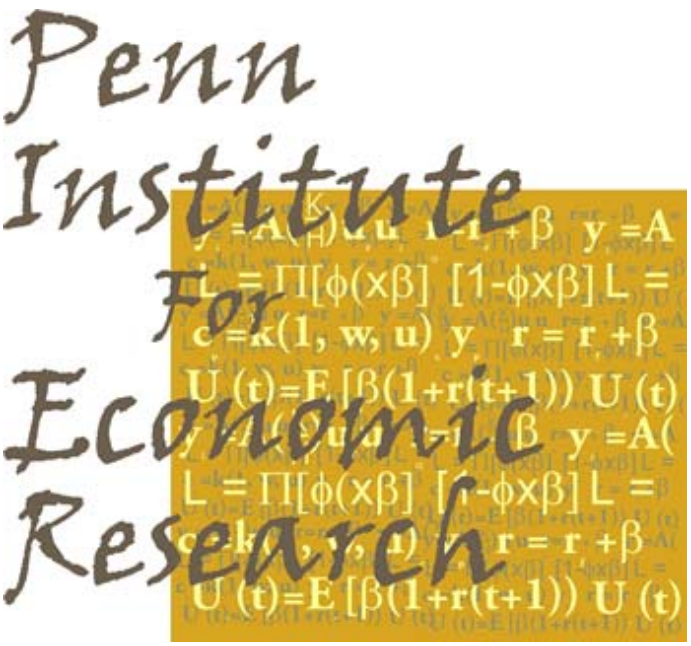

Penn Institute for Economic Research
Department of Economics
University of Pennsylvania
3718 Locust Walk
Philadelphia, PA 19104-6297
pier@econ.upenn.edu
http://www.econ.upenn.edu/pier

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"Estimating Welfare Effects Consistent with Forward-Looking Behavior. Part II: Empirical Results"

by

Michael P. Keane and Kenneth I. Wolpin

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Estimating Welfare Effects Consistent With Forward-Looking Behavior

Part II.: Empirical Results

Michael P. Keane*

and

Kenneth I. Wolpin**

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*New York University
** University of Pennsylvania

I. Introduction

In this paper, we provide estimates of welfare benefit effects on a set of behaviors that includes welfare participation, fertility, marriage, work and schooling using approximations to the decision rules that would be derived from an explicit dynamic optimization problem. The estimates are based on data from the 1979 youth cohort of the National Longitudinal Surveys of Labor Market Experience (NLSY79).

We use the stylized model and associated simulations from Part I as a guide in specifying the approximate decision rules that we estimate here. It is useful to highlight some key ways that our findings in Part I cause us to depart from usual practices in the estimation of welfare effects. First, it has been common in the literature to measure state-specific welfare benefit levels using simple summary measures, such as the basic grant level, or the benefit level for a woman with two children. In Part I, we showed that this specification could lead to misleading results. The benefit rules are complex, and changes in features of these rules can cause important changes in incentives, even while leaving simple summary measures unchanged. In this paper, we instead use the seven parameter function, described in Part I (equation 10), that we fit to the rules of all of the states in the U.S. over the period 1967-1990. These benefit rule functions provide highly accurate approximations to the full complexity of the underlying rules. The seven parameters enter our estimated decision rules, rather than a single summary measure.

Second, the existing literature looks only at effects of current benefits on current decisions. Our simulation results in Part I indicate that this specification may lead to misleading results. For example, in the case of a choice like fertility, i.e., whether or not to have a child, which affects welfare eligibility and benefits over a long period of time, current benefits are

relatively unimportant as compared to benefits that can be expected in the future. To capture the influence of future benefits on current decisions, we include in our estimated decision rules not only the current values of the seven benefit rule parameters, but also their state-specific means (over the 1967-1990 period).

Much of the existing literature has focused on differences between pooled and state fixed-effects estimates of benefit effects on behavior. Our consideration of dynamic behavior, as well as our simulations in Part I, leads to the conclusion that these differences are subject to a quite different interpretation from that found in the literature. Fixed-effects estimates do not merely control for unobserved heterogeneity across states in tastes for work, welfare, etc., and in other relevant state programs, e.g., Medicaid. They also wipe out the state-specific "permanent" means of the benefit rule parameters, so the effects of permanent changes in benefit rules become unidentified. As we showed in the simulations in Part I, the impact of transitory changes in benefits on behavior, as are identified in controlling for state fixed-effects, can be quite different than the impact of permanent changes.

Finally, our development of a dynamic behavioral model in Part I demonstrated the potential importance of including lagged choice variables in the estimation of decision rules. Most of the prior static literature on welfare effects has not included such controls. In two recent surveys, Moffitt (1992, 1996) has summarized the prior, largely static, empirical literature on behavioral effects of welfare. He notes the following patterns: (i) There are generally found to be statistically significant effects of welfare generosity on welfare participation and on labor supply; (ii) Of the more recent studies, more tend to find statistically significant effects of welfare generosity on demographic outcomes, fertility and marriage, than do not; (iii) Quantitative

estimates of welfare effects vary over a wide range, with the effects on demographic outcomes tending to be small.

Using cross-state variation, we find that welfare benefit rules as measured by the current realizations of the benefit rule parameters and by their "permanent" means are jointly statistically significant determinants of all of the choices we consider. However, in the case of the demography-related choices, we do not precisely estimate separately either the effect of the current realizations of the benefit rule parameters or of their means. Similarly, when we use only within-state variation, the current benefit parameter realizations, the only effects that are estimable in this case, are statistically significant for welfare participation, work and school attendance, but not for pregnancies and marital status. Thus, our empirical results are generally in line with that of the literature in terms of precision of the estimates.

To ascertain the quantitative significance of welfare effects, we perform the experiment of replacing the welfare system in one state with that of another. We use the set of six states with the largest representation in the NLSY97 (California, Michigan, New York, North Carolina, Ohio and Texas). We find that changing the welfare system in any of the three more generous states (CA, MI, NY) to that of any of the other less generous states (NC,OH,TX) would substantially alter the behavior of the women in the former states.

The paper is organized as follows. In the next section we discuss the specification of the approximate decision rules that are estimated. Section II discusses estimation issues that arise in implementing the model. Section III describes the NLSY79 data and the analysis sample, defines the variables and presents descriptive statistics. Estimation results are presented in section V and the following section summarizes and concludes.

II. The Specification of Approximate Decision Rules:

Given that we do not structurally estimate an explicit optimization model, we do not set out the exact specification of preferences and constraints. We do, however, provide a coherent approach to the formulation of the approximate decision rules that are the basis for our estimation. We begin with a discussion of the specification of approximate decision rules.

