ABSTRACT

Title of Document: EFFECTS OF SOCIAL POLICY REFORMS AND THE ECONOMY ON WELFARE PARTICIPATION AND EMPLOYMENT AMONG SINGLE MOTHERS

Christopher M. Herbst, Doctor of Philosophy, 2007

Directed By: William A. Galston
College Park Professor
School of Public Policy

Child care subsidies and the Earned Income Tax Credit (EITC) are vital government tools for increasing employment and reducing poverty among low-income families. This dissertation, therefore, explores many features of these policies, including their evolution, correlates of participation, and impacts on employment.

Chapter 1 provides an overview of child care subsidies and the EITC, focusing on recent policy developments, labor supply incentives, and a critical review of the empirical employment literature.

Chapter 2 explores why, despite substantial growth in funding, participation in child care subsidy programs remains comparatively low. Results suggest that although 30 percent of households with children are eligible for child care subsidies, take-up is 14 percent. The low take-up rate is driven by several factors: eligible non-recipients differ from recipients in ways that make subsidies unnecessary or undesirable; the practice by states to trade-off generosity in eligibility for additional generosity in benefits; and the practice by states to ration benefits according to specific household characteristics.

Chapter 3 examines the effects of child care costs and net-of-taxes wages on the employment of single mothers. Although a substantial literature estimates separately the impact of prices and taxes, no study has created a modeling framework that accounts for both factors simultaneously. Merging empirical techniques from previous child care and EITC studies yields employment elasticities of -0.174 and 0.711, respectively. An implication of this finding is that price-effects are considerably smaller than those reported elsewhere, while tax-effects accord with previous estimates. Results also suggest that single mothers became less responsive to prices and more responsive to taxes throughout the 1990s, especially after expansions to subsidy programs and the EITC.

Chapter 4 investigates heterogeneous employment effects of social policy reforms across varying economic conditions. Allowing the effects of policy reforms on single mothers to vary with the economy leads to several interesting results. Policy "carrots" are more likely to reveal heterogeneous effects at low intensity work margins, while policy "sticks" show significant variation at increasingly demanding margins. However, all policies produce the largest employment effects in favorable economic conditions, implying that a strong economy reinforces the incentives created by social policy reforms.

EFFECTS OF SOCIAL POLICY REFORMS AND THE ECONOMY ON WELFARE PARTICIPATION AND EMPLOYMENT AMONG SINGLE MOTHERS

By

Christopher M. Herbst

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2007

Advisory Committee:
Professor William A. Galston, Ph.D., Chair
Professor Jonah B. Gelbach, Ph.D.
Professor Sandra L. Hofferth, Ph.D.
Professor Mark Hugo Lopez, Ph.D.
Professor Peter Reuter, Ph.D.

© Copyright by
Christopher M. Herbst
2007

DEDICATION

For LoTrain (Mom) and Buddy (Dad)

ACKNOWLEDGEMENTS

And this mess is so big
And so deep and so tall
We can not pick it up.
There is no way at all!
--Dr. Suess, *The Cat in the Hat*

Along the way, I received considerable support and encouragement from numerous individuals, without whom this dissertation would still be messy.

I would like to express my deepest gratitude to my advisor, Professor Mark Lopez, whose generosity and guidance are responsible for getting me through the past four years. Professor Lopez is the rarest of advisors: his friendly demeanor and sharp intellect provided the ideal ingredients for me to grow as a person and scholar. Our conversations, which could easily span everything from esoteric Stata code (keep if keeper == cnt) to the adoption of pigs, will be sorely missed. I am forever indebted to him.

My dissertation committee also made significant contributions to this research and, more generally, my intellectual development. I benefited greatly from countless conversations with Professor William Galston, the committee Chair. His willingness to take time out of his busy schedule to provide advice on a range of issues is much appreciated. Professor Jonah Gelbach's recommendations on the econometrics vastly improved what you see in these pages. His exceptional ability to simultaneously think about analytics and policy relevance was inspirational. My knowledge of child care subsidy policy was constantly challenged and enhanced by Professor Sandra Hofferth. Her deep experience in such matters is reflected throughout this document. Finally, special thanks are in order for Professor Peter Reuter. Not only did Professor Reuter

contribute immensely to this dissertation, but he was also one my greatest supporters throughout the academic job search process.

None of this research would have been possible without the generous financial support from the Child Care Bureau's Research Scholars Grant program, sponsored by the U.S. Department of Health and Human Services, Administration on Children, Youth and Families, Child Care Bureau. I am especially grateful to Dawn Ramsburg and Ivelisse Martinez-Beck, whose flexibility allowed me to pursue this research to whatever end it might have led.

I owe an enormous debt to several other individuals. Professor Mac Destler's important role as the official doctoral student "shepard" cannot be understated. Professors Burt Barnow and Randi Hjalmarsson were generous with their time and advice when reading drafts of this manuscript. Professor Doug Besharov provided excellent insight into child care subsidy policy and data. Barbara Cronin kept me insured and on the payroll. Of course, I always got by with a little help from my friends, especially Yyannu Cruz Aguayo, Soumya Chattopadhyay, (Professor) Melissa Comber, Brent Elrod, Sara Herbst, Kevin Jones, Emily Kirby, Pramit Mitra, and Kelly Panciera.

Any mention of my mother and father, to whom this dissertation is dedicated, cannot possibly sum up the debt of gratitude I owe them for their love and support throughout the graduate school experience.

Finally, I thank my love, Rebecca Simmons, the person who has provided the greatest advice and inspiration throughout the process of writing this dissertation. Becky was forced to learn more about selection bias than is advisable. Nevertheless, she remained by my side through thick and thin, and for this I am eternally grateful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (CONTINUED)

LIST OF FIGURES

CHAPTER 1: OVERVIEW OF CHILD CARE SUBSIDY POLICY AND THE EARNED INCOME TAX CREDIT

1.1 Introduction to Child Care Subsidies and the Earned Income Tax Credit (EITC)

Child Care Subsidies

Prior to the 1980s, child care legislation was severely hampered because of a belief that a growing child care industry would lead to a "soviet-style system of communal child-rearing."[1] Opposition typically focused on the federal government's intrusion in marriage and the family and the notion that women should stay home to care for their children. However, employment data released during the mid-1970s suggested for the first time that a majority of women with children were in the labor force. This trend led to two important policy developments during this period. Congress in 1974 passed Title XX of the Social Security Act, which provided funds for a range of social services, including child care. States are allocated entitlement funds on the basis of population and are given wide latitude on the services provided and the groups to whom those services are directed. Child care accounts for the largest share of Title XX spending, at 13 percent, but federal allocations have declined over time (Committee on Way and Means, 2000). The other development, as shown in Figure 1.1, was the 1976 and 1981 amendments to the Dependent Care Tax Credit (DCTC). Originally a tax deduction, the DCTC was first changed to a non-refundable tax credit, meaning that only families with positive tax liability could claim the benefit. The maximum credit amount was then increased to $2,400 for one child and $4,800 for two children, and Congress

[1] This is a quote taken from an anonymous leaflet entitled "Raising Children—Government's or Parent's Rights?" The leaflet was part of a smear campaign aimed at derailing the Child and Family Services Act. The leaflet and other material associated with the campaign can be found in *Background Materials Concerning Child and Family Services Act*, 1975, H.R. 2966, 94th Congress, December 1976.

altered the benefit schedule so that the credit rate declined with income (but remained constant for AGI above $28,000).

