of the distribution are not as strong as these increases might lead one to believe. In particular, the probability that a randomly selected father has a noncompliance cost of 0.2 or less is 0.72, 0.67, 0.60, and 0.57, respectively, for specifications 1–4. Nevertheless, the estimates of the noncompliance cost distribution are much less precise and are more unstable across specifications than are the estimates of the distribution of \( \delta \). The reasons for these differences were alluded to in Section III.

C. Estimates of the Preferences of Institutional Agents

In deriving the distribution of preference weights for the institutional agent, we must utilize estimates of the distributions of the preference parameters of the father. We will use the point estimates of these distributions from specification 4 of Table 4 (so that the parameter \( \delta \) is beta distributed and \( \theta \) is Weibull distributed). These estimates are used together with (8) to form an estimate \( \hat{r}^* \) for each sample element.

The empirical density of \( \hat{r}^* \) is represented in Figure 2 in the form of a histogram. As noted in Section II, it is possible for any or all of these weights to lie outside the unit interval; in this particular sample we found that only one did (and that one was equal to 1.009). The distribution of the welfare weights is roughly symmetric, though some positive skewness can be discerned. The mean of the distribution is 0.431 and the standard deviation is 0.159. The probability of observing a \( \hat{r}^* \) greater than 0.5 is only 0.306.

The results of this exercise are consistent with the often-heard claim that noncustodial fathers are given preferential treatment by courts and legislative agents. The reader should bear in mind that the preference-weight distribution we estimate fully takes into account the noncompliance problem. Thus we have shown that child-support orders are low not (only) because compliance becomes less likely as the order is increased, but because of the relatively low valuation of the expected welfare of custodial mothers and children by institutional agents.

D. Comparative-Statics Exercises

We can now put the model to use in addressing some policy-relevant issues. First, we ask what the distribution of child-support awards would look like in our sample if institutional agents set awards so as to maximize the expected welfare of children and custodial mothers. This corresponds to the case in which \( \hat{r}^* = 1 \) for all institutional agents; it is strictly of interest from a normative standpoint. Second, we conduct a comparative-statics exercise in which we look at the effect of a shift in the distribution of noncompliance costs on expected child-support transfers, taking into account the reactions of institutional agents.

Of course, if institutional agents assumed perfect compliance on the part of noncustodial

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29 This cannot be viewed as a proper comparative-statics exercise since it involves a change in the preferences of a set of agents. Only if one thought of replacing the current set of institutional agents with others, all of whom assigned a weight of unity to the combined welfare of custodial mothers and their children, could this be considered a valid policy experiment.
fathers and were attempting to maximize the expected welfare of the child, they would order the father to transfer all of his income to the mother. Allowing for noncompliance, an institutional agent who has this objective will not order the father to transfer all of his income to the mother, since the probability of compliance with such an order will be zero. Figure 3A contains the distribution of optimal orders in this case.30 The distribution has approximately the same shape as the actual distribution of child-support awards shown in Figure 2A (they both largely track the distribution of the incomes of fathers, the most important determinant of awards). While the distributions have similar shapes, there are a number of notable differences. Whereas the average award is $225 per month in the sample, the average award when \( \tau^* = 1 \) is $682 per month. Moreover, the correlation between the actual award and the one computed in this experiment is only 0.307. The general lack of relationship (linear or nonlinear) between the observed and the optimal award when \( \tau^* = 1 \) is illustrated in Figure 3B. Only in one case is the optimal award less when \( \tau^* = 1 \) than the observed award (this is the case in which the imputed \( \hat{\tau}^* \) was 1.009, so that in the experiment less weight was placed on the sum of the child’s and the mother’s welfare).

We now turn to the main comparative statics exercise of the paper. Since current child-support policy focuses on shifting the punishments associated with noncompliance, we will look at how expected transfers from the father to the mother change when the noncompliance-cost distribution shifts.

