

DATA APPENDIX:

THE TRANSITION FROM WELFARE TO WORK

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PURPOSE

In “The Transition from Welfare to Work,” our central goal was to estimate how factors influence a welfare recipient’s decision to transit off of welfare by working (i.e., to “work first”) or to transit off of welfare by first obtaining additional schooling or job training and then seeking out employment (i.e., to “school first”).

The purpose of this data appendix is to elaborate on the explanation and reporting of three parts of our research: (1) the data sets used and variable definitions, (2) the estimation of the probability of using a voucher, and (3) the random-effects estimation results which were omitted from the paper for space considerations.

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DATA SETS

The TAFDC/OCCS Data Set (Voucher Recipients):

Our primary data have been provided by several state agencies in Massachusetts. We use the Office of Child Care Services (OCCS) monthly billing files that reflect actual payments and other information on the use of child care vouchers by current and former TAFDC recipients. We match to this, the monthly files of the Department of Transitional Assistance (DTA) which tracks those enrolled in Massachusetts’ Employment Services Program (ESP). Merging these data produces a longitudinal data set containing 14 months of data from July 1996 through August 1997. This data set, therefore, contains information regarding the individual (e.g., age, race), the household (e.g., age of the youngest child, marital status), and details regarding the voucher used (e.g., type of care, length of care, reimbursement rate).

The goal of our research project is to investigate more fully than others in the past what factors affect a single mother’s decision to transit from welfare into the workforce by going to work immediately or by first obtaining more schooling. Our aim is to include individual and household data, characteristics of the local child care market (including availability, quality, and cost), characteristics of the voucher program, early childhood education opportunities and programs, welfare reform regulations, and local labor market characteristics. Thus, to the TAFDC/OCCS data set of voucher-recipients, we sought out data for these other factors.

While not perfect, we believe these data more effectively capture local labor and child care markets than previous studies. We describe our data and sources below. Table A1 reports the summary statistics for all of our variables for the 58,170 monthly observations from 10,297 single mothers. This represents all voucher recipients according to the OCCS for our time periods who were single mothers with at most a high school education and who were associated with one of five Child Care Resource and Referral Agencies (CCR&Rs) that provided the data. These data are used when random-effects estimation is employed. When fixed-effects estimation is employed, we can only use those mothers who switch from working to schooling or from schooling to working at some point during the time span we observe them. Table A2 reports the summary statistics for this sample of 20,704 monthly observations from 2,881 single mothers.

Individual Data

Our individual data are available for 14 months, July 1996 through August 1997. The DTA intake interview gives us information on several characteristics of the recipient, including their age, race, and education. For as long as the voucher recipient continues to receive public assistance or is enrolled in the ESP, the monthly re-evaluation interviews report the recipient's labor market activities. We restrict the sample to single mothers with at most a high school degree in order to focus on a sample of households that face similar labor market conditions.

Characteristics of the Market for Child Care

To control for the availability of care in each township, we aggregate the number of slots offered by family care providers as reported in the May 1996 Licensing List (provided by OCCS) and then rescale by the number of children aged 0 to 11 to arrive at a "slots-per-tot" measure of availability. Unlike family care providers, group care providers are licensed to care for a particular number of children in a particular age group. We define four types of care: infant (0 to 23 months), toddler (24 to 47 months), pre-school (48 to 59 months), and school aged (60 months or older). We then calculate the number of group care slots per 100 poor children in the age group of the recipients' youngest child. Using the OCCS billing files, we also approximate the number of child care slots per 100 poor children contracted by the state.

(Note: for all population estimates, we start with the 1990 census which reports populations by age by township. We then use a 1997 estimate of the township populations provided by the Census to estimate the 1997 township populations by age group.)

We measure the quality of care in each township by the percent of group care slots offered by providers accredited by the National Association for the Education of Young Children (NAEYC). To do this, we match providers listed in the May 1996 Licensing List to the NAEYC's January 1998 list of accredited providers.

Finally, using the 1997 Resource and Referral Database (provided by the five CCR&Rs), we calculate each township's median weekly price of group child care for the age group of the household's youngest child.

The Child Care Voucher System

In terms of obtaining and using child care vouchers, the two most important decisions made by the state are the co-payment schedule and reimbursement rate. The state legislature sets the maximum reimbursement rate that it will pay to providers for care under the voucher program, which varies by type of care, length of care, age of child and area of the state. Mothers with child care vouchers are not directly affected by reimbursement rates, even if they are required to make co-payments. However,

mothers are indirectly affected by the reimbursement rate because of its effect on providers. Higher rates should encourage more providers to accept vouchers. Higher rates may also encourage providers to alter the characteristics of the care they provide (e.g., increase their quality of care, extend their hours of care, or provide transportation). Reimbursement rates range from \$14 per day up to \$38 per day.