Approximate Decision Rules:

As the discussion of the derivation of the decision rules in Part I illustrated, the determinants of the alternative-specific value functions are the set of observable and unobservable state space elements. Although not explicit in that discussion, the state variables relevant to each alternative are not necessarily identical. Specifically, under the type 1 ER (where there is no serial correlation in benefit parameters), the state variables that enter the alternative-specific value functions, $V_a^{cf}(S_a^{cf})$, are[1]:

$$
\begin{aligned}
S_a^{00} &= \{N_a, \epsilon_a^y, \lambda^s, \Omega^s\} , \\
S_a^{10} &= \{N_a, \epsilon_a^y, \epsilon_a^c, \lambda^s, \Omega^s\} , \\
S_a^{01} &= \{N_a, \epsilon_a^y, \epsilon_a^f, \mathbf{b}_a^s, \lambda^s, \Omega^s\} , \\
S_a^{11} &= \{N_a, \epsilon_a^y, \epsilon_a^c, \epsilon_a^f, \mathbf{b}_a^s, \lambda^s, \Omega^s\} ,
\end{aligned}
\tag{1}
$$

where N_a is the stock of children at age a, the ϵ's are the shocks to preferences and earnings, $\mathbf{b}_a^s$ is the vector of benefit parameters at age a, and λ^s and Ω^s are the parameter matrices of the ER. Because current realizations of benefit rule parameters under either the type 2 or type 3 ER provide information about future benefit parameter realizations, all of the alternative-specific value functions would contain $\mathbf{b}_a^s$ for those ER's (as well as the additional matrix of parameters,

Λ^s, contained in the ER). Recall that the entire state space, containing all of these elements, is denoted by S_a.

Letting $d_a^k = 1$ if alternative k is chosen at age a and zero otherwise and denoting $V_a^{\neg k}(S_a^{\neg k})$ as the maximum of the alternative-specific value functions excluding that of alternative k, decision rules take the form:

$$
\begin{aligned}
(2) \qquad d_a^k &= 1 \quad \text{iff} \quad V_a^k(S_a^k) - V_a^{\neg k}(S_a^{\neg k}) = F_a^k(S_a) > 0 \\
&= 0 \qquad\qquad \text{otherwise.}
\end{aligned}
$$

Note that the decision rules depend on the entire state space, S_a, although individual value functions do not. Given the state variables that enter the model, to estimate approximate decision rules, then, requires choosing a function F.

We augment the simulated model, whose approximate decision rules we estimate, by an additional set of choices.

Choice Set:

In the model that we simulated in the part I, the woman's choice set consisted of decisions at each age of whether or not to contracept, $c_a \in \{0,1\}$ and whether or not to receive welfare, $f_a \in \{0,1\}$, given that the eligibility criteria were met. In this empirical exercise, we extend the choice set to include whether or not to attend school, $s_a \in \{0,1\}$, whether or not to work, $h_a \in \{0,1\}$, and whether or not to be married, $m_a \in \{0,1\}$. Because we do not observe contraceptive decisions in the data, but rather pregnancies leading to a birth, we take the observation of whether or not the woman is pregnant in a period to be the measured outcome.

The State Space:

As seen in (1), in the model that we simulated, the state space included only the number of children (which entered the model via the utility function), the current values of the benefit rule parameters (which entered the model both via the budget constraint and through the formation of expectations about future welfare benefits) and the parameters of the welfare benefit evolutionary rule, ER, (which entered the model only via the formation of expectations about future welfare benefits). A complete specification of the model with the augmented choice set would spell out through which of the three channels, preferences, constraints and/or expectations, the state space elements operated.

Models differ in the choice of the state space elements themselves and where in the model they appear. However, because we do not specify an explicit behavioral model, we only list the state space elements that are included in the approximate decision rules. It would not be difficult to imagine behavioral models that would be consistent with the set of state variables we have chosen.[2]

Given the augmented set of choices, the set of variables that constitute the state variables are also considerably broader than those of the illustrative model presented in part I. The observable state space elements are shown in Table 1. As seen, all of the state space elements except for the current benefit parameters, which are exogenous by assumption, are determined prior to the decision period, a point we discuss further below. State variables are either one period lags of decision variables (or potential decision variables that we do not consider, as in the case of net worth or parental co-residence status), the cumulation of prior decisions from age 14 (e.g., stock of children, work experience, school attainment) or initial conditions (e.g., race, parental schooling). We discuss the construction of the state variables in the data section below.

The parameters of the ER ($\lambda^s, \Lambda^s, \Omega^s$) are specific to each state and do not vary by either age or cohort. Thus, in order to identify the effects of changes in those parameters, the estimation of approximate decision rules cannot rely exclusively on within-state variation, i.e., specifications that include state dummies cannot be used to estimate effects of permanent changes in benefit parameters. In specifications that include state dummies, in order to account for omitted preferences and constraints that differ across states, only the effect of changes in the realizations of benefit rule parameters are estimable. In that case, only transitory welfare effects are identified.

A specification of the decision rules that includes only current benefit parameter realizations, as is found in the literature, will estimate conceptually different welfare effects depending on the source of variation used in the estimation. Allowing for cross-state variation, the estimated effect is a composite of both permanent differences in ER parameters across states (that cause the current benefit parameter realization to differ across states) and transitory differences in the parameter realizations across states and over calendar time. Allowing only for within-state variation, the estimated effect is of a transitory change alone. As our simulations have shown, transitory and permanent effects are quite different.

III. Data

The youth cohort of the National Longitudinal Surveys of Labor Market Experience (NLSY79) contains extensive information about schooling, employment, fertility, marriage, household composition, geographic location and welfare participation for a sample of over 6,000 women who were age 14-21 as of January 1, 1979. In addition to a nationally representative core sample, the NLSY contains oversamples of blacks, Hispanics and the military. The analysis we

perform makes use of the annual interviews between 1979 and 1991 for the core sample and for the black and Hispanic oversamples. We use this data to estimate approximate decision rules for five choices: welfare receipt, pregnancies leading to live births, marital status, employment status and school attendance. We describe in turn the construction of the choice variables and state variables from the NLSY79 data.