As we have shown, shifts in the noncompliance-cost distribution will not only affect the behavior of the father, but will also impact the institutional agent.31 Thus the total effect of a change in the noncompliance-cost distribution must explicitly account for both “direct” effects (those which hold constant the order) and “indirect” effects (those resulting from a change in the child-support order). We begin by writing the expected transfer as a function of the noncompliance-cost distribution \( G \) and the child-support order, \( s(G) \), which is itself a function of the distribution \( G \) through the institutional agent’s optimizing behavior. Now the expected transfer can be written \( E(t^{**})(G, s(G)) \) where the

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30 Figure 3 excludes three cases for which the optimal order when \( \tau^* = 1 \) exceeds $2,000 per month. These cases were only excluded for the purpose of graphical presentation and are included in all the descriptive statistics cited in the text.

31 Recall that in our formulation of the institutional agent’s problem the distribution of noncompliance costs is taken as exogenous. A more general formulation would give institutional agents the ability to partially influence the distribution of noncompliance costs through their actions.
arguments of \( t^{**} \) have been dropped for notational simplicity. To see the effect of a change in \( G \) on the expected transfer begin by taking the total derivative of \( E(t^{**}) \) with respect to \( G \), which is

\[
\frac{dE(t^{**})}{dG} = \frac{\partial E(t^{**})}{\partial G} + \frac{\partial E(t^{**})}{\partial s} \left( \frac{ds}{dG} \right).
\]

After multiplying both sides by \( G/E(t^{**}) \), multiplying the second term on the right-hand side by \( s/s \), and rearranging terms, we have

\[
\frac{dE(t^{**})}{dG} \cdot G \frac{\partial E(t^{**})}{\partial G} = \frac{\partial E(t^{**})}{\partial s} \left( \frac{s}{E(t^{**})} \right) \frac{ds}{dG} \left( \frac{G}{s} \right)
\]

or, definitionally,

\[
(10) \quad \eta_T = \eta_P + \eta_S \varepsilon
\]

where \( \eta_T \) is the total elasticity of the expected transfer with respect to the distribution \( G \), \( \eta_P \) is the partial elasticity of the expected transfer with respect to \( G \) (holding constant the order), \( \eta_S \) is the elasticity of the expected transfer with respect to the order, and \( \varepsilon \) is the elasticity of the optimal order with respect to \( G \).\(^{32}\)

To compute these elasticities it is necessary to define operationally what we mean by a shift in the distribution \( G \). Recall that our preferred specification for \( G \) was a Weibull distribution. We will shift the distribution of \( \vartheta \) given in (9) by perturbing the parameter \( \xi_1 \) while holding constant the value of the parameter \( \xi_4 \). Since \( \partial G(\vartheta; \xi_3, \xi_4)/\partial \xi_3 = 0 \) for all \( \vartheta \), \( G(\vartheta; \xi_3, \xi_4) \) first-order stochastically dominates the distribution \( G(\vartheta; \xi_1, \xi_4) \) whenever \( \xi_1 < \xi_3^{\prime} \).\(^{33}\) Thus decreasing the parameter \( \xi_4 \) makes it more costly, in a stochastic sense, for

the father not to comply with any given order. By changing this parameter in this manner, we can examine the implications of increasing child-support “enforcement” for expected transfers; an increase in the level of enforcement is an often-recommended policy action.

Given the income distribution for each case, the child-support order \( s \), the point estimates of the preference parameters from specification 4 of Table 4, and the case-specific estimates of \( \tau^* \) determined from (8), we computed each of the terms in (10) for every member of the sample. Figure 4 contains histograms of all of the elasticities that appear in (10).

Perhaps it is best to begin with the most easily interpretable elasticity, which is \( \eta_P \). Though we do not demonstrate it here, it is straightforward to show analytically that the expected transfer cannot decrease when a distribution \( G \) is replaced with a distribution that first-order stochastically dominates it, when the order is held constant. This implies that the elasticity \( \eta_P \) must be nonnegative for all possible values of \( y \) and \( s \). In Figure 4B we see that for a 1-percent decrease in the parameter \( \xi_3 \), the expected transfer increases by about 0.15 percent on average. The maximum elasticity in the sample is 0.342 while the minimum is 0.001. The distribution of \( \eta_P \) looks quite symmetric in this sample.