Those receiving cash assistance in Massachusetts do not face a co-payment, while former cash assistance recipients face a co-payment schedule that depends on family income, family size and whether care is part-time or full-time. The schedule relating income to co-payments is analogous to a tax schedule. Thus, one can identify its effect on behavior only if there are exogenous changes to the schedule. Unfortunately, the schedule did not change during our period of study. Hence, we are unable to estimate the impact of co-payments on the probability of working. We do, however, include the number of household dependents (when not estimating a fixed-effects model) to capture, in part, the affect of the co-payment schedule.

State and federal funding for child care vouchers has steadily increased with time. Using the statewide voucher budget reported by OCCS, we calculate government spending on vouchers to have totaled \$434 per poor child in fiscal year 1997 (which ended June 30, 1997). For fiscal year 1998, we calculate \$511 was budgeted for each poor child, an 18 percent increase.

The last variable included under the heading of the Child Care Voucher System is the probability of using a voucher. This variable is a generated variable following Goldberger (1972), Murphy and Topel (1985), and Pagan (1984, 1986). The creation of this variable is discussed in the next section.

Early Education Programs

We incorporate information on the three major early education programs in Massachusetts – Community Partnerships for Children, Head Start, and publicly provided kindergarten programs.

Starting in the early 1990s, the Massachusetts Department of Education invited grant applications from private organizations, public schools, charities, and others to help care for children. Each grant recipient, no more than one per township, is called a Community Partnership for Children (CPC). Over the years, the monies have been renewed annually and increased and more CPCs have been funded. By fiscal year 1998, 229 townships received almost \$60 million through 157 different CPCs. We include in our analysis the township's annual CPC budget per poor child. For the most part, the CPCs fund Pre-K programs.

We collected the 1996-97 and 1997-98 Program Information Reports filed by the 28 Head Start delegate agencies in Massachusetts. Using information on when Head Start programs operate, we determine if the household's youngest child is "Head Start Eligible". To be eligible there must be a Head Start program in town, it must be open (not on winter or summer break), and it must serve the age group of the household's youngest child.

We obtained information from the Massachusetts Department of Education as to which school districts offered a free Pre-K program and each school district's age requirement for starting kindergarten in the fall of 1996. We then determined Head Start, Pre-K, kindergarten, and elementary school eligibility of the youngest child in the household. We classify a child as being school-eligible if he or she is age-eligible for an existing local education program and that program is in session.

Welfare Reform and Other Policy Variables

To account for the welfare reform regulations in Massachusetts, we include binary variables indicating the appropriate age group of the recipients' youngest child (under two years-old, two to five years-old,

and six years-old or older), a binary indicating the imposition of time limits (December 1996), and the interaction of these two in order to observe changes in behavior when facing time limits.

We also include a time trend and a binary variable indicating whether standard operations at the local welfare office consolidate responsibilities across caseworkers. A binary variable accounting for the October 1996 increase in the federal minimum wage and changes in federal employer tax credits is also included. Finally, during the time period of our study, the Massachusetts Office of Business Development funded 439 certified projects intended to foster economic revitalization throughout the state. On average these projects spent \$439 per worker.

Local Labor Market and Community Characteristics

Using the Bureau of Labor Statistic's ES 202 data, we include each township's percent of local jobs that are in the retail trade and service sectors as most working women of the type in our sample are employed in the services and trade sectors (Witte et al., 2000). We also include the median hourly wage of cashiers in the individual's metropolitan statistical area. We include a binary variable at the township level indicating the presence of a job center operated by the Massachusetts Division of Employment and Training. Using the 1990 Census data again, we also include median household income for each household's zip code. Lastly, we include a complete set of binaries denoting township, Boston neighborhoods, welfare offices, and metropolitan statistical areas. Boston neighborhoods vary by zip code and were provided by the Boston Development Authority. The distribution of individuals across geographic areas is given in Table A3.

The DOR Data Set (Voucher-Eligible Individuals):

Using a twenty percent random sample of households receiving public assistance in 1997 assembled by the Massachusetts Department of Revenue (DOR), we have access to records on 22,851 individual households headed by a single mother. Using data on quarterly earnings, we designate households as voucher-eligible if their income is below 75 percent of the state median income. Keeping only income-eligible households leaves us with 20,410 observations. However, we only know which CCR&R each household is associated with if the household actually used a voucher. Thus, before estimating the probability of voucher use, we use geocode information to determine which CCR&R each family in the DOR data set is most likely to work with if they would receive a voucher. We then keep only those observations that are associated with one of the five CCR&Rs that provided the TAFDC/OCCS (voucher recipient) data. When we do this, we are left with 6,626 observations of voucher-eligible individuals. In order to be confident in the mapping of geocodes to CCR&Rs, Table A4 presents the percent frequency counts for each CCR&R in both data sets. Except for the New England Farm Workers Council, which has 27.65 percent representation in the TAFDC/OCCS data but only 17.8 percent representation in the DOR data, the CCR&Rs in the DOR data match their representation in the TAFDC/OCCS data fairly closely.