The NLSY79 collects much of the relevant information, births, marriages and divorces, periods of school attendance, job spells, and welfare receipt, as dated events. This mode of collection allows the researcher the freedom to choose a decision period essentially as small as one month, i.e., to define the choice variables on a month-by-month basis. However, the occurrence of pregnancies (as well as their reporting) are by their nature quite noisy and once pregnant, there is no variation in the state of pregnancy for a considerable number of months. Similarly, welfare receipt, marital status, employment and school attendance all exhibit considerable state dependency on a month-by-month basis. There would, therefore, not seem to be much loss in information to aggregating the data to some extent, with the gain being a simplification in the specification of the state space. Although the exact choice of the length of a period is arbitrary, we adopted as reasonable a decision period of six months. Periods are defined on a calendar year basis, beginning either on January1 or on July 1 of any given year. We begin the analysis with data on choices starting from the first six month calender period of 1979 and ending in the second six month calendar period in 1990.

Choice Variables

As noted, we consider the following choices: whether or not to (i) receive welfare (AFDC), (ii) become pregnant (culminating in a live birth), (iii) be married and live with

spouse, (iv) work and (v) attend school. The variables are defined as follows:

Welfare Receipt:

AFDC receipt is reported for each month within the calendar year preceding the interview year. The respondent checks off each month from January through December that a payment was received.[3] We define a woman as receiving welfare in a period if she reported receiving an AFDC payment in at least three of the six months of the period.[4]

Pregnancy Status:

The NLSY79 reports the dates of all live births. We assume that the month of the conception occurred nine months prior to the birth. We ignore all pregnancies that did not lead to a live birth.

Marital Status:

The NLSY79 provides a complete event-dated marital history that is updated each interview. A woman is considered married in the period if she was married at any time during the semester and lived with her spouse.[5]

Employment Status:

At the time of the first interview, an employment history was collected back to January 1, 1978 which provided details about spells of employment with each employer including the beginning and ending dates (to the week) of employer attachments as well as gaps within employer-specific spells. Subsequent rounds collected the same information between interview dates. Using this information together with data on usual hours worked at each employer, we calculated the number of hours worked in each period. A woman was considered working in a period if she averaged at least 10 hours per week of work over the period.

School Attendance:

The NLSY79 collects data that permit the calculation of a continuous monthly attendance record for each women.[6] A woman was defined to be attending school if she reported being in school each month between January and April in the first six-month calendar period and each month between October and December in the second calendar period.

State Variables

As noted, any variable that affects alternative-specific value functions should be included in the specification of the approximate decision rules for any choice. It is natural to include variables that are linked to the choice set we consider. In many if not most instances, these state variables will reasonably have a number of such linkages, through preferences, constraints and/or expectations formation, that cannot be identified separately in a non-structural empirical analysis.

Benefit Parameters:

As seen in table 1, there are two sets of state variables related to the welfare benefit system: the actual realizations in any period (that vary over time and among states) and the parameters governing the evolution of those parameters (the ER's, that vary among states, but not over time). The type 3 ER, that is, the general VAR, of the seven parameter system depicted in equation 10 of Part I., would contain an extremely large set of parameters. Including all of them as variables in the approximate decision rules is not feasible; given that they vary only by state, they would exhaust all of the degrees of freedom necessary to estimate their effects. As an approximation, we include only the means (over the 1967-1990 period) of the (seven) benefit parameters for the woman's state of residence.

Welfare:

The state variables related to welfare participation, created from the data on current welfare receipt already described, were whether the woman was receiving welfare the previous period and the cumulative number of periods she had received welfare.

Fertility:

The state variables related to fertility, created from the record of births, were whether the woman had a child in the previous period and the total number of prior births.

Marriage and Divorce:

The state variables used to represent this history were whether the woman was married in the previous period, whether she was divorced in the previous period and the cumulative number of periods she was ever married.

Employment:

The employment state variables distinguish between part- and full-time work. A woman was assigned as a part-time worker in a period if her total hours worked during the period was between 260 and 759 hours (an average of 10-30 hours per week) and a full-time worker if her hours exceeded 760 (over 30 hours a week). Part- and full-time work experience up to a particular period is simply the cumulation of the number of periods worked as a part- or full-time worker up to that point. The state variables related to employment used in the specification of the decision rules were whether the woman was employed part- or full-time in the previous period and cumulative number periods she worked part- or full-time.

Schooling:

We used the attendance record along with the highest grade completed reported as of the 1979 interview date to calculate the cumulative number of periods of attendance.[7] The state

variables related to schooling used in the specification of the decision rules were whether the woman attended school in the previous period and cumulative attendance.[8]

Parental Co-residence:

We included as a state variable, obtained from the household rosters at the time of the interview, whether or not a woman resided with a parent in the previous period.[9]

Net Worth:

Beginning with the 1985 interview, the NLSY collected asset and liability information that permits the calculation of the woman's net worth at the time of the interview. The state variable corresponds to net worth in the previous period, e.g., net worth measured in the first half of the year is the state variable for decisions made in the second half of the same year.

Initial Conditions - Family Background Variables:

Decision rules depend on preferences, abilities and biological factors (fecundity) that are difficult to measure directly. We assume that these factors can be accounted for with a small set of family background characteristics. We include as state variables the individual's race-ethnicity (white, black or Hispanic), mother's and father's schooling and whether the woman resided in a nuclear family at age 14.

Descriptive Statistics

Table 2 provides descriptive statistics, both weighted and unweighted, for the choice variables and family background variables for all states represented in the NLSY79 and for the six states represented in the simulations.[10] In all, the sample contains 3,087 women who are observed for a total of 71,564 six-month periods.[11] Reflecting the sampling design of the NLSY97, 47 percent of the women are white, 32 percent are black and 21 percent Hispanic.

Those percentages vary considerably among the states. The percentage of whites varies from as low as 23 percent in Texas to as high as 75 percent in Michigan, the percentage of blacks from 14 percent in California to 42 percent in North Carolina and the percentage of Hispanics from zero percent in North Carolina to 53 percent in California. Thus, in drawing comparisons among the states, the figures based on sample weights differ substantially from those not based on weights.[12]

Recall that the first three states (CA, MI and NY) are the most generous in terms of welfare benefits and the latter three (NC, OH and TX) the least generous. Within the first group, Michigan is the most generous followed by California and then New York. Among the second group, Texas is the least generous and North Carolina the next least generous followed closely by Ohio. Overall, welfare was received in 5.5 percent of the (weighted) sample periods. Restricting attention to periods in which a child had already been born, a condition for eligibility, welfare participation increases to 12.8 percent.

Now, if states are identical in all respects other than their welfare programs (and people are fundamentally the same in all states of residence), welfare participation should track program generosity as in the simulations of the behavioral model. However, recall from our simulations (see Part I., table 3) that the rank-ordering is not exact and depends on the actual pattern of benefit parameter realizations and the type of ER. As seen in table 2, the extent of welfare participation is in fact greatest in Michigan and least in Texas, and except for Ohio (as perhaps coincidentally in the simulations), the rank ordering of participation follows the rank ordering of welfare generosity. At a *prima facia* level, the data are consistent with the most obvious implication of optimizing behavior.