The late-1980s and early-1990s marked a period of heightened interest in child care policy, largely due to the work requirements mandated by the 1988 Family Support Act (FSA). In fact, the FSA created the first federal child care entitlements through Aid to Families with Dependent Children Child Care (AFDC-CC) and Transitional Child Care (TCC). The AFDC-CC program guaranteed child care benefits so that welfare recipients could participate in the JOBS program, which enrolled able-bodied individuals into employment and job training activities. The TCC was an open-ended entitlement that subsidized child care costs for up to 12 months after leaving welfare. Families were required to pay fees on a sliding scale basis established by each state.

Child care subsidy policy was expanded once again in 1990 with the passage of the Omnibus Budget Reconciliation Act (OBRA90). It created the landmark Child Care and Development Block Grant (CCDBG), which aimed to directly subsidize child care costs and increase quality. Parents were able to spend CCDBG funds on a range of providers, including relatives and neighbors, as long as these services met local standards and licensing requirements. Eligibility was set at 75 percent of a state's median income (SMI), and qualifying children had to be under age 13. Federal allocations for the CCDBG totaled $2.5 billion over three years. The 1990 OBRA also created the At-Risk Child Care (ATCC) program, which provided a capped entitlement of $1.5 billion over five years for families at risk of becoming welfare dependent.

The barrier to employment posed by child care costs gained increased prominence in the wake of historic welfare legislation passed in 1996. The Personal Responsibility

and Work Opportunity Reconciliation Act (PRWORA) eliminated the legal entitlement to cash welfare and child care assistance for low-income families. Congress repealed Aid to Families with Dependent Children (AFDC), which was the primary public assistance program for 60 years, and replaced it with Temporary Assistance to Needy Families (TANF). The legislation imposes strict work requirements on recipients, places a 60-month lifetime limit on welfare, sanctions families that fail to comply with work activities, and devolves to states substantial authority to develop their own reform approaches.

Due to its strong work mandates, the 1996 PRWORA restructured the federal government's role in providing child care assistance (see Figure 1.1 for a summary). Congress repealed the AFDC-CC, TCC, and ARCC programs, and along with CCDBG money, consolidated these funding streams into a single Child Care and Development Fund (CCDF). There are three primary elements to CCDF funding. Each state receives a pre-determined share of federal *mandatory* funds, which are not subject to annual appropriations. States also qualify for *matching* grants, provided they meet certain Maintenance of Effort (MOE) requirements (i.e. maintain or exceed pre-CCDF spending). Finally, the legislation authorizes nearly $1 billion in *discretionary* money that does not require a state match (Long & Clark, 1997). Overall, PRWORA allocated $21 billion for child care over a seven year period, 70 percent of which must be used to subsidize costs for families receiving TANF or transitioning from welfare into work (Greenberg, Lombardi, & Schumacher, 2000).

Eligibility for CCDF funds is set at 85% of the state median income (SMI), although states are able to establish a lower ceiling. States are given substantial

flexibility in designing their subsidy systems, including being able to transfer up to 30 percent their TANF block grant to the CCDF, setting reimbursement and co-payment rates, and defining work activities. However, PRWORA stipulates that states must spend no less than four percent of their CCDF allocation on quality improvement activities. Furthermore, a market rate survey must be conducted every two years so as to ensure that subsidy families have "equal access" to high-quality providers. Results from the survey are used to set payment rates at or greater than the 75th percentile of what the local market is charging. The law also suggests that co-payments are considered affordable if families do not spend more than 10 percent of their income on child care.

Granting states flexibility through the CCDF has led to substantial variation across subsidy regimes. As Table 1.1 shows, very few states use the proposed federal income eligibility ceiling of 85 percent of SMI: it ranges from 39 percent in Illinois to 85 percent in Georgia, Mississippi, and Texas. The interaction of income eligibility limits with states' median incomes has led to dramatic variation in the maximum income at which families can quality for child care subsidies, from $18,000 in Missouri to $48,000 in Connecticut. As previously mentioned, states are given broad authority to determine other components of eligibility, including the types of income that should be counted toward or excluded from eligibility. For example, 16 states currently exempt income from the EITC when calculating a family's eligibility for child care subsidies. Table 1.2 also suggests that states determine fees in a number of ways, including flat rates, percent of cost, percent of reimbursement rates, and percent of income. Providers may set differential reimbursement rates depending on the mode of care (center-based versus family-based) and the age of the child (infant versus pre-school), but it must do so at the

75th percentile of the price distribution in the local market. The reimbursement rates in Table 1.1 are based on services for pre-school age children in center-based settings for the state's largest urban area.

Much of the variation across CCDF regimes is driven by the amount of money allocated to each state. Table 1.2 shows these figures. The first column includes only the federal allocation to each state through the mandatory, discretionary, and matching mechanisms. The mandatory component is determined through a formula that accounts for the size of each state's population under age 13 and for the income level. Recall that states may transfer up to 30 percent of their TANF funding to the CCDF, and as shown in the second column, states have done so to varying degrees. Similarly, there is significant variation in the MOE levels that states must meet in order to qualify for federal matching grants. However, many of these differences are due to differential child care expenditures that existed before the creation of the CCDF. It is also interesting to note that Head Start and the CCDF are currently the two largest child care programs in terms of overall expenditures, but Head Start is better funded with respect to dollars per recipient, at around $5,759 (Blau, 2000). CCDF dollars per child is $3,500, and as Table 1.2 shows, states are serving children at approximately the same level.

Data on subsidy take-up are starting to emerge from various sources. Although it appears that states are serving a large number of children in any given month, as shown in Table 1.3, and the number of subsidy recipients has grown dramatically over time (1.8 million in 2001 compared to 1.0 million in 1996), recent evidence suggests that 12 percent to 15 percent of eligible children currently receive assistance (ACF, 1999). Findings from a U.S. General Accounting Office (GAO) (1999) study confirm this,

estimating that states are serving no more than 15 percent of the CCDF-eligible population. Furthermore, Schumacher and Greenberg (1999) determine that less than half of employed welfare leavers receive subsidies. However, those receiving assistance are using subsidies in a variety of child care modes, and not surprisingly, there is substantial variation across the states. For example, Table 1.3 shows that while only six percent and nine percent of subsidy recipients in Connecticut and Massachusetts, respectively, use them for family-based providers, this mode predominates in Oregon and Indiana (76 percent and 58 percent, respectively). Overall, however, families appear to be using subsidies for center-based providers at a higher rate than for family-based providers, 58 percent compared to 31 percent.

The Earned Income Tax Credit (EITC)

The idea behind the EITC emerged during consideration of President Nixon's welfare reform proposal, the Family Assistance Plan (FAP). The FAP was designed to replace AFDC with a federal minimum cash guarantee and was aimed at working poor, two-parent families with children. Although it was never enacted, Senator Russell Long, then Senate Finance Committee Chairman, expressed interest in a derivative of the plan to assist poor workers by offering wage supplements instead of welfare payments. The EITC was initially conceived as a "work bonus" for the working poor, and it sought to offset some of the increase in payroll taxes, which had grown to 5.8 percent by 1973. Senator Long stated that the purpose of the work bonus was to "prevent the taxing of people onto the welfare rolls." [2] The 1974 recession provided additional motivation to adopt a low-income wage subsidy because Congress was interested in stimulating

[2] Long, Russell. Remarks in the Senate. *Congressional Record*. September 30, 1972. p. 33010.

demand across the earnings distribution. In response, the Tax Reduction Act of 1975 was passed, which refunded $8.1 billion in 1974 individual income taxes and cut 1975 taxes by an additional $10 billion. This legislation established an earned income credit for taxpayers with children that was phased in at a rate of 10 percent, up to a maximum credit of $400, and then phased out until earnings reached $8,000 (Figure 1.1 provides a summary of the major EITC expansions, and Table 1.4 displays the relevant program parameters throughout the EITCs history). The credit is refundable, meaning that if tax liabilities are less than the EITC a family can receive a check for the difference from the Internal Revenue Service (IRS).