Table A5 presents the summary statistics for the DOR data. Compared to the TAFDC/OCCS data, the age of the mother, the percent with a high school degree, and the number of dependents are roughly the same. The most striking difference between the data sets is the racial compositions. Although the percent of mothers who are black is roughly the same, the DOR data set contains a much greater percentage of whites than the TAFDC/OCCS data, and thus necessarily, the TAFDC/OCCS data set contains a much greater percentage of Hispanics. A similar discrepancy exists in the percent of observations that come from Boston. Over half of the TAFDC/OCCS observations come from Boston (and not coincidentally have a greater percentage of minorities), whereas less than forty percent of the DOR observations come from Boston.

THE PROBABILITY OF VOUCHER USE

Our goal is to more fully understand how characteristics of the local child care market, the voucher system, and welfare reforms (among other factors) influence the decision to “work first” or “school first” as one transits off of welfare. Estimating the decision of working versus schooling on our data set of voucher recipients, therefore, is problematic as everyone in the data set not only qualified for a voucher but actually used a voucher. In order to address this selection problem, we must take into account the probability of using a voucher. To do this, we follow Pagan (1984, 1986), which advances Goldberger (1972) and is similar to Murphy and Topel (1985), and estimate the probability of using a voucher using the DOR data set. Using those results, we predict voucher use for all observations in the TAFDC/OCCS data set. Pagan refers to the predicted variable, in this case the predicted probability of voucher use, as a generated regressor. An alternative method would be to use the Probit results on voucher use by the voucher-eligible individuals in the DOR data set in order to calculate the Mills ratio for each voucher recipient in the TAFDC/OCCS data set. Results from using the predicted probability of voucher use as well as the Mills ratio are presented later in the appendix.

Using the DOR data set (i.e., the sample of voucher-eligible individuals), we are now ready to estimate the probability of voucher use equation. There are two main issues at this point. First, we can only include variables in the regression that we also have available in the TAFDC/OCCS data as the ultimate objective is to predict the probability of use for individuals in that data set. Second, we need exclusion restrictions to identify the probability of voucher use equation from the probability of work versus schooling equation. Mathematically, we could rely on functional form differences to identify the equations, but in this case, association with a CCR&R serves as a particularly attractive exclusion restriction. CCR&Rs administer vouchers and help in finding appropriate child care. Thus, CCR&Rs clearly facilitate voucher use. They do not, however, help welfare recipients find work or schooling. This is left to welfare offices, the Department of Employment and Training, and the ESP. Thus, we include association with one of our five CCR&Rs in the probability of voucher use equation by including four dummy variables.

The probability of using a voucher equation is estimated with a Probit model in which individual characteristics and CCR&R association are included as explanatory variables. The regression results are reported in Table A6. These results are then used to predict the probability of voucher use (or the Mills ratio) for each observation in the voucher-recipient data set.

ESTIMATION

We model the work versus schooling decision as depending on human-capital/socio-demographic characteristics of the individual (H), characteristics of the market for child care (C), policy and administrative variables related to the Massachusetts child care voucher system (V), characteristics of early childhood education programs (E), other public policy variables including welfare reform legislation (P), and local labor market conditions and community characteristics (L). In general, the model we estimate can be written as:

$$(1) \quad \text{Prob. of Work}_{i,t} = \text{Logit} (\beta H_{i,t} + \alpha C_{i,t} + \gamma V_{i,t} + \phi E_{i,t} + \delta P_{i,t} + \xi L_{i,t} + \varepsilon_{i,t})$$

for individual i in time period t . As we observe households over time, the estimation of equation (1) involves unobserved family-specific attributes that may affect the unbiasedness and consistency of the estimation. Chamberlain (1983) first suggested ways in which to address these issues.

We assume that the error term in equation (1), $\varepsilon_{i,t}$, is comprised of an individual effect (μ_i), a time-effect (γ_t), and a random-effect ($v_{i,t}$) that varies both in the cross-section and in the time series so that

$$\varepsilon_{i,t} = \mu_i + \gamma_t + v_{i,t}.$$

This specification of the error term allows us to address the possible correlation of behaviors of individuals across time that are likely to be present when some explanatory variables are measured at “macro-levels,” for example, at the zipcode or township level rather than at the individual level. (See Moulton (1990) for a thorough discussion of the issue. Tauchen and Witte (1994) employ the same strategy that we follow here.)