Pregnancy rates do not vary as greatly among the states as does welfare participation. Nevertheless, except again for Ohio, the rate as expected is higher in the three more generous states. However, compared to welfare participation the ordering conforms less to actual generosity within the groups; New York's pregnancy rate exceeds that in California and Texas' rate exceeds that in North Carolina. Marital status as measured by the proportion of periods spent living with a spouse also follows the welfare ranking. With the exception of Texas, where the proportion of periods married and living with a spouse is lower than either California or Michigan, marriage is more prevalent in the less generous states. The proportion of periods spent working is higher in the lower benefit states, as would be expected, although again the ranking within groups does not exactly track generosity. The only surprising pattern is for school attendance, which, except for Texas, is lower in the less generous states (NC and OH).

IV. Results

Although the descriptive statistics appear to be qualitatively consistent with optimizing behavior, as also seen in table 2, there are large differences among the states in other characteristics of the women. For example, the proportion of black women (person-periods) varies from 8.5 percent (weighted) in California to 21.4 percent in New York and the proportion Hispanic from zero in North Carolina to 23.8 percent in Texas. Similarly, average parental school attainment differs among the states by more than two years from the lowest to the highest. To provide an assessment of the impact of welfare generosity that accounts for such differences, we have estimated the approximate decision rules described above using women from all of the states represented in our sample.[13]

We estimate three logit specifications of the approximate decision rules. All of the

specifications include the state variables described above, but differ in the source of variation in welfare benefits.[14] The first specification relies on cross-state variation in the ER's (as represented by the means of the seven benefit rule parameters) and in the benefit parameter realizations for women of the same age and cohort, i.e., the regressors include individual dummies for each age-cohort combination. This variation allows us to determine the impact of permanent changes in the welfare system that would affect both the ER and the actual realizations. The second specification is the same as the first, but controls for state of residence using state-specific dummy variables. This specification identifies the effect of transitory changes in benefit parameter realizations (it holds the ER constant given that they are state-specific), by using differences across states in the over-time variation in benefit realizations as the source of variation. The specification assumes (and identification requires because of the inclusion of age by cohort, or equivalently year and age or year and cohort, effects) that these transitory effects are the same in each state. The third specification, like the second, uses time-series variation in benefit parameter realizations that arises for women who reside in the same state, but in this case for women who are also from the same cohort. It includes dummy variables for age, allowing for women of different ages to choose different behaviors, but assumes (and identification requires) that the effects of the benefit parameter realizations are the same at each age. Thus, specifications two and three provide estimates of the same transitory benefit rule parameter effects using different sample variation.

Table 3 provides p-values for the null hypothesis of zero welfare effects for each specification and for each choice variable.[15] In the first specification, i.e., no state effects, separate tests are reported for the joint significance of the seven realized benefit rule parameters,

the realized b_t's, the joint significance of the seven ER parameters, the means denoted by $\bar{b}'$s, and the overall joint significance for all 14 welfare parameters. In the next two specifications, i.e., with state effects, only the joint test for the significance of the benefit parameter realizations can be carried out. The table also shows which age-cohort-state combinations are held constant in each specification.

The overall joint test in the first specification (row 3) indicates that welfare programs matter in determining all of the choices.[16] However, neither (joint) transitory (b_t's) nor (joint) permanent ($\bar{b}'$s) effects are always precisely estimated; in particular, neither is well identified for pregnancy and marital status decisions.[17] This lack of precision in the estimates of the effects of changes in benefit parameter realizations on pregnancies and marriage, and to a lesser extent on welfare participation, is also seen in specifications two and three that are based only on time-series variation in welfare generosity.[18] This finding is consistent with much of the earlier literature.

Table 4 uses the estimates of the first specification to forecast the impact of a global changes in welfare rules.[19] We do not perform similar counterfactual experiments with the other two specifications that are based on within-state variation in benefits alone because the counterfactual to which they correspond, namely the effect of changing the realizations of the benefit parameters of one state to that of another state while maintaining the original ER, is not an interesting policy experiment.

Table 4 shows the proportionate marginal changes in the choices made by women residing in state A that would ensue if the benefit rules of state B were unanticipatedly adopted (also with state B's realizations of the benefit parameters), and this change was expected to be

permanent. Reading down the columns (State A), the first row within any state (State B) depicts the change in the proportion of women of any given age who choose to receive welfare over the six month period (restricted to women who have had at least one child), the second row the proportion who choose to become pregnant, the third row the proportion who choose to be married and live with her spouse, the fourth the proportion who choose to work and the last the proportion who choose to attend school. The impact that is measured in table 4 is that which would occur in the first six-month period after adopting the new rules, but not in periods subsequent to that. To obtain estimates of the impact in periods following the first period of adoption would require that one calculate choice probabilities that do not condition on state variables that evolve with the choices.[20]

The block diagonal elements of table 4's matrix, where the column and row state are the same, repeat the weighted means of the choice variables from table 2. The changes (derivatives) obtained from the logit specification, shown in the off-block-diagonal elements, are evaluated at these sample proportions.

It is most revealing to contrast the changes that would occur if the benefit rules of the most and least generous states were reversed. For example, the estimates imply that if Michigan (State A, second column) adopted the Texas (State B) benefit rules, the percent of women receiving welfare (of those with at least one child) would fall in the first six-month period after adoption by 19.2 percentage points, from 23.6 to 4.4 percent. The resulting 4.4 percent of Michigan woman (within the age range of our data) that would choose to receive welfare under Texas rules is actually lower than the 6.4 percent of woman residing in Texas who choose to receive welfare.