The EITC received one-year extensions during 1975-1977 until it was made permanent under the 1978 Revenue Act. This legislation also increased the maximum credit to $500 and the eligibility limit to $10,000, and it added a plateau region over which the maximum credit applied. Finally, an "advanced payment" option was added in 1978 that allowed workers to receive their credit incrementally throughout the year.

Legislation on the EITC slowed for several years until the passage of the Tax Reform Act of 1986 (TRA86). This law increased the subsidy rate to 14 percent, from 11 percent, and raised the maximum income to which the subsidy applied, from $5,000 to $6,080. This increased the maximum credit to $851, which was then phased out at a rate of 10 percent until earnings reached $15,432. The EITC received its second major expansion through the Omnibus Budget Reconciliation Act of 1990 (OBRA90). A separate benefit schedule was created for families with more than one child: the subsidy rate was set initially at 17.3 percent of earnings up to $7,140, for a maximum credit of $1,235. Families with one child, on the other hand, could claim the EITC at a rate of

16.7 percent over the identical earnings range, thereby increasing the maximum credit from $953 to $1,192. Both benefit schedules phased-out between $11,250 and $21,250. A third expansion to the EITC occurred when President Clinton signed the Omnibus Budget Reconciliation Act of 1993 (OBRA93). It created a third benefit schedule for childless tax filers, containing a subsidy of 7.65 percent for the first $4,000 of earnings and a maximum credit of $306. The subsidy rate for families with one child increased to 34 percent by 1995, while the rate for families with two or more children grew to 40 percent. However, to offset some of these increases, the maximum creditable earnings amount was lowered from $7,750 in 1994 to $6,160 in 1995 (for families with one child) before being raised again in 1996. The most important result of the 1993 EITC expansion was seen in the large increase of the maximum credit, which by 1996 grew to $2,152 for families with one child and $3,556 for families with two or more children. Finally, the most recent changes to the EITC came in 2001 through President Bush's EGTRRA. This law took a number of steps to reduce the credit's implicit marriage penalty by creating separate flat and phase-out regions for joint and non-joint tax filers. Although the flat region begins at the same earnings level for joint and non-joint filers, the maximum credit applies to an additional $1,000 of earnings for joint filers and therefore extends the phase-out region by the same amount for these families. This plateau/phase-out differential will grow to $2,000 starting in 2005 and $3,000 starting in 2007.[3]

Eligibility for the EITC is determined along a number of dimensions. First, the taxpayer must have non-zero earned income from wages or salary, business self-

[3] Interestingly, the changes to the EITC were not the only EGTRRA provisions directed at low-income individuals. It also decreased the lowest income tax bracket from 15 percent to 10 percent, expanded to Child Tax Credit $1,000 and made it refundable for families above AGI $10,000, and significantly expanded the DCTC.

employment, or farm self-employment. Second, an individual's adjusted gross income must be below some threshold, which varies by year and the presence and number of children. Until OBRA93 created a small EITC for childless workers, a taxpayer needed to have a qualifying child who met age, relationship, and residency tests. The qualifying child must be a child, grandchild, stepchild, or foster child of the taxpayer, under 19 years old (under 24 if a full-time student), or permanently disabled, and lives with the taxpayer for the entire tax year.[4] An individual becomes ineligible for the EITC if aggregate income from interest, dividends, and capital gains exceeds $2,600.[5]

As of 2003, a taxpayer with non-zero earnings and one qualifying child is eligible to receive a 34 percent wage subsidy on earnings up to $7,490, for a maximum credit of $2,547. The EITC is then phased-out at a rate of 15.98 percent between $13,730 and $29,666. Taxpayers with two or more children receive a 40 percent subsidy on earnings up to $10,510, for a maximum credit of $4,204. The maximum credit is received until earnings reach $13,730, at which point the credit is phase-out at a rate of 21.06 percent until $33,692. As previously mentioned, beginning in 2002 there is a larger flat and phase-out region for joint tax filers so as to minimize the inherent marriage penalties in the EITC.

Table 1.5 displays information on the EITCs expenditures and claimants over time. During the first decade of the program, there was very little variation in the cost. Prior to the TRA86 expansion, expenditures on the ETIC were between $1 billion and $2 billion. By increasing the subsidy rate and lowering the phase-out rate, however, the 1986 tax law more than tripled expenditures, from $2 billion in 1986 to $7.5 billion in

[4] The Ticket to Work and Work Incentives Improvement Act of 1999 and EGTRRA01made several changes to the definition of a qualifying child. The most important change was increasing the residency requirement of the child from over six months to one year.
[5] EGTRRA01 stipulates that income from employee compensation is to be excluded from the definition of earned income.

1990. Moreover, the 1990 and 1993 expansions produced immediate increases in expenditures, bringing the total cost of the program to nearly $32 billion by the end of the 1990s. The growth in EITC spending has slowed in recent years, but it is currently the most expensive anti-poverty program in the U.S. arsenal. In fact, nearly two-thirds of single mothers experience negative tax liabilities because of the EITC (Eissa, Kleven, & Kreimer, 2004). Table 1.5 also shows the amount of EITC spending on the refunded portion of the credit, or the amount paid to individuals in excess of their tax liability. Most EITC dollars go toward the refundable portion of the credit, reflecting the fact that recipients owe very little, if anything, in federal taxes. Finally, it is interesting to note that the number of claimants has grown in accordance with statutory changes, some of which is mechanical (eg., increasing the phase-out range), but program growth is also due to business cycle changes and the increased employment rates of single mothers.

Data on the characteristics of EITC recipients is difficult to generate, but a few studies have matched federal income tax returns with census data. Liebman (1999a), for example, shows that 75 percent of 1990 EITC recipients worked at least 1,000 hours for the year and another 60 percent worked over 1,500 hours. Fully 40 percent of EITC recipients were non-Hispanic white, 39 percent were non-Hispanic black, and 20 percent were Hispanic. As expected, education levels are low: over 40 percent of recipients did not have a high school diploma and 37 percent received no more than a high school education. Interestingly, public assistance rates were low as well, with only 16 percent receiving welfare and 25 percent receiving food stamps. Take-up rates among eligibles appear to be high, and the program is fairly target efficient. Scholz (1994) uses matched federal income tax data with the SIPP and finds that 80 percent to 86 percent of eligible

taxpayers received the EITC in 1990. It is difficult to know how take-up rates changed throughout the 1990s, but Hotz and Scholz (2001) offer a few clues. On the one hand, EITC take-up rates might have increased because eligibility levels extend farther into the income distribution, where filing propensities are higher. However, it is well-documented that record numbers of single mothers entered the labor force throughout the 1990s, and it could be argued that these individuals file at lower rates (Meyer & Rosenbaum, 2000).