Although the fixed-effects estimator requires few assumptions other than that the unobservable family-specific effect be constant over time, it relies only on deviations from family-specific means to estimate the parameters, and thus it ignores time-invariant information as well as the initial values of time-variant information. Also, generalizing the results from random-effects estimation out of sample rests of firmer ground than generalizing results from fixed-effects estimation. The traditional (or structured) random-effects estimator, however, has been criticized, because it imposes a constant correlation across all time periods on the unmeasured, family-specific effect, i.e.,

$$\text{Cor}(\varepsilon_{i,s}, \varepsilon_{i,t}) = \rho \text{ for all } i \text{ and } s \neq t.$$

This is equivalent to requiring that unmeasured family-specific behavioral patterns have a constant correlation across all time periods. To the contrary, most behavioral models suggest that the degree to which behaviors are correlated declines with time. Liang and Zeger (1986) and Liang et al. (1992) provide for an unstructured random-effects estimator that is free from the restrictive assumption of the traditional random-effects model. Specifically, they allow for

$$\text{Cor}(\varepsilon_{i,s}, \varepsilon_{i,t}) = \rho_{s,t} \text{ for all } i \text{ and } s \neq t.$$

To discern the robustness of our results, we estimate equation (1) using fixed-effects, structured random-effects, and an unstructured random-effects estimator that imposes no structure on the correlation of the family-specific random-effects over time. We also calculate robust standard errors to adjust for the heteroskedasticity imparted by the unbalanced panels of households, as we observe households for varying lengths of time as they enter and leave the child care voucher program.

We estimate equation (1) using all three approaches – fixed-effects, traditional random-effects, and unstructured random-effects. A Hausman test rejects the random-effects models in favor of the fixed-effects model, so the results in the paper focus exclusively on those results. Results from all three estimators, however, are given in Tables A7 and A8 of the appendix. Table A7 includes the results when the specification includes the predicted probability of voucher use, while Table A8 includes the results when the specification includes the Mills ratio.

Finally, the estimated coefficients in Tables A7 and A8 only point to the direction of the effect, they do not reveal information concerning the magnitude of the effect given the logit structure of the estimation. Tables A9 and A10, therefore, present the estimated effect on the decision of working versus schooling under several scenarios. The results in Tables A7 concerning the fixed-effects estimation are identical to those in Table 5 of the paper. The last two columns of Table A9, however, report the estimated effects for the same hypothetical scenario when applied to either of the random-effects results. And Table A10 reports the estimated magnitudes from the same scenarios when using the estimated coefficients in Table A8 (which uses the Mills ratio).

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Table A1. Descriptive Statistics for Random-Effects Estimation (N = 58,170).

	Mean	Median	Std Dev	Min	Max
Individual Characteristics					
Worked positive hours last week.	0.587	1	0.492	0	1
Age of mother.	27.935	26.667	6.865	15	56
Mother has no high school degree.	0.464	0	0.499	0	1
Mother has a high school degree or GED.	0.536	1	0.499	0	1
English is spoken in the household.	0.936	1	0.245	0	1
English is not spoken in the household.	0.064	0	0.245	0	1
Household race is black.	0.381	0	0.486	0	1
Household race is Hispanic	0.344	0	0.475	0	1
Household race is white, non-Hispanic.	0.276	0	0.447	0	1
Number of household dependents.	2.648	2	0.969	1	8
Child Care Market Characteristics					
Family care slots per 100 kids.	5.036	5.503	1.669	1.304	7.427
Group care slots per 100 kids by age of child.	6.415	5.269	4.284	0	24.743
State contracted slots per 100 kids.	1.409	1.667	0.516	0.034	2.675
Percent group centers NAEYC accredited.	0.164	0.151	0.146	0	1
Median weekly price of care by age group	80.19	72.96	27.67	45	225
Child Care Voucher System					
State daily reimbursement rate.	24.98	27.50	8.13	14	38
State & federal subsidy per poor child in \$100.	4.475	4.34	0.293	4.34	5.11
Probability of using a voucher.	0.476	0.484	0.140	0.022	0.810
Probability of using a voucher after welfare reform.	0.339	0.406	0.246	0	0.810
Early Education Programs					
Head Start exists in township.	0.454	0	0.498	0	1
Full-day kindergarten.	0.847	1	0.360	0	1
CPC funding per poor child in town.	5.255	3.523	3.606	0	53.126
Youngest child is Head Start eligible.	0.121	0	0.326	0	1
Youngest child is school eligible.	0.084	0	0.278	0	1
Welfare Reform and Policy Variables					
Youngest child is under 2 years-old.	0.262	0	0.440	0	1
Youngest child is 2 to 5 years-old.	0.521	1	0.500	0	1
Youngest child is at least 6 years-old.	0.217	0	0.412	0	1
Time limits imposed on Dec. 1, 1996.	0.712	1	0.453	0	1
Time limits * youngest child is under 2.	0.184	0	0.387	0	1
Time limits * youngest child is 2 to 5.	0.370	0	0.483	0	1
Time limits * youngest child is over 5 years old.	0.158	0	0.365	0	1
Time trend.	8.218	9	3.949	1	14
Welfare office is consolidated.	0.437	0	0.496	0	1
October 1996 minimum wage increase.	0.842	1	0.365	0	1
Economic revitalization dollars per worker.	439	32	534	0	2349
Labor Market and Community Characteristics					
Retail and service jobs per worker in town.	0.549	0.561	0.069	0.205	0.808
Median Cashier Wage in MSA.	0.161	0.081	0.150	0	0.433
DET Job Center exists in township.	0.570	1	0.495	0	1
Median household income in zipcode.	26,499	25,723	6,542	13,721	70,928

Table A2. Descriptive Statistics for Fixed-Effects Estimation (N = 20,704).