Similarly, the percent of Michigan women who choose to become pregnant in that period would fall by .7 percentage points with the adoption of the Texas welfare program, from 5.4 percent to 4.7 percent. Although seemingly only a small change, the resulting proportion of pregnancies (evaluated at the levels of their current state variables) is only slightly higher than that for women residing in Texas, 4.6 percent. The percent married and living with spouse would rise by 1.4 percentage points, from 39.8 to 41.2 percent, which would accentuate the difference between the states, unlike for welfare receipt and for pregnancies. The percent of working women would rise by 2.6 percentage points, increasing overall participation from 60.3 percent to 62.9 percent, still below the participation rate in Texas of 68.9 percent. Finally, the percent of women attending school (under the age of 25) would fall by 1.5 percentage points. This last result might seem inconsistent with optimizing behavior. However, it is possible that work and schooling are actually viewed as substitutes for the set of women for whom welfare provides *ex ante* a potentially valuable option. Thus, for these women reducing welfare generosity might increase their propensity to work and reduce their propensity to attend school.[21] Qualitatively almost identical results are obtained with other paired contrasts between more and less generous states.[22] For example, concentrating on welfare participation, if Michigan were to adopt the benefit rules of CA, NY, NC, OH or TX, welfare participation would be predicted to drop by 9.7, 33.1, 67.8, 39.0 and 81.4 percent, which corresponds exactly to the ranking of the states by their relative generosity. With respect to market participation, the same change would lead to an increase in the percentage of women who work 2.0, 1.1, 19.1, 10.9 and 4.3 percent, which is consistent with the ranking by generosity except for Texas. Although there are such reversals, they predominantly arise with respect to pregnancy and marital status outcomes, which is

consistent with the lower precision of the estimates with respect to those choices (see table 3).[23]

VI. Conclusions

Using simulations of the stylized model presented in Part I. of this paper as a guide, we have estimated approximations to the decision rules of forward-looking women for welfare participation, fertility, marriage, work and school attendance using data from the NLSY79. The estimates of the approximate decision rules indicated that both the current period benefit parameters and the state-specific long run means of the benefit parameters have statistically significant effects on welfare participation, work and school attendance decisions. However, for fertility and marriage, neither the current period benefit parameters nor the long-run means were found separately to be statistically significant, although they were found to be jointly significant. This result is consistent with existing literature that controls only for current benefit realizations and finds no statistically significant effects of current welfare benefits on fertility and marriage. Yet, it is also not inconsistent with a scenario in which the welfare system as a whole affects fertility and marriage.

As our simulations showed, benefit changes may have no effect on fertility if they are perceived as having no permanence, since the actual birth will (most likely) occur after the next benefit parameter realization.[24] Although we do not include marriage in our simple simulation model, it would presumably exhibit a similar pattern, since, given the persistence of marriage choices, most of the marriage duration would (most likely) be realized under future benefit levels. Thus, our findings are not inconsistent with the following behavioral interpretation: (1) women are forward-looking in their decision-making and (2) women's perceptions are that benefit parameter changes exhibit little or no persistence. Note that these perceptions appear to

be wrong, as the actual VARs that we estimate imply that benefit parameter innovations have significant persistence.

Finally, we use our estimated decision rules to simulate the effects of particular U.S. states adopting the ER's of other states. This experiment corresponds to a permanent change in the welfare rule generating process for a state. These effects can be quite large. For example, the estimates imply that if Michigan, the state with the most generous program among the six we use for the experiment, adopted the Texas welfare program, the state with the least generous program, the percentage of women receiving welfare (of those with at least one child) would fall in the first period of adoption by 19.2 points (an 81 percent fall), the percentage who choose to become pregnant in that period would fall by .7 (a 12 percent drop), the percentage of women who are married and living with spouse would rise by 1.4 points (a 3.5 percent increase), the percentage of working women would rise by 2.6 points (a 4.8 percent increase), and the percentage of women attending school (under the age of 25) would fall by 1.5 points (a 7 percent decline).

An important caveat to our results arises because, as we have discussed, it is not possible to identify both state effects (unobserved heterogeneity at the state level) and the effects of state-specific permanent means of the benefit rule parameters. To allow for both state effects and for permanent differences in benefit rules across states, it is necessary to structurally estimate an explicit behavioral model. Given assumptions about expectations formation concerning future welfare benefits, it is possible to identify fundamental preference parameters from within-state over-time variation in benefit rule parameters. We are currently implementing such a structural approach (Keane and Wolpin (2000)).

Footnotes

1. The superscript refers to joint contraceptive (c) - welfare participation (f) alternatives.

2. In a preliminary paper, Keane and Wolpin (2000), we have specified a dynamic model that we are structurally estimating which incorporates the variables included in the approximate decision rules estimated here.

3. This procedure has led to a serious seam problem. In the monthly data, there are many more transitions out of welfare between December of one year and the following January than there are between any two months within any calendar year. We attempt to account for this problem in the empirical specification we adopt.

4. The use of almost any cutoff in establishing welfare participation would have only a small effect on the classification; most women who report receiving welfare during a six month period report receiving it in all six months.

5. A household roster is reported only at the interview date, i.e., only once a year and on a specific day. We define the woman as residing or not residing with a spouse during the entire six month period if the interview date occurred in that period. Therefore, there is almost always at least one six-month period in each calendar year in which whether the women is residing with a spouse is missing. We assumed that if the spouse residence status was the same in the period before and after the missing period, then the status in the missing period was the same as in the surrounding periods. Otherwise, we left it as missing.

6. Beginning with the 1981 interview, school attendance was collected on a monthly basis for the prior calendar year. Prior to the 1981 interview, attendance was ascertained at the interview date and if not attending, the date of last attendance was obtained.

7. To obtain the highest grade completed (in years) as of January 1, 1979 (initial schooling) we used data also on the last date of school attendance for those not attending at the 1979 interview date. Cumulative attendance up to any period is initial schooling multiplied by 2, plus periods attended up to that period.

8. Cumulative attendance is not the same as completed schooling to the extent that individuals attend school without progressing through grade levels or skip grades. The alternative of using highest grade completed at each interview date would also have serious measurement problems in that the data exhibits significant longitudinal inconsistencies, e.g., grade levels that fall from one year to the next.

9. We treated the missing data on parental co-residence that arises from the annual nature of the household composition data in the same way as we treated the missing data on whether the woman was residing with her spouse.

10. The weights are those based on the initial 1979 survey.

11. The sample was restricted to women who were never observed to have resided in another state since the age of 14. This selection criterion, which accounts for about a 30 percent reduction in the sample, along with dropping the military and poor white oversamples, accounts for the fifty percent reduction in overall sample size.

12. Notice that the mean age over the sample periods is 23 and varies by less than one-half year among the six states.

13. An alternative to estimating decision rules as we have specified them above is to solve out recursively for the state variables that are themselves related to prior choices. For example, cumulative schooling is simply the sum of all past periods of school attendance. This would lead

to a specification of the choices as functions of initial conditions cum family background variables, the parameters of the ER and all past realizations of the benefit rule parameters.The specification adopted by Rosenzweig (1995), which averages over the past realizations and uses within-state variation, is consistent with this interpretation.