In terms of target efficiency, Scholz and Levine (2000) find that over 60 percent of EITC benefits are directed at taxpayers below the poverty line. Liebman (1998) calculates that 40 percent of families below 50 percent of the poverty line receive the EITC, while 80 percent of families between 100 percent and 150 percent of the poverty line receive the credit. This appears to be consistent with recent IRS data presented in Table 1.6, which shows the distribution of EITC filers and payments across several income levels. Approximately 39 percent of all EITC filers and 26 percent of filers with children are in the subsidy region, and these individuals receive 29 percent of total EITC payments. Another 18 percent of all EITC claimants and 20 percent of claimants with children are in the plateau region, and they receive 32 percent of EITC benefits. Finally, 43 percent and 52 percent of all recipients and those with children, respectively, are in the phase-out region. Those on the phase-out receive 39 percent of total payments.

1.2 Behavioral Impacts of Child Care Costs and Subsidies

This discussion focuses on several economic issues related to child care subsidies. First, it reviews arguments justifying government intervention in the child care market, with a special emphasis on the cost-effectiveness component. It then provides a broad

economic framework for the employment and educational incentives that arise from subsidy programs.[6] Finally, it reviews the relevant econometric evidence on the labor supply and education effects of child care costs and subsidies.

Justification for Child Care Subsidies

Scholars and policymakers typically cite four arguments to justify government intervention in the child care market (Blau, 2001). First, subsidies can ameliorate shortages for specific types of child care services, such as infant care, night and weekend care, and services for handicapped children. A shortage, in this context, means there is a mismatch between the type or quality of services supplied in the market and the price at which consumers are willing to pay for such services. Consumer-side subsidies increase purchasing power, thereby bolstering demand for specific services and requiring higher quality. Child care providers should then respond to this additional demand by increasing the supply of desired services and raising average quality.

A second argument for child care subsidies focuses on imperfections in the market stemming from poor information and about child care quality and the positive externalities created by high quality care. Imperfect information deals with the notion that consumers are not well-informed about the distribution of child care options. Furthermore, consumers know less about child care quality than does the provider. Since child care is an experience good, parents only realize the level of quality after they have consumed it. As Blau (2001) notes, information problems might lead to adverse selection of providers because child care in general is a low-wage occupation. If workers who receive high wage offers outside the child care industry are less likely to be child care

[6] A formal economic model of labor supply and educational attainment will be specified in a later section. This discussion is merely to set the stage for the literature review.

providers and if these outside wage offers are positively correlated with child care quality, then adverse selection would ensue. The externality argument focuses on the presumption that parents do not fully recognize the positive benefits to children and society from choosing high-quality care. For example, child development experts argue that such services are correlated with improved intellectual development and academic achievement, while reducing the incidence and societal costs of crime, illegitimacy, and teenage childbearing (Barnett, 1992; 1995; Campbell & Ramey, 1994; Karoly et al., 1998; Nash, 1997; Vandell & Wolfe, 2000). The implication here is that if parents are not fully aware of the external benefits of high-quality child care or they do not posses the financial means to purchase it, then they will not consume the socially optimal amount.

The third argument in favor of subsidizing child care deals with equity and distributional considerations. Some scholars propose that that child care should be viewed as a merit good, suggesting that all families must have equal access to services irrespective of their ability to pay for them (Bergman, 1996). Given the aforementioned externalities of high-quality child care, subsidies might be justified not only for low-income families but also for their high-earning counterparts. However, one thing to bear in mind is a potential equity-efficiency trade-off: if the societal benefits to high-quality child care are small or if positive externalities do not extend up the income distribution, then it may be more efficient to re-allocate child care dollars to programs with greater social and economic benefits.

The final argument is that child care subsidies are cost-effective for the government. Proponents argue that child care subsidies help former welfare recipients

become economically self-sufficient. The logic for the argument is as follows: since subsidies reduce contemporaneous child care costs, low-income women will be more likely to work, thus leading to concomitant growth in human capital over time. Low-income women are using subsidies for two primary purposes, both of increase human capital: direct work experience and education/job training. These activities, in turn, could lead to rising returns to employment and ultimately economic self-sufficiency. The government may therefore realize long-term net savings because it ceases welfare payments to and receives increased tax revenue from individuals who might have continued on welfare in the absence of child care subsidies.

The extent to which child care subsidies are cost-effective depends on a number of factors. Clearly, the number and distribution of recipients, CCDF funding levels, and states' eligibility requirements are critical determinants. As previously mentioned, subsidy regimes vary considerably across the states. Income eligibility limits are particularly important because they determine the reach of potential subsidy effects and therefore the cost-effectiveness. For example, if price and subsidy effects are greatest among the lowest earners, then extending eligibility deep into the income distribution will decrease average cost-effectiveness. In addition, higher income eligibility limits may reduce cost-effectiveness by picking up windfall beneficiaries—or individuals who would work even in the absence of child care subsidies—and so there is little additional labor supply generated per subsidy dollar spent. Another set of factors that should influence cost-effectiveness is the extent to which the government saves cash assistance (TANF and food stamps) funds and generates additional tax revenue. This could occur when subsidy recipients realize wage growth that makes them ineligible for welfare and

brings them into the bottom tax bracket. Still another cluster of features deals with the trade-off between paid and unpaid child care modes. Child care subsidies are used only for paid care, but some families prefer sources of unpaid care. This would appear to increase the amount of employment generated per subsidy dollar spent. However, a decrease in the price of child care should induce some windfall beneficiaries to switch from unpaid to paid sources of care, leading to additional government expenditures without the attending increase in labor supply. Finally, average cost-effectiveness depends crucially on the relative behavioral distortions associated with labor supply, educational attainment, and welfare receipt. As discussed below, all three outcomes should be sensitive to child care costs and subsidies, but the relative size of their elasticities will drive the cost-effectiveness analysis.[7] Labor supply and education are expected to be positively related to child care subsidies, but welfare receipt is ambiguous. Subsidies could increase the probability of receiving cash assistance in the shot-run, since CCDF rules give priority to families on welfare or attempting to transition from welfare. But welfare receipt should decline over time as workers' earnings exceed TANF eligibility limits.

A Simple Economic Framework for Labor Supply and Child Care Subsidies

Consider the following model of the relationship between child care costs and labor supply, as adopted from Blau (2000; 2001), Blau and Robins (1988), and Ribar (1995). The primary motivation for child care expenditures is to allow a parent to enter the paid labor force. Work-related expenses, including child care, may exceed the net returns to employment, particularly among low-income families. The result is that a

[7] Research on the optimal design of tax policies, for example, typically finds that the results are particularly sensitive to the size of wage and income elasticities (Browning, 1995; Liebman, 1999b).

higher price for child care increases the probability that a parent's net wage is lower than the reservation wage (or the lowest wage that an individual would be willing to work for), which, according to economic theory, decreases the likelihood of employment. A testable policy implication of this model is that a child care subsidy allows a mother to keep more of her market earnings, thereby increasing the incentive to enter the labor force. The model is indeterminate with respect to a subsidy's effect on the number of hours of work, conditional on already being employed.

The structure of CCDF subsidies is non-linear, that is, the subsidy rate is greater for individuals employed the fewest hours and declines as earnings rise, until workers reach the break-even point. The overall prediction in this case is a positive incentive to enter the labor force. But the non-linearity may have implications for the chosen level of employment. A possible distortion is that workers may reduce their work effort to qualify for child care assistance or qualify for a higher subsidy rate.