	Mean	Median	Std Dev	Min	Max
Individual Characteristics					
Worked positive hours last week.	0.546	1	0.498	0	1
Age of mother.	28.4	27	7.1	15.7	56
Mother has no high school degree.	0.453	0	0.498	0	1
Mother has a high school degree or GED.	0.547	0	0.498	0	1
English is spoken in the household.	0.950	0	0.218	0	1
English is not spoken in the household.	0.050	0	0.218	0	1
Household race is black.	0.419	0	0.493	0	1
Household race is Hispanic	0.324	0	0.468	0	1
Household race is white, non-Hispanic.	0.257	0	0.437	0	1
Number of household dependents.	2.603	1	0.945	1	8
Child Care Market Characteristics					
Family care slots per 100 kids.	5.106	5.503	1.596	1.304	7.427
Group care slots per 100 kids by age of child.	6.553	6.655	4.214	0	24.743
State contracted slots per 100 kids.	1.445	1.667	0.502	0.034	2.675
Percent group centers NAEYC accredited.	0.167	0.164	0.141	0	1
Median weekly price of care by age group	80.44	71.36	27.62	45	225
Child Care Voucher System					
State daily reimbursement rate.	25.61	28.5	8.00	14	38
State & federal subsidy per poor child in \$100.	4.466	4.34	0.285	4.34	5.11
Probability of using a voucher.	0.470	0.477	0.142	0.030	0.803
Probability of using a voucher after welfare reform.	0.337	0.398	0.245	0	0.798
Early Education Programs					
CPC funding per poor child in town.	5.088	3.523	3.348	0	53.126
Head Start exists in township.	0.426	0	0.494	0	1
Youngest child is school eligible.	0.258	0	0.437	0	1
Welfare Reform and Policy Variables					
Youngest child is under 2 years-old.	0.272	0	0.445	0	1
Youngest child is 2 to 5 years-old.	0.541	0	0.498	0	1
Youngest child is at least 6 years-old.	0.187	0	0.390	0	1
Time limits imposed on Dec. 1, 1996.	0.714	0	0.452	0	1
Time limits * youngest child is under 2.	0.183	0	0.387	0	1
Time limits * youngest child is 2 to 5.	0.391	0	0.488	0	1
Time limits * youngest child is over 5 years-old.	0.139	0	0.346	0	1
Time trend.	8.185	9	3.870	1	14
Welfare office is consolidated.	0.400	0	0.490	0	1
October 1996 minimum wage increase.	0.849	0	0.358	0	1
Economic revitalization dollars per worker.	419	18.59	527	0	2,349
Labor Market and Community Characteristics					
Retail and service jobs per worker in town.	0.551	0.561	0.064	0.205	0.808
Average hourly wage of cashier in MSA.	6.699	7	0.346	6.2	7
DET Job Center exists in township.	0.546	0	0.498	0	1
Median household income in zipcode.	26,446	25,440	6,377	13,721	70,928

Table A3. Frequency of Monthly Observations by Location.

<i>Townships</i>					
Acushnet	189	Framingham	1,184	Springfield	11,146
Boston	21,399	Holyoke	2,031	Taunton	976
Cambridge	1,190	Lowell	3,920	Waltham	625
Chelsea	1,375	New Bedford	4,839	Wareham	462
Chicopee	1,454	Newton	226	Westfield	610
Dartmouth	347	Revere	797	Winthrop	143
Fall River	3,979	Somerville	943	Woburn	335
<i>Boston Neighborhoods</i>					
Allston-Brighton	549	Jamaica Plain	742	South Boston	695
Central Boston	569	Mattapan	1,428	South Dorchester	7,988
Charlestown	646	North Dorchester	1,634	South End	905
East Boston	1,040	Roslindale	838	Not in Boston	36,771
Hyde Park	854	Roxbury	3,511		
<i>Welfare Offices</i>					
Bowdoin Park	9,622	New Bedford	5,375	Taunton	976
Davis Square	3,005	New Market Square	6,229	Waltham	625
Fall River	3,979	Revere	3,355	Wareham	462
Framingham	1,184	Roslindale	3,862	Westfield	610
Holyoke	2,031	Springfield Liberty St	12,600	Woburn	335
Lowell	3,920				
<i>Metropolitan Statistical Areas</i>					
Boston	29,655	New Bedford	5,375	Springfield	15,241
Lowell	3,920	Providence	3,979		

Table A4. Child Care Resource Agency Percent Frequency Counts across Data Sets.

	OCCS: Random-Effects	OCCS: Fixed-Effects	DOR
<i>Child Care Resource Agency:</i>			
Child Care Choices of Boston	35.05%	40.44%	41.67%
Child Care Resource Center	8.68%	8.26%	11.82%
Child Care Search	11.18%	10.41%	9.39%
New England Farm Workers Council	27.65%	25.93%	17.79%
Child Care Works	17.44%	14.96%	19.33%
<i>Number of Observations</i>	10,297	2,881	6,626

Table A5. Descriptive Statistics (N=6,626).