14. In addition, in order to maintain the sample size, missing value dummy variables were included for the following variables: cumulative (part- and full-time) work experience, cumulative periods on welfare, lagged net worth, mother's schooling and father's schooling. For the cumulative variables, the dummy variable was set to one in the first period following the missing information on either employment status or welfare receipt. Unfortunately, information on employment and welfare receipt is available only as of January 1, 1978 so that for the older women at the start of the survey, initial levels of work experience and cumulative welfare receipt cannot be created. We, therefore, created the cumulative work experience variable only for women who were age 17 or younger as of that date and used the dummy for missing work experience for those over 17. On the other hand, with respect to welfare receipt, we assumed that cumulative receipt was zero prior to that date. In addition, to account for the seam problem that exists in welfare receipt, we included a period-specific effect in the welfare receipt decision rule.

15. Sample sizes reported in table 3 differ from those in table 2 for several reasons. All of the specifications drop the first period observation because we do not have data on parental co-residence in periods prior to1979. In addition, there are sample restrictions that are specific to each choice. The decision about welfare receipt is conditioned on having a child, pregnancies on not having had a pregnancy in the previous period, marital status and work on being at least 16 years of age and school attendance on being age 25 or less.

16. Appendix table A.1 presents the p-values for the same logit specifications separately for whites, blacks and Hispanics. For all three groups, welfare parameters are statistically significant with respect to decisions about receiving welfare, working and attending school. For the demographic variables, statistical significant effects are obtained only for the pregnancy decision rule for white women. These results are consistent with those found by other researchers (Moffitt (1992, 1996)).

17. To see how robust these results are to reducing the extent of cross-state variation used in the estimation, we included region dummies. In that specification, the p-values in table 3 for the joint test in row three are .003, .198, .035, .000 and .000. Thus, in all cases other than pregnancies, the conclusions from the joint tests of significance are unaffected. Of course, it should be recognized that including state dummies, as in specification two, makes it impossible to estimate effects of permanent changes in the benefit rule parameters. The region dummies themselves were jointly significant in all cases except for school attendance. Also, including a dummy variable for whether the woman resided in an urban area at age 14 did not affect any of the joint tests.

18. Specifications that allowed for additional sources of variation in benefit parameter realizations, such as controlling separately for age, cohort and state yielded similar conclusions.

19. The logit estimates on which this table is based is reported in appendix table A.2. As seen in that table, individual benefit parameters are often statistically insignificant although, as seen in table 3, they are jointly significant.

20. Such an exercise would require a multinomial choice framework.

21. Indeed, although the welfare system, because it taxes earnings, provides a clear disincentive for teenage women who have children to work, it does not directly discourage school attendance.

22. Given the logit specification, the change in the log-odds that occurs when a less generous state adopts the system of a more generous state is the same magnitude but reversed in sign. The difference in the absolute values of the probabilities as reported in table 4 arise because the baseline probabilities of the states, at which the derivatives are evaluated, differ.

23. Contrasting states of similar welfare generosity, although a valid exercise, does not provide equally convincing evidence on the plausibility of the estimates for reasons we discussed previously. We do not, therefore, discuss those contrasts, although they are provided in table 4.

24. Recall, that the model that was simulated did not allow for income effects.

References

Keane, Michael P. and Wolpin, Kenneth I. "Estimating the Effect of Welfare on the Education, Employment, Fertility and marriage Decisions of Women." Mimeo. University of Pennsylvania, May, 2000.

Moffitt, Robert. "Incentive Effects of the U.S. Welfare System: A Review." Journal of Economic Literature, March 1992, 30, pp. 1-61.

_____. "The Effect of Welfare on Marriage and Fertility: What Do We Know and What Do We Need To Know." Mimeo, Johns Hopkins University, 1996.

Rosenzweig, Mark R. "Welfare, Marital Prospects and Nonmarital Childbearing." Mimeo, University of Pennsylvania, 1995.

Table 1: State Variables

Current Period	One Period Lag	Cumulative Since Age 14	Initial Conditions at Age 14
Realization of Benefit Parameters	Attended School	Attained Schooling	Race/Ethnicity
Parameters of the Evolutionary Rule	Had a Birth	Children Ever Born	Mother's Schooling
	Worked Part-Time Full-Time	No. of Periods Worked Part-Time Full-Time	Father's Schooling Resided in Nuclear Family
	Marital Status	No. Periods Married	
	Received Welfare	No. Periods of Welfare	
	Lived with Parent(s)		
	Net Worth		

Table 2: Descriptive Statistics: All States and Selected States

	All States	CA	MI	NY	NC	OH	TX
Proportion of Person-Periods							
Receiving welfare							
weighted	0.055	0.082	0.104	0.048	0.033	0.063	0.028
unweighted	0.091	0.119	0.146	0.078	0.063	0.114	0.041
Receiving welfare (one or more children ever born)							
weighted	0.128	0.192	0.236	0.129	0.076	0.132	0.064
unweighted	0.193	0.252	0.311	0.188	0.127	0.230	0.085
Becomes pregnant							
weighted	0.049	0.047	0.054	0.049	0.042	0.050	0.046
unweighted	0.051	0.054	0.052	0.049	0.048	0.053	0.050
Is married and lives with spouse							
weighted	0.373	0.377	0.398	0.279	0.441	0.432	0.323
unweighted	0.323	0.318	0.351	0.232	0.384	0.363	0.328
Works							
weighted	0.675	0.644	0.603	0.625	0.756	0.655	0.689
unweighted	0.625	0.597	0.583	0.525	0.707	0.622	0.646
Attends school							
weighted	0.205	0.232	0.215	0.252	0.147	0.180	0.230
unweighted	0.202	0.216	0.225	0.235	0.167	0.181	0.226
Mean Age							
weighted	23.4	23.3	23.5	23.5	23.1	23.5	23.2
unweighted	23.3	23.1	23.4	23.3	23.1	23.5	23.1

Table 2: Continued

Proportion							
White							
weighted	0.764	0.698	0.875	0.646	0.816	0.886	0.556
unweighted	0.472	0.334	0.747	0.340	0.577	0.662	0.226
Black							
weighted	0.165	0.085	0.120	0.214	0.184	0.124	0.206
unweighted	0.321	0.136	0.234	0.345	0.423	0.305	0.293
Hispanic							
weighted	0.071	0.217	0.005	0.139	0.000	0.010	0.238
unweighted	0.206	0.530	0.019	0.316	0.000	0.032	0.480
Mean Schooling							
Mother							
weighted	11.3	11.8	11.8	11.7	10.1	11.7	10.5
unweighted	10.5	10.2	11.6	10.5	10.0	11.5	9.0
Father							
weighted	11.5	12.0	11.6	11.7	9.6	12.0	10.6
unweighted	10.6	10.4	11.4	10.8	9.0	11.5	9.0
Proportion in Nuclear Family at age 14							
weighted	0.824	0.780	0.808	0.805	0.805	0.783	0.843
unweighted	0.748	0.754	0.751	0.679	0.695	0.843	0.779
Number person-periods	71564	9665	3847	4589	2697	4454	6632
Number of persons	3087	419	164	206	115	192	285