Another issue deals with access to sources of unpaid (or informal) child care, including a parent, grandparent (or other relative), neighbor, or babysitter. Child care subsidies reduce the price of services in the formal market but leave unchanged the cost of using informal providers. This is because no money was exchanged in the first place. Therefore, subsidies increase the incentive to substitute unpaid care with paid care, and this incentive becomes stronger if it is believed that quality is greater in the formal child care market. In other words, it is plausible that subsidies "crowd out" sources of unpaid child care, especially in unregulated and informal settings, where it is believed that services are of questionable quality.

Review of the Econometric Evidence

Non-experimental evidence on the relationship between child care subsidies and women's work decisions comes from two primary sources: studies on price effects and studies of actual subsidy programs. The former is an indirect approach to estimating a subsidy effect, but it can allow useful inferences under certain conditions. There are, however, several things to keep in mind when interpreting these results. As Blau (2001) notes, there could be important unobserved costs associated with obtaining a child care subsidy, either from the time it takes to fill out the necessary forms and navigate bureaucratic rules or from the stigma involved in participating in welfare programs.[8] If individuals are in fact sensitive to a participation stigma, then estimated price effects are likely overstated relative to subsidy effects. Another factor to consider is that price effects are derived from a linear specification, whereas CCDF subsidies are non-linear. While it can be argued that child care costs are comparable to subsidies for deriving elasticities at the extensive margin (employment decision), there could be differences if the goal is to estimate elasticities at the intensive margin (hours of work), since this is where the non-linearities arise. Finally, price and subsidy effects may diverge because the former provides a negative incentive to employment, and the latter provides a positive incentive. Individuals' labor supply decisions are probably very sensitive to the type of incentive structure they face.

Nevertheless, this approach has been quite common in the literature, and the results are surprisingly uniform. Table 1.7 presents a summary of empirical work on the

[8] See Moffitt (1983) for a discussion of the disutility associated with the stigma attached to welfare participation.

effect of child care costs on female labor supply in the U.S.[9] Although nearly every study finds a negative relationship between the price of child care and maternal employment, the range of elasticities is quite large, from 0.06 to -1.36. However, most studies find elacticities that center on -0.35. Several factors could account for this wide variation. Generally speaking, this research spans three decades, uses five different data sets, draws dissimilar samples, and employs disparate estimation techniques. Some studies derive elasticities from samples of all mothers, while others disaggregate by marital status. Restricting samples to families with children under age six appears to be the most common technique, but there are a few studies that examine price effects for children up to age 14. Studies also vary samples by income-level, either restricting inclusion to families below the poverty line or including all low-income families. Measures of the child care price variable rely on variation across both geographic areas (provider-specific) and individuals, and studies vary the unit of time at which costs are determined. However, the most likely candidate for the range of elasticities stems from subtleties in the specification of the participation equation and the methods used to identify the child care price variable.

The most common methodological approach to examining price effects includes a discrete choice participation probit with predicted child care costs and wages as the key right-hand-side variables. However, before estimating the main labor supply equation, one must first specify the underlying structural model, which consists of four equations: a predicted wage equation, a predicted child care price equation, a conditional employment

[9] Michalopoulos and Robins (1999) provide employment estimates from a pooled sample of Canadian and U.S. child care users, yielding an elasticity of -0.16. Powell (1997; 1998) and Cleveland and Hyatt (2003) use only Canadian data. The first Powell paper finds an elasticity of -0.38, while the second estimates elasticities of -0.21 and -0.71 for part-time and full-time work, respectively. The Cleveland and Hyatt paper report a statistically significant effect of child care costs on employment for single mothers, but do not provide an elasticity. Finally, a recent paper from Fong and Lokshin (2000) estimate a price elasticity of -0.17 for Hungarian mothers.

equation, and a conditional child care mode equation. The two conditional equations are considered reduced form specifications and are used to construct sample selection terms in the wage and price equations. The wage equation is corrected for selectivity on employment, while the child care price equation contains selection terms for employment and child care mode. As discussed in more detail below, previous studies rely on either functional form or a set of theoretically-defined exclusion restrictions to identify the selection equations and the final employment probit.

The first step in this process involves deriving the fitted values from a selection-corrected wage equation by ordinary least squares (OLS) regression on the subsample of mothers with positive wages. Selectivity effects are identified through a first-stage employment probit in which the number and presence of young children, presence of other adults, and unearned income are commonly included in the probit but excluded from the wage equation. The wage equation is ultimately specified as a function of human capital variables, previous labor market experience, demographic characteristics, and the sample selection term.

A double sample-selection child care price equation is then estimated by OLS from which the fitted values are derived. Predicted values of child care expenditures are calculated to deal with two issues. First, a corner solution exists, that is, non-zero expenditure data are only observed for employed mothers who are using paid sources of care. Second, child care costs may be endogenous if there are unmeasured components related to the decision to be employed and use paid sources of care. The price equation is estimated on the subsample of working mothers with positive child care expenditures. Selectivity terms in this equation are identified through a first-stage employment probit

and paid child care probit. Common variables to identify the price equation (i.e., excluded from it) are the state unemployment rate, AFDC/TANF and food stamp benefits, total number of children, disability status, and various functional form attributes. The child care price equation is ultimately specified as a function of demographic characteristics that influence the type and quality of child care chosen (i.e., presence and number of young children), economic variables thought to be correlated with preferences, sources of unpaid care, and regional differences in child care services.

Of the 14 studies detailed in Table 1.7, eight employ the basic approach outlined above (Blau & Robbins, 1991; Riber, 1992; Connelly & Kimmel, 2001; Kimmel 1995; U.S. Gao, 1994; Connelly, 1992; Han & Waldfogel, 2001; Anderson & Levine, 2000).[10] That is, they estimate reduced form participation probits and include predicted child care costs as the key explanatory variable. Another three studies treat the work decision simultaneously with the decision to use a given type of child care (Blau & Robbins, 1988; Blau & Hagy, 1998; Ribar, 1995). This is accomplished by cross-classifying several child care modes with the categorical employment decision and estimating multinomial logistic regressions. Ribar's (1995) work is noteworthy because it specifies a full structural model based on utility-maximizing behavior, and it estimates employment, child care expenditure, and hours-in-care equations jointly. The primary motivation for specifying a multi-choice dependent variable is that it more accurately classifies the choice-set faced by prospective workers. Changes in the price of child care do not affect the work decision independently of other factors, but rather pose families with a number

[10] Research in this area was started by Bowen and Finegan (1969), who revealed the importance of child care costs to maternal labor supply. Heckman's (1974) seminal work established the importance of considering informal arrangements, which typically provide care at little or no cost, when estimating the effect of price. Heckman argues that the decision to purchase care involves not only weighing the price and quality of market care, but also considering the identical components of informal. Therefore, an examination of the employment effect of child care costs must take into account the labor supply decisions of the mother and other household members jointly.

of trade-offs among combinations of employment states and child care modes. Two studies attempt to estimate the labor supply effects of the Dependent Care Tax Credit (DCTC) by regressing hours of work on the effective wage rate (Averett, Peters, & Waldman, 1997; Michalopoulos, Robins, & Garfinkel, 1992). Averett, Peters, and Waldman (1997) derive an econometric model that exploits the kinked nature of the DCTC by incorporating such non-linearities into the budget set. Michalopoulos, Robins, and Garfinkel (1992), on the other hand, specify a full structural model and estimate a Stone-Geary utility function. Interestingly, although both studies examine the identical tax credit, they produce markedly different elasticities: the former estimates an elasticity of hours worked with respect to child care costs of -0.78, while the latter estimates elasticities of essentially zero.