	Mean	Median	Std Dev	Min	Max
Probability of using a voucher.	0.3679	0	0.4823	0	1
Age of mother.	29.0	28.5	6.7	16	50
Age of youngest child (in months).	63.3	58.8	42.2	0	156
Mother has no high school degree.	0.4337	0	0.4956	0	1
Mother has a high school degree or GED.	0.5231	1	0.4995	0	1
Household race is black.	0.3456	0	0.4756	0	1
Household race is Hispanic	0.1601	0	0.3668	0	1
Household race is white, non-Hispanic.	0.4943	0	0.5000	0	1
Number of household dependents.	2.0660	2	1.2053	1	10
Household resides in Boston.	0.3885	0	0.4842	0	1
Household resides in Boston MSA.	0.5278	1	0.4965	0	1

Source: Twenty percent random sample of assistance recipients in the five Child Care Resource and Referral Agency areas of interest who were voucher-eligible in Massachusetts in 1997. Assembled by the MA Department of Revenue.

Table A6. Probability of Using a Voucher (Probit Regression)

	Coef.	St. Error	<i>p</i> -value
Age of mother.	-0.0515	0.0219	0.019
Age of mother squared.	0.0003	0.0004	0.404
Age of youngest child (in months).	0.0130	0.0016	0.000
Age squared of youngest child (in months).	-0.0001	0.0000	0.000
Mother has no high school degree.	-0.3462	0.0347	0.000
Household race is black.	0.3427	0.0448	0.000
Household race is Hispanic	0.2640	0.0516	0.000
Number of household dependents.	0.0991	0.0152	0.000
Household resides in Boston.	0.0298	0.0914	0.744
Household resides in Boston MSA.	0.1159	0.1399	0.407
CCRA=Child Care Choices of Boston	0.1036	0.0953	0.277
CCRA=Child Care Search	0.3600	0.1462	0.014
CCRA=New England Farm Workers Council	0.5726	0.1471	0.000
CCRA=Child Care Works	0.5588	0.1455	0.000
Constant	0.1743	0.3398	0.608
Number of Observations	6,626		
Pseudo R-squared	0.0944		
Log-likelihood	-3947		

Source: Twenty percent random sample of assistance recipients from 1997. (Massachusetts Department of Revenue).

Table A7. Estimation Results Using the Predicted Probability of Voucher Use

	Fixed Effects		Random-Effects Unstructured Corr.		Random-Effects Structured Corr.	
	Coef.	t - stat	Coef.	t - stat	Coef.	t - stat
Age of mother.			0.381	16.931	0.392	16.509
Age of mother squared.			-0.005	-15.158	-0.006	-14.751
Mother has no high school degree.			-0.320	-5.753	-0.305	-5.525
English is not spoken in the household.			-0.497	-6.421	-0.477	-6.087
Household race is black.			0.037	0.550	0.075	1.160
Household race is Hispanic			0.117	1.719	0.129	1.970
Number of household dependents.			-0.051	-2.140	-0.055	-2.280
Family care slots per 100 kids.	-0.290	-2.182	-0.013	-0.168	-0.057	-0.861
Group care slots per 100 kids.	0.067	3.040	0.022	1.679	0.035	3.165
State contracted slots per 100 kids.	0.792	3.668	0.097	1.104	0.092	1.070
Percent group centers accredited.	1.364	3.583	0.347	1.561	0.463	2.360
Median weekly cost of care.	0.011	3.174	0.004	1.622	0.003	1.649
State daily reimbursement rate	0.044	4.310	0.010	1.943	0.014	2.852
State & federal subsidy per poor child.	0.531	3.574	0.302	5.809	0.310	5.549
Probability of using a voucher.	5.336	3.495	0.943	2.973	1.108	3.535
Probability of using a voucher after reform.	-0.099	-0.322	-0.167	-1.266	-0.315	-2.123
CPC funding per poor child.	0.035	1.935	-0.015	-1.751	-0.003	-0.428
Head Start exists in township.	1.031	2.065	0.319	0.915	0.326	1.074
Youngest child is school eligible.	-0.015	-0.216	-0.001	-0.030	0.047	1.809
Youngest child is under 2 years old.	-1.803	-5.695	-0.782	-4.810	-0.865	-5.910
Youngest child at least 2, not yet 6 yrs old.	-0.887	-4.297	-0.355	-3.865	-0.435	-5.040
Time limits imposed on Dec. 1, 1996.	-0.045	-0.246	0.055	0.801	0.115	1.523
Time limits * youngest child is under 2.	-0.161	-1.124	-0.032	-0.634	-0.016	-0.261
Time limits * youngest child is 2 to 6.	-0.200	-1.569	-0.033	-0.784	-0.046	-0.926
Time trend.	0.173	14.420	0.033	8.014	0.037	8.602
Welfare office is consolidated.	-2.459	-3.600	-0.718	-1.628	-0.809	-2.110
October 1996 minimum wage increase.	-0.235	-3.247	-0.111	-4.713	-0.111	-4.185
Economic revitalization dollars per worker.	3.8E-04	2.372	1.4E-05	0.229	7.8E-05	1.160
Retail and service jobs per worker.	2.121	0.754	1.746	1.006	1.065	0.715
Average cashier hourly wage in MSA.	-1.714	-0.847	-1.350	-1.182	-0.785	-0.777
DET Job Center exists in township.	-1.011	-3.031	-0.417	-1.960	-0.299	-1.628
Median household income in zipcode.	3.1E-05	3.187	1.3E-05	2.031	1.1E-05	2.084
Number of observations.	20,704		58,170		58,170	
Number of families.	2,881		10,297		10,297	
Wald Test (chi-squared degrees of freedom)	1,587.4	(50)	1,607.9	(57)	1,642.2	(57)