Next consider the distribution of the order elasticity, \( \eta_S \), which appears in Figure 4D. This elasticity is of some independent interest in the sense that it can be thought of as representing the outcome of a policy experiment in which all orders are unilaterally increased by 1 percent, holding fixed the cost of non-compliance distribution. While we have emphasized (at least implicitly) the role of the judge and attorneys associated with a particular case in setting the order, over the past decade these agents have faced stricter guidelines concerning the determination of child-support orders from other sets of institutional agents such as legislators.\(^{34}\) Thus, even if a judge has

\(^{32}\) In computing this elasticity, we condition on the welfare weight \( \tau^* \) of the institutional agent for each particular case.

\(^{33}\) A distribution \( F(x) \) is said to first-order stochastically dominate the distribution \( W(x) \) if \( W(x) \geq F(x) \ \forall x \).

\(^{34}\) This is particularly true in Wisconsin where explicit guidelines have been in force since the mid-1980’s, but is also true in a large number of other states.
no motive to change an order given his preference weight, it may be modified by the actions of these other agents. It is in this sense that varying $s$ with no change in the other parameters of the model can constitute a valid policy experiment.

From Figure 4D we see that in this sample the expected transfer for all sample members increases when the order is increased. This need not be the case, because increases in ordered amounts can reduce expected transfers if the increased noncompliance they entail is not outweighed by the increase in the transfer when there is exact compliance with the order. On average, a 1-percent change in the ordered amount changes the expected transfer by 0.425 percent. The minimum value is 0.012, and the maximum value is 0.650.

We now turn to Figure 4C which contains the distribution of the elasticity of the ordered amount with respect to a decrease in the parameter $\xi_3$. The most interesting characteristic of this distribution is that only 6.3 percent of the elasticities are positive, so that for the vast majority of sample cases the order decreases when the probability of complying with the initial order increases. This is due to the fact that when it becomes more costly not to comply the custodial parent and child experience an increase in their expected welfare. The only way for the institutional agent to redistribute this gain is through the order, and because most institutional agents give a substantial weight to the noncustodial father's expected welfare, the result will be significant reductions in ordered amounts. The average elastic-
ity is −0.303, the maximum value is 0.126, and the minimum value is −3.806. The distribution displays pronounced negative skewness.

The distribution of the net effect of a change in the distribution of noncompliance costs on expected transfers appears in Figure 4A. The distribution is quite symmetric, and the average elasticity is very close to zero at 0.038 (compare this with the average \( \eta^p \) of 0.146). Thus the decreases in orders predicted in the vast majority of cases, together with the decreases in expected transfers they generate, effectively offset the increases in expected transfers produced by the decrease in \( \xi \) when the order is held constant. Thus, institutional agents can be seen as important forces that maintain the status quo with regard to the distribution of welfare in nonintact households when there are changes in the constraints facing divorced parents.

V. Conclusion

We have attempted to provide a framework within which both the child-support compliance decisions of noncustodial fathers and the child-support awards set by institutional agents can be coherently interpreted. The parsimoniously parameterized model of child-support transfers captures the qualitative features of the empirical distribution of monthly payments. More importantly, we have shown how estimates of behavioral parameters obtained from such an analysis could be used to conduct an investigation of the child-support award decision.

We think the empirical results demonstrate that the behavioral modeling approach taken here can be very useful in addressing policy-relevant issues. Perhaps the most interesting result is that, for most cases in our sample, the weight attached to the combined welfare of custodial mothers and their children is relatively small compared to the weight attached to the welfare (ignoring noncompliance costs) of noncustodial fathers. The estimates thus suggest that institutional agents made low child-support orders not solely out of concern that higher orders would lead to noncompliance, but rather because they placed a high weight on the welfare of noncustodial fathers.

Any conclusions reached using such a highly structured model should be viewed with a significant amount of caution. From our point of view, the principal limitations of the model as it is presently constituted are its static structure, the restrictive functional forms used to represent the preferences of all the agents, the assumption that only one parent can make expenditures on the child, the restriction that the parents behave noncooperatively, and the assumption that there exists no mechanism by which parents can truthfully reveal information to institutional agents. Nevertheless, we feel that our results are sufficiently interesting and suggestive to encourage further work on postdivorce behavior in the direction taken here.

REFERENCES


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In Figure 4C we have recoded the two values of \( \xi \) that were less than −2 as −2 for purposes of graphical presentation.