Although the studies in Table 1.7 employ somewhat different estimation strategies, there are a few drawbacks that plague nearly all of them. First, much of the research is conducted on a single cross-section of data, leaving few opportunities to find exogenous sources of variation to identify the wage and price variables. However, one promising avenue for research is exemplified in Baum's (2002) dynamic analysis of maternal labor supply following childbirth.[11] Using a hazard model for the return to work, the author estimates an elasticity with respect to child care costs of -0.59. Second, as Anderson and Levine (2000) and Blau (2001) note, the exclusion restrictions in both sample-selection models and the final employment probit vary greatly across the studies and often rely on perfunctory assumptions about exogeneity. Studies that rely solely on functional form are even more suspect. Sensitivity analyses conducted by Kimmel

[11] Baum's (2002) research is similar in spirit to early work by Leibowitz, Klerman, and Waiter (1992), who use NLSY data to study women's work decisions two years after childbirth. The authors find that larger child care tax credits are associated with higher re-employment probabilities following childbirth. However, the authors do not provide an elasticity for their estimate.

(1998) show that differences in price elasticities are most likely due to the mix of control variables in the final employment probit and how identification is achieved in the cost of care equation. Kimmel does not find substantial differences between switching from single and double selection-correction terms, nor do alternative definitions of the price variable appear to be important.[12]

Recall that the second approach to evaluating the effect of child care subsidies is to examine actual subsidy receipt among low-income families. Although it is much smaller than the body of work on price effects, the subsidy literature is quite diverse. Table 1.8 summarizes the empirical research focusing on labor supply and child care subsidies. One of the studies, by Berger and Black (1992), takes advantage of a natural experiment by comparing employment rates for women who are receiving subsidies and those on the waiting list. Gelbach's (2002) creative approach examines a number of labor market outcomes among those with children enrolled in public school—an implicit 100 percent child care subsidy. The remaining three studies model employment as a function of actual subsidy receipt (Meyers, Heintze, & Wolf, 2002; Blau & Tekin, 2001; Tekin, 2004). This research begins by estimating a subsidy equation and then using the predicted probability of receipt as the main regressor in the employment equation. Below is a detailed description of each study.

Using data from two child care subsidy programs in Kentucky, Berger and Black (1992) created a natural experiment by comparing employment probabilities for single

[12] Anderson and Levine (2000) conduct sensitivity tests of their specification against the one in U.S. GAO (1994). Differences in the elasticities appear to be driven by the choice of variables in the cost of care equation, confirming Kimmel (1998). However, switching from a logarithmic to a level scale for the price variable leads to a nontrivial change in the elasticity. The authors also vary the estimation by marital status, age of the child, skill level, and poverty status. Larger price elasticities are found for younger children, less-skilled workers, and those at or near the poverty line. Generally speaking, elasticities decline as a function of skill level, but there are exceptions. Anderson and Levine (2000) use three years of SIPP data, allowing them to increase statistical power, conduct extensive sub-group analyses, and build in an exogenous time component. These factors may explain the relative stability of their elasticities.

mothers who received a subsidy and those on the waiting list. The two subsidy programs were fairly comparable: one provided a $50-per-week subsidy for mothers earning no more than 60 percent of SMI, while the other program reimbursed $60 per week for those at 80 percent of SMI and below. Estimates from a participation probit imply that 97.7 percent of single women receiving subsidies were employed, compared to 85.5 percent among those on the waiting list. One of the drawbacks of this approach, which Berger and Black (1992) recognize, is that the subsidy effect could be severely biased if social service workers selected recipients on the basis of unmeasured components related to employment propensities. Therefore, the authors look at employment rates for the sub-sample of subsidy recipients before and after they received the subsidy. This produced an effect of 8.4 percentage points. However, questions still remain about the extent of self-selection into the application process.

Gelbach (2002) uses 1980 Census data to examine the implicit child care subsidy that operates through free public kindergarten. As in other studies, subsidy receipt is endogenous if the mother has strong, unobserved tastes for work that leads her to enroll the child at the earliest possible age. Gelbach uses a unique instrumental variables strategy that exploits natural variation in the child's quarter of birth. Quarter of birth is likely to be associated with subsidy receipt because state rules mandate that children be five years old (by December 31) in order to enroll in a given year. Therefore, children born prior to December 31 (the fourth quarter, for example) are eligible for a child care subsidy in that year, while children born after the new-year (the first quarter, for example) are not eligible until the following fall. Gelbach argues that the assignment of child care subsidies based on quarter of birth is independent of unobserved work

preferences. Two-state least squares (2-SLS) estimates suggest that access to free public kindergarten is associated with an additional four weeks of work, three hours of work per week, and a five percentage point increase in the probability of employment.

Meyers, Heintze, and Wolf (2002) use data on a sample of California AFDC recipients and estimate subsidy effects through a two-stage model. The first stage models the probability of subsidy receipt, conditional on using market child care. This is done to ameliorate the potential endogeneity of subsidy receipt. Women with strong, unobserved tastes for work are more likely to be employed even if subsidies are not available. Furthermore, CCDF administrators specifically target welfare recipients, who are presumably less-skilled, and so self-selection into a subsidy program could operate through administrative rules. Using the predicted probabilities from the first stage, the authors then estimate a binomial participation equation, with subsidy receipt as the key right-hand-side variable. Simulations from the labor supply equation imply that as the probability of subsidy receipt goes from 0.10 to 0.60, the employment probability increases from 0.30 to 0.81.

A similar estimation approach by Blau and Tekin (2001) uses data on a nationally representative sample of single mothers with at least one child under age 13. Like Meyers et al. (2002), the authors first estimate a reduced form subsidy equation, conditioned on family characteristics and state-level policy variables. The second-stage equation models outcomes such as employment, schooling, and welfare receipt as a function of the likelihood of receiving a subsidy. Child care subsidies are associated with a 0.05 to 0.11 percentage point increase in the probability of employment, a 0.08 percentage point increase in the probability of employment, and a 0.10 percentage point

increase in the likelihood increase of receiving welfare. The last result is not surprising, given that CCDF rules give priority to families on welfare or attempting to transition from welfare.

A number of conceptual and empirical issues are raised by the Meyers et al. (2002) and Blau and Tekin (2001) studies. Ideally, this research would incorporate the amount of the child care subsidy into the mother's budget constraint and then model the work decision as a function of those preference parameters. But data inadequacies have stymied such an approach. Instead, researchers have available an indicator of actual subsidy receipt from which they derive predicted probabilities for the entire sample of mothers. At best, this permits an analysis of the work decision based on mothers' expectations about receiving a subsidy, leaving in question the true behavioral impact of actual subsidy receipt. Another issue, highlighted by Blau (2000), deals with unavailability of a comparison group, making it difficult to arrive at an unbiased estimate of the subsidy effect. Comparison groups are difficult to find because most low-income women face the identical subsidy regime. To deal with the problem, these studies estimate a first-stage subsidy equation in order to ameliorate self-selection into the application process. However, the exclusion restrictions used to identify the subsidy effect are not derived from a formal theoretical model, and they are often of questionable empirical value. Even state CCDF rules—such as eligibility limits, fees, and reimbursements rates—might not be good sources of exogenous variation because they dictate how much a mother can earn to remain eligible for subsidies and therefore determine the relative value of her employment (Blau & Tekin, 2001). Moreover,

aggregate state-level variables and state fixed-effects have proved to be weak identifiers in individual-level data.