Note: The dependent variable in each regression equals one if the mother is working and equals zero if she uses her voucher to pursue more schooling. Each regression also includes dummy variables for township, welfare office, Boston neighborhood, and metropolitan statistical area. Statistical significance is conveyed at the standard *t*-statistic thresholds of 1.645, 1.96, and 2.576.

Table A8. Estimation Results Using the Predicted Mills Ratio

	Fixed Effects		Random-Effects Unstructured Corr.		Random-Effects Structured Corr.	
	Coef.	t - stat	Coef.	t - stat	Coef.	t - stat
Age of mother.			0.366	16.713	0.373	16.192
Age of mother squared.			-0.005	-14.918	-0.005	-14.430
Mother has no high school degree.			-0.444	-11.452	-0.436	-11.043
English is not spoken in the household.			-0.511	-6.594	-0.488	-6.244
Household race is black.			0.126	2.214	0.171	3.107
Household race is Hispanic			0.220	3.649	0.238	4.111
Number of household dependents.			-0.012	-0.544	-0.013	-0.578
Family care slots per 100 kids.	-0.293	-2.204	-0.016	-0.215	-0.066	-0.999
Group care slots per 100 kids.	0.070	3.165	0.022	1.700	0.035	3.246
State contracted slots per 100 kids.	0.801	3.707	0.097	1.113	0.090	1.049
Percent group centers accredited.	1.364	3.580	0.344	1.546	0.465	2.374
Median weekly cost of care.	0.011	3.073	0.004	1.621	0.003	1.598
State daily reimbursement rate	0.044	4.350	0.010	1.934	0.014	2.974
State & federal subsidy per poor child.	0.527	3.548	0.307	5.910	0.308	5.552
Mills ratio.	0.007	0.126	-0.003	-0.311	0.000	-0.045
Mills ratio after reform.	-0.001	-0.057	-0.010	-1.407	-0.012	-1.783
CPC funding per poor child.	0.036	1.983	-0.015	-1.832	-0.003	-0.402
Head Start exists in township.	1.053	2.106	0.295	0.846	0.312	1.026
Youngest child is school eligible.	-0.002	-0.028	0.003	0.104	0.052	1.994
Youngest child is under 2 years old.	-1.911	-6.064	-0.788	-4.835	-0.883	-6.038
Youngest child at least 2, not yet 6 yrs old.	-0.876	-4.230	-0.328	-3.599	-0.418	-4.857
Time limits imposed on Dec. 1, 1996.	-0.156	-1.211	-0.034	-0.865	-0.048	-1.037
Time limits * youngest child is under 2.	-0.054	-0.381	-0.026	-0.513	-0.003	-0.044
Time limits * youngest child is 2 to 6.	-0.131	-1.035	-0.030	-0.733	-0.042	-0.852
Time trend.	0.170	14.232	0.033	8.141	0.038	8.796
Welfare office is consolidated.	-2.488	-3.638	-0.711	-1.611	-0.811	-2.114
October 1996 minimum wage increase.	-0.240	-3.318	-0.110	-4.680	-0.112	-4.250
Economic revitalization dollars per worker.	3.7E-04	2.338	1.4E-05	0.239	7.2E-05	1.086
Retail and service jobs per worker.	2.202	0.784	1.670	0.962	0.922	0.619
Average cashier hourly wage in MSA.	-1.338	-0.662	-1.246	-1.092	-0.623	-0.618
DET Job Center exists in township.	-1.039	-3.114	-0.398	-1.873	-0.281	-1.531
Median household income in zipcode.	3.1E-05	3.150	1.3E-05	2.015	1.1E-05	2.048
Number of observations.	20,704		58,170		58,170	
Number of families.	2,881		10,297		10,297	
Wald Test (chi-squared degrees of freedom)	1574.9	(50)	1617.8	(57)	1644.4	(57)

Note: The dependent variable in each regression equals one if the mother is working and equals zero if she uses her voucher to pursue more schooling. Each regression also includes dummy variables for township, welfare office, Boston neighborhood, and metropolitan statistical area. Statistical significance is conveyed at the standard *t*-statistic thresholds of 1.645, 1.96, and 2.576.