Table 3: P-values for Tests of Significance of Welfare Effects in Decision Rules Governing Welfare Participation, Fertility, Marriage, Work and School: Logit Specifications[a]

	Receives Welfare			Becomes Pregnant			Is Married and Living with Spouse			Works			Attends School		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
b_t's	0.080	0.046	0.100	0.897	0.342	0.380	0.164	0.433	0.130	0.000	0.000	0.000	0.003	0.004	0.000
$\overline{b}$'s	0.039	-	-	0.260	-	-	0.209	-	-	0.000	-	-	0.002	-	-
b_t's + $\overline{b}$'s	0.000	-	-	0.049	-	-	0.043	-	-	0.000	-	-	0.000	-	-
Age-cohort dummies	*	*	-	*	*	-	*	*	-	*	*	-	*	*	-
State-cohort dummies	-	-	*	-	-	*	-	-	*	-	-	*	-	-	*
State dummies	-	*	-	-	*[b]	-	-	*	-	-	*	-	-	*[b]	-
Age dummies	-	-	*	-	-	*	-	-	*[b]	-	-	*	-	-	*
No. of obs.	27573	27533	25321	54090	54090	54090		50368	49846	56160	56160	56160	37226	37212	36483

a. * indicates inclusion in the specification

b. P-value less than 0.10

Table 4: Change in Choice Probabilities if State A adopts State B's Welfare Program

	State A					
	CA	MI	NY	NC	OH	TX
State B						
CA						
Receives Welfare[a]	0.192	-0.023	0.034	0.036	0.044	0.056
Becomes Pregnant	0.047	0.003	0.005	0.009	0.002	0.009
Is Married and Living with Spouse	0.377	-0.018	0.043	0.014	-0.007	-0.030
Works	0.644	0.012	0.009	-0.080	-0.052	-0.013
Attends School	0.232	-0.021	-0.013	0.038	0.024	-0.006
MI						
Receives Welfare[a]	0.020	0.236	0.049	0.045	0.058	0.064
Becomes Pregnant	-0.003	0.054	0.002	0.007	-0.001	0.006
Is Married and Living with Spouse	0.018	0.398	0.058	0.033	0.012	-0.013
Works	-0.011	0.603	-0.003	-0.089	-0.063	-0.023
Attends School	0.022	0.215	0.010	0.054	0.042	0.016

Table 4: Continued

NY						
Receives Welfare[a]	-0.047	-0.078	0.129	0.015	0.009	0.038
Becomes Pregnant	-0.005	-0.002	0.049	0.005	-0.003	0.004
Is Married and Living with Spouse	-0.050	-0.069	0.279	-0.038	-0.058	-0.076
Works	-0.008	0.003	0.625	-0.086	-0.060	-0.020
Attends School	0.013	-0.009	0.525	0.047	0.034	0.006
NC						
Receives Welfare[a]	-0.080	-0.116	-0.023	0.076	-0.015	0.025
Becomes Pregnant	-0.010	-0.009	-0.006	0.042	-0.009	-0.002
Is Married and Living with Spouse	-0.013	-0.032	0.031	0.441	-0.021	-0.042
Works	0.099	0.115	0.110	0.756	0.046	0.080
Attends School	-0.054	-0.073	-0.071	0.147	-0.022	-0.060

Table 4: Continued

OH						
Receives Welfare[a]	-0.059	-0.092	-0.009	0.009	0.132	0.033
Becomes Pregnant	-0.002	0.001	0.003	0.007	0.050	0.006
Is Married and Living with Spouse	0.006	-0.012	0.048	0.021	0.432	-0.024
Works	0.052	0.066	0.062	-0.037	0.655	-0.036
Attends School	-0.028	-0.048	-0.044	0.018	0.180	-0.034
TX						
Receives Welfare[a]	-0.145	-0.192	-0.071	-0.029	-0.063	0.064
Becomes Pregnant	-0.009	-0.007	-0.004	0.001	-0.007	0.046
Is Married and Living with Spouse	0.032	0.014	0.068	0.048	0.027	0.323
Works	0.013	0.026	0.022	-0.069	-0.038	0.689
Attends School	0.006	-0.015	-0.007	0.043	0.029	0.230

a. one or more children ever born.

Table A.1: P-values for Tests of Significance of Welfare Effects in Decision Rules Under Specifications (1) and (3) by Race

	Receive Welfare		Become Pregnant		Is Married		Works		Attends School	
	(1)	(3)	(1)	(3)	(1)	(3)	(1)	(3)	(1)	(3)
Whites										
$b_{t'}s$	0.181	0.541	0.301	0.286	0.336	0.452	0.248	0.007	0.335	0.026
$\overline{b'}s$	0.347	-	0.216	-	0.102	-	0.000	-	0.331	-
$b_{t'}s + \overline{b'}s$	0.000	-	0.027	-	0.158	-	0.000	-	0.029	-
No. obs.	11023	5584	25362	25015	23618	23261	26726	26535	17355	16587
Blacks										
$b_{t'}s$	0.075	0.032	0678	0.901	0.699	0.266	0.186	0.001	0.170	0.012
$\overline{b'}s$	0.000	-	0.068	-	0.334	-	0.000	-	0.022	-
$b_{t'}s + \overline{b'}s$	0.000	-	0.285	-	0.140	-	0.000	-	0.002	-
No. obs.	10803	10333	17355	17037	16476	14657	18273	18119	12074	11166
Hispanics										
$b_{t'}s$	0.003	0.255	0.361	0.189	0.272	0.329	0.107	0.235	0.109	0.119
$\overline{b'}s$	0.010	-	0.978	-	0.380	-	0.000	-	0.003	-
$b_{t'}s + \overline{b'}s$	0.000	-	0.229	-	0.380	-	0.002	-	0.005	-
No. obs.	5617	4641	10057	10214	9903	9243	11161	10951	7645	7209

Table A.2: Logit Parameters Estimates for Specification One[a, b]