There is, however, one other critical drawback that plagues nearly every study in this literature, Gelbach's (2002) work notwithstanding. The imposition of work requirements as a condition for receiving a subsidy make it very difficult to discern whether the employment effect is a "real" behavioral response or simply a mechanical response to administrative rules. This problem is evident in Berger and Black's (1992) study of two Kentucky subsidy programs, both of which placed a 20-hour-per-week work requirement on subsidy recipients. But it is also problematic for any study using data in the post-PRWORA policy environment, in which work requirements coincide with child care subsidy receipt. The central analytic problem is highlighted in Berger and Black's (1992) research. Even if we assume that selection bias is purged from the 12 percentage point subsidy effect, the estimate likely suffers from what I call "administrative rules bias." To see how, the reported subsidy effect may usefully be thought of as comprising two distinct parts: a behavioral response to reduced child care costs and a mechanical response to the work requirement. It is impossible with their data to determine the relative importance of these separate components, but a reasonable conclusion is that the authors' finding is biased upward because some subsidy recipients would not have worked in the absence of work requirements. The problem is apparent again in Blau and Tekin's (2001) finding that child care subsidies are associated with increased welfare participation *and* labor supply. The former result runs counter to economic theory, not to mention the justification for subsidizing child care in the first place. But it is a

reasonable mechanical response, given that welfare recipients have statutory priority for CCDF subsidies.

The presence of work requirements, therefore, makes it difficult to infer a true employment effect from child care subsidies. Researchers cannot be confident that a commingling of behavioral responses and administrative rules are not driving the results. Blau's (2000) point of finding good comparison groups becomes even more important in this context. Future work in this area might focus on individuals who are not affected by work requirements or components of states' CCDF plans that differentially affect the extent to which individuals are subjected to work requirements.

1.3 Behavioral Impacts of the EITC

This section discusses two economic issues related to the EITC. It first reviews a simple theoretical framework in which to understand the EITCs labor supply incentives. It then summarizes the econometric evidence on labor force participation and hours of work. Much of this discussion attempts to distinguish between labor market incentives along the extensive versus intensive work margins and differential incentives for single versus married women.

Work Incentives in the EITC

As previously stated, one of the primary justifications for expanding the EITC has been that it encourages stronger work effort relative to the alternative of an NIT or cash assistance programs like AFDC/TANF or food stamps. However, the credit creates a complicated set of work incentives that varies by work and marital status and the number of children in the household. The EITC can usefully be thought of as three separate

programs (Browning, 1995). The phase-in range, with its negative MTR, operates likes a wage subsidy by increasing workers' net-of-tax wages. The plateau range, where the credit rate is zero for each additional dollar earned, acts like a lump sum transfer. Finally, the phase-out range is essentially a negative income tax because of the way it gradually phases out benefits as earnings rise.

Generally speaking, economic theory predicts that the credit will increase labor supply along the extensive work margin. Eligibility for the program is confined to those with positive earnings, and recipients experience an expanded budget set that makes work look more attractive at every wage level. In other words, the increased effective wage rate for EITC recipients previously not working leads to only a positive substitution effect. However, theory predicts that although participation decisions will remain unchanged among taxpayers already working, hours of work will decline.[13] For example, taxpayers in the plateau region would work in the absence of the EITC, and so its introduction does not alter the value of their time in the labor market. What changes is the size of the EITC benefit, which leads to a negative income effect. Since the empirical evidence suggests that leisure is a normal good, taxpayers in the plateau region are expected to reduce hours of work. Consider next recipients in the phase-out region: families with one child experience a 34 percent implicit tax on earnings, while those with two children experience a tax of 40 percent. This produces negative income and substitution effects, leading to a reduction in hours of work. Furthermore, since the EITC produces a nonconvexity in the budget constraint, workers above the break-even point may reduce their work effort in order to become eligible for the program. Overall labor

[13] Herein is another similarity of the NIT to the EITC: participation responses are much stronger than those at the intensive margin (Robins, 1985).

supply effects are driven largely by the relative elasticities at the extensive and intensive margins and the distribution of taxpayers along the three segments.

The discussion thus far assumes that individuals are filing tax returns separately. However, married households often file joint returns, and therefore the AGI for calculating taxes becomes the sum of both spouses' earnings. This has important implications for the labor supply incentives faced by primary and secondary earners, as noted by Eissa and Hoynes (1998). Suppose for illustrative purposes that the husband in this model is the primary earner and the wife is the secondary earner. The labor supply incentives faced by the husband are essentially identical to those faced by single taxpayers. Wives, on the other hand, face a more complicated set of employment decisions. These individuals are de facto EITC recipients if they remain out of the labor force and the husband's earnings are within the eligibility limits. As Eissa and Hoynes (1998) explain, if the husband earns $11,650 (in 1997), which places him near the beginning of the phase-out region, the family receives an EITC worth $3,656 (for two children) if the wife remains out of the labor force. If she decides to work, however, the family's credit will be reduced by $0.21 for each additional dollar she earns, until the family's income reaches $29,290. The implicit tax on the wife's earnings coupled with social security and state taxes can move her total MTR into a region that provides strong incentives to remain out of the labor force. Therefore, the so-called "marriage penalty" embedded in the EITC essentially rewards secondary earners for remaining out of the labor force.[14] However, recent changes to the credit, through the EGTRRA01, should

[14] Alm and Whittington (1995) and Feenberg and Rosen (1995) address marriage penalties in the federal income tax code generally. Research by Dickert-Conlin and Houser (1998) and Holtzblatt and Rebelein (1999) examine marriages penalties in the EITC specifically. The latter studies found that higher EITC benefits lead to higher female headship rates among white women but lower rates among black women.

mitigate the effects of the marriage penalty by extending the plateau and phase-out regions for couples filing joint tax returns.

Review of the Econometric Evidence

The empirical literature on the labor supply effects of the EITC is small relative to that of child care subsidies, but its methods are quite diverse. It is similar in tradition to earlier research on income taxation and labor supply (Burtless & Hausman, 1978; Hausman, 1980, 1985; McCurdy, 1992; McCurdy, Green, & Paarsch, 1990; Moffitt, 1984; Triest, 1992).[15] The majority of this work, which yields reduced form estimates, focuses on evaluating major changes to the EITC embedded in tax laws. The goal has been to identify a population most likely affected by the EITC and then compare this group's work effort before and after the EITC expansion, relative to the change in some comparison group. Another cluster of studies estimating "quasi-structural" models combines some of the most attractive aspects of reduced form methods by exploiting the EITCs differential treatment of families over time, while also specifying the variables that affect the work decision. A third group comprises more traditional "structural" methods that specify a formal labor supply model from which the parameters of the budget constraint emerge.