Table A9. Predicted Differences in the Probability of Working from Table A7.

	Fixed Effects	Unstructured Correlation	Structured Correlation
<i>Child Care Effects</i>			
Group care capacity increases from 10 to 15 slots per 100 kids.	0.078** 3.874	0.027 1.647	0.042** 3.457
NAEYC accredited group centers increases from 15% to 25%.	0.033 3.798**	0.009 1.551	0.011* 2.396
Median cost of weekly care increases from \$80 to \$120.	0.100 1.132	0.037 0.539	0.029 0.556
<i>Voucher Effects</i>			
State reimbursement rate increases from \$27 to \$36 per day.	0.092** 6.878	0.023 1.896	0.030** 3.095
State & federal child care subsidy increases from \$434 to \$511 per poor child in township.	0.095** 11.061	0.058** 5.485	0.057** 8.003
Probability of using a voucher increases from 50% to 60%.	0.121** 27.211	0.023** 2.859	0.027** 3.968
<i>Early Childhood Education Effects</i>			
CPC funding increases from \$40 to \$50 per poor child.	0.087* 2.253	-0.036 1.831	-0.008 0.418
A local Head Start program exists.	0.213* 2.652	0.080 0.916	0.077 1.119
Youngest child is eligible for a schooling program and the program is in session.	-0.004 -0.215	0.000 -0.030	0.011 1.816
<i>Regulatory Effects</i>			
Youngest child is under 2 years-old as compared to being at least 2 years-old but not yet 6 years-old.	-0.224** -2.800	-0.102* -2.458	-0.107** -2.709
Youngest child is at least 6 years-old as compared to being at least 2 years-old but not yet 6 years-old.	0.189** 3.764	0.088** 3.894	0.101** 4.806
<i>Imposition of the time limit:</i>			
When the youngest child is under 2 years-old.	-0.046 -0.785	0.005 0.231	0.025 0.886
When the youngest child is 2 to 6 years-old.	-0.060 -0.937	0.005 0.243	0.017 0.690
When the youngest child is at least 6 years-old.	-0.008 -0.244	0.014 0.803	0.025 1.558

Note: Reported below the marginal effect for each change is the appropriate *t*-statistic. The predicted probability of working for the base case is 58.7 percent under the fixed-effects model, 52.5 percent under the unstructured random-effects model, and 56.8 percent under the structured random-effects model. Statistical significance at the 1% level is conveyed by ** and at the 5% level is conveyed by *.

Table A10. Predicted Differences in the Probability of Working from Table A8.

	Fixed Effects	Unstructured Correlation	Structured Correlation
<i>Child Care Effects</i>			
Group care capacity increases from 10 to 15 slots per 100 kids.	0.081** 4.089**	0.027 1.669	0.042** 3.592
NAEYC accredited group centers increases from 15% to 25%.	0.033 3.796	0.009 1.537	0.011* 2.416
Median cost of weekly care increases from \$80 to \$120.	0.097 1.093	0.037 0.539	0.028 0.539
<i>Voucher Effects</i>			
State reimbursement rate increases from \$27 to \$36 per day.	0.092** 6.956	0.023 1.891	0.031** 3.274
State & federal child care subsidy increases from \$434 to \$511 per poor child in township.	0.094** 10.765	0.059** 5.625	0.056 8.361
<i>Early Childhood Education Effects</i>			
CPC funding increases from \$40 to \$50 per poor child.	0.089* 2.310	-0.038 -1.909	-0.008 -0.392
A local Head Start program exists.	0.216** 2.727	0.074 0.847	0.073 1.071
Youngest child is eligible for a schooling program and the program is in session.	0.001 -0.028	0.001 0.104	0.012* 2.004
<i>Regulatory Effects</i>			
Youngest child is under 2 years-old as compared to being at least 2 years-old but not yet 6 years-old.	-0.252** -3.223	-0.110** -2.651	-0.115** -2.929
Youngest child is at least 6 years-old as compared to being at least 2 years-old but not yet 6 years-old.	0.186** 3.714	0.082** 3.624	0.097** 4.622
<i>Imposition of the time limit:</i>			
When the youngest child is under 2 years-old.	-0.045 -0.928	-0.013 -0.775	-0.012 -0.548
When the youngest child is 2 to 6 years-old.	-0.071 -1.251	-0.016 -0.924	-0.022 -1.057
When the youngest child is at least 6 years-old.	-0.029 -1.164	-0.008 -0.864	-0.010 -1.028

Note: Reported below the marginal effect for each change is the appropriate *t*-statistic. The predicted probability of working for the base case is 58.7 percent under the fixed-effects model, 52.5 percent under the unstructured random-effects model, and 56.8 percent under the structured random-effects model. Statistical significance at the 1% level is conveyed by ** and at the 5% level is conveyed by *.