	Receive Welfare	Become Pregnant	Is Married: Living w/Spouse	Works	Attends School
b_0	0.0024	-0.00016	-0.0015	-0.007	-0.0054
	(0.0021)	(0.0014)	(0.0026)	(0.0010)	(0.0015)
b_1	-0.0033	0.0064	0.0090	0.0046	-0.0048
	(0.0099)	(0.0066)	(0.0131)	(0.0047)	(0.0073)
b_2	0.0394	-0.0361	0.0096	-0.0506	0.0178
	(0.0705)	(0.0450)	(0.0918)	(0.0321)	(0.0482)
b_3	-2.247	-0.8449	-0.1327	-1.278	0.7698
	(0.966)	(0.6005)	(1.266)	(0.3090)	(0.5883)
b_4	0.00089	-0.00091	-0.0012	0.0016	0.0037
	(0.0022)	(0.0015)	(0.0028)	(0.0011)	(0.0016)
b_5	0.0116	-0.0545	0.0111	0.0005	0.0010
	(0.0092)	(0.0061)	(0.0122)	(0.0042)	(0.0067)
b_6	0.0064	-0.0018	0.0165	0.0017	-0.0008
	(0.0129)	(0.0083)	(0.0142)	(0.0053)	(0.0093)
$\bar{b}_0$	-0.0035	-0.0020	0.0011	-0.0002	0.0011
	(0.0017)	(0.0010)	(0.0024)	(0.0008)	(0.0011)

Table A.2: Continued

$\bar{b}_1$	0.0144	0.0061	0.0076	0.0017	-0.0016
	(0.0083)	(0.0047)	(0.0111)	(0.0054)	(0.0050)
$\bar{b}_2$	-0.1650	-0.0695	-0.1056	-0.0318	-0.0052
	(0.0672)	(0.0365)	(0.0845)	(0.0289)	(0.0378)
$\bar{b}_3$	-6.147	-0.235	3.154	5.027	-4.917
	(2.940)	(1.728)	(4.550)	(1.359)	(1.810)
$\bar{b}_4$	0.0052	0.0029	0.0010	0.0015	-0.0013
	(0.0021)	(0.0012)	(0.0029)	(0.009)	(0.0012)
$\bar{b}_5$	-0.0119	-0.0077	-0.0193	-0.0207	0.0152
	(0.0108)	(0.0057)	(0.0142)	(0.0043)	(0.0057)
$\bar{b}_6$	0.1116	0.0094	-0.1082	-0.0346	0.0560
	(0.0479)	(0.0283)	(0.0687)	(0.0227)	(0.0294)
<u>In Previous Period</u>:					
Lived with Parent	0.2334	-0.4330	-2.387	0.1011	0.2320
	(0.0816)	(0.0648)	(0.1466)	(0.0433)	(0.0630)
Attended School	0.1213	-0.6332	-0.5200	-0.1156	3.072
	(0.1263)	(0.0817)	(0.1341)	(0.0443)	(0.0628)
Had a Birth	0.2060	-0.1511	0.5921	-0.3151	-0.3427
	(0.0899)	(0.0868)	(0.1367)	(0.0560)	(0.1492)

Table A.2: Continued

Worked Part-Time	-0.5629	-0.0824	-0.1533	2.149	0.0592
	(0.0939)	(0.0589)	(0.1133)	(0.0366)	(0.0509)
Worked Full-Time	-1.5424	-0.1769	-0.3491	4.108	-0.4651
	(0.1047)	(0.0573)	(0.1084)	(0.0521)	(0.0631)
Was Married	-0.9473	1.202	7.447	-0.3305	-0.9877
	(0.1137)	(0.0699)	(0.1306)	(0.0566)	(0.1151)
Was Divorced	0.1001	0.4777	1.026	-0.0836	-0.3121
	(0.1406)	(0.1189)	(0.1807)	(0.0892)	(0.1866)
Was on Welfare					
July-December	2.9050	0.2562	-2.281	-0.7101	-0.0508
	(0.1008)	(0.1119)	(0.2159)	(0.0871)	(0.1636)
January-June (change from July-December)	2.1439	-0.1287	0.5974	-0.2295	0.2952
	(0.1349)	(0.1257)	(0.2032)	(0.0967)	(0.1842)
Net Worth	-0.1353	2.57E-06	5.34E-06	0.1418	-0.4406
	(0.0984)	(5.02E-07)	(1.44E-06)	(0.0474)	(0.1217)
Cumulative:					
Periods Attended School	-0.0858	-0.0135	0.0714	0.1673	0.2692
	(0.0229)	(0.0142)	(0.0314)	(0.0120)	(0.0204)

Table A.2: Continued

Children Ever Born	0.0906	-0.0587	0.0501	-0.0946	-0.2845
	(0.0414)	(0.0305)	(0.0609)	(0.0245)	(0.0711)
Periods Worked Part-Time[c]	0.0304	0.0010	0.0360	0.0774	0.0040
	(0.0238)	(0.0135)	(0.0298)	(0.0113)	(0.0135)
Periods Worked Full-Time[c]	-0.0848	-0.0068	0.0165	0.0792	0.0288
	(0.0250)	(0.0097)	(0.0207)	(0.0089)	(0.0161)
Periods Ever Married	-0.0017	-0.0447	-0.0480	0.0156	0.0672
	(0.0083)	(0.0057)	(0.0120)	(0.0050)	(0.0813)
Periods on Welfare	0.1031	-0.0046	-0.0736	0.0164	-0.0041
	(0.0114)	(0.0118)	(0.0242)	(0.0085)	(0.0212)
<u>Family Background</u>					
Black	0.6640	0.3941	-0.9790	-0.2236	0.1257
	(0.1017)	(0.0538)	(0.1477)	(0.0438)	(0.0558)
Hispanic	0.2579	0.1974	-0.1880	0.0629	0.1909
	(0.1206)	(0.0599)	(0.1718)	(0.0521)	(0.0660)
Mother's Schooling[c]	-0.0020	-0.0146	-0.0107	0.0234	0.0405
	(0.0141)	(0.0083)	(0.0228)	(0.0074)	(0.0099)
Father's Schooling[c]	-0.0329	-0.0021	-0.0322	-0.0023	0.0323
	(0.0122)	(0.0072)	(0.0193)	(0.0060)	(0.0077)

Table A.2: Continued

Nuclear Familiar at Age 14	-0.0909	-0.0180	0.3068	0.0621	0.0747
	(0.0753)	(0.0511)	(0.1304)	(0.0405)	(0.0564)

a. Robust standard errors in parenthesis.

b. Includes cohort by age dummies and a dummy for January-June period.

c. Includes missing values dummies.