Table 1.9 summarizes the three major approaches to evaluating labor supply effects of the EITC. The first four studies use reduced form methods; the next two use quasi-structural methods; and the last two studies use a structural approach. The studies by Ellwood (2000), Hotz, Mullin, and Scholz (2003) and Meyer and Rosenbaum (1999; 2001) concentrate on labor supply effects along the participation margin, while Dickert,

[15] For reviews of this literature, see Heckman (1993) and Killingsworth and Heckman (1986).

Houser, and Scholz (1995), Keane (1995) and Keane and Moffit (1998) estimate hours-of-work equations. With the exception of Eissa and Hoynes (1998), all studies focus on single mothers. Each study will be discussed in detail below, but it is important to note that even though there is substantial methodological diversity in these studies, they come to a fairly consistent result: the EITC has a positive and economically large effect on employment for single women with children.

EITC effects derived from reduced form approaches attempt to exploit a specific expansion of the tax credit. The expansion has historically occurred in the context of a larger tax law. Nevertheless, the basis for this approach is to observe participation rates for a sample of individuals most likely affected by an EITC expansion (eg., single mothers with less than a high school education) before and after the passage of the law. However, since these studies do not follow the identical sample over time, a comparison group is chosen to net out influences from underlying economic trends or policy shocks. A difference-in-differences estimator is used to compare employment changes for the sample of single mothers before and after the EITC expansion, relative to changes in a comparison group. Identification of the EITC effect is based on the fairly restrictive assumption that economic conditions or other policy changes do not differentially affect the two groups.[16] The studies reviewed here predominately use a sample of single women without children as the comparison group, although some researchers use samples of low-skilled single women without children or single mothers with more than a high school education.[17] Given the restrictive nature of the identifying assumptions, most

[16] Difference-in-differences approaches have been criticized for being atheoretical and unable to provide estimates of economically interesting parameters, such as elasticities (Heckman, 1996).
[17] To use these groups as comparisons, one must make the assumption that marital status and fertility decisions are made exogenously to changes in the EITC.

researchers use multiple control groups and ultimately pin the credibility of their results on estimating similar labor supply effects across the various groups.

Eissa and Liebman (1996) use CPS data from 1985-1987 and 1989-1991 to examine the employment response of single mothers to the 1986 EITC expansion. The EITC changes were embedded in the large TRA86, which altered several other components of the tax code, including an increase in the standard deduction and dependent deduction.[18] The authors use several comparison groups to identify the effect of the EITC expansion and estimate a number of difference-in-differences probit models. They find that the 1986 EITC changes increased labor force participation among single mothers with children by 2.8 percentage points. Furthermore, the expansion increased labor supply by 6.1 percentage points for a low-education sub-sample. The authors do not find statistically discernible effects for hours worked among those already in the labor force.

Eissa and Hoynes (1998; 2004) use the 1985-1997 waves of the CPS to investigate the labor supply response of married couples with children to the 1993 EITC expansion. Like previous expansions, this one was embedded in a larger tax law, the OBRA93. The authors first employ a difference-in-differences framework to estimate labor supply effects at the participation margin, using married couples without children as the comparison group. They then estimate a number of standard labor supply models that account for several variables of interest in the budget set, including a net-of-taxes wage rate. Two dependent variables are modeled: the binary work decision and hours-of-work, conditional on already being employed. The primary source of identifying variation

[18] Increasing both deductions was particularly beneficial to single mothers (head of household filers) because they increased the income level at which these families jumped from the first to the second tax bracket.

comes from the differential tax treatment of families of different sizes over time, especially the three EITC expansions between 1986 and 1993. To estimate the hours-of-work equation, the authors rely on two sets of instrumental variables for net wages. Results from the difference-in-differences model suggest that the 1993 EITC expansion reduced participation rates for married women with children by 3.1 percentage points. This finding is largely consistent with simulations based on the employment probit, which implies that the three EITC expansions reduced labor supply among married women by 1.2 percentage points. The hours-of-work equation yields widely divergent results, most likely stemming from weak instruments and the inability to account for nonlinearities in the tax structure.

There are three important concerns with the use of difference-in-differences estimators for modeling labor supply effects of the EITC. First, changes to the credit have historically been included in a large tax law, thus making it difficult to separate labor supply effects due to the EITC from those due to other tax changes. Furthermore, EITC expansions involved multiple, simultaneous changes that affected the phase-in rate, maximum credit, and the phase-out rate. For example, changes to the EITC through TRA86 increased the subsidy rate from 11 percent to 14 percent (thereby increasing the maximum credit) and lowered the phase-out rate from 12 percent to 10 percent. It would have been beneficial for Eissa and Liebman (1996) to examine those individual parameters, but it is not possible to do so in a difference-in-differences framework. Second, the use of all single mothers as a treatment group is questionable because not all such women receive the EITC, nor are all of them eligible for the program. The problem is highlighted by Liebman (1999a), which finds that just 50 percent of 1990 EITC

eligibles are either formerly or never married. Therefore, it is conceivable that some proportion of labor supply effects are due to changes in a subset of the treatment group that is irrelevant to the analysis. It would be ideal to construct a data set that merges employment information with tax returns, but to date only one such study exists (Hotz, Mullin, & Scholz, 2003). A final concern with these studies is whether the use of single women without children is an appropriate comparison group. Critics argue that employment rates are so high for these women that it is unlikely they would respond to changes in economic or policy conditions at all (or in the same way that single mothers would). However, nearly every study in this cluster uses alternative definitions of the basic comparison group to test the robustness of its findings. The group comprised of low-income or low-skilled single women appears to be the most promising.

As previously stated, a second class of studies employs quasi-structural methods to estimate labor supply effects of the EITC. This work, which is exemplified by Meyer and Rosenbaum (1999; 2001), keeps in place the basic comparison of single mothers to women without children and attempts to identify labor supply effects through their differential tax and welfare treatment. Identifying variation also comes from cross-state variation in tax and welfare systems, in addition to federal and state changes over time. Finally, authors use state- and year-specific interactions with the presence of children. However, these models are also structural in that they draw from economic theory to suggest parameterizations of policy and budget constraint variables that enter the work decision. This approach allows researchers to generate wage and income elasticities and to conduct the appropriate policy simulations. Key variables in the labor supply equation typically include net wages, non-labor income, AFDC/TANF benefits, food stamp

benefits, probability of welfare receipt, local labor market conditions, and a full set of demographic controls. Labor supply effects of the EITC are usually inferred through the net wages variable. Several studies focus almost exclusively on participation at the extensive margin (Eissa & Hoynes, 1998; Meyer & Rosenbaum; 1999; 2001), while others examine labor supply models of the intensive margin (Dickert, Hauser, & Scholz, 1995; Hoffman & Seidman, 1990; U.S. GAO, 1993).

Dickert, Houser, and Scholz (1995) use a sample of married and single women from the 1990 SIPP to examine the effects of net wages on moving from 0 to 20 (or 40) hours of work per week. The authors' net wages variable accounts for implicit taxes through benefit reduction rates and the EITC's phase-in/-out regions and for explicit taxes through Social Security, federal income, and state income taxes. Labor supply models estimated jointly with program participation imply that a 10 percent increase in net wages increases the probability of working by two percentage points for single parents. Net wages is positively associated with labor supply in two-parent families but only significantly so for secondary earners. Simulations based on the regression models suggest that the OBRA93 EITC expansion increased single parents' participation probability by 3.3 percentage points, while leading to a decline in work effort among secondary earners.

Meyer and Rosenbaum's (1999; 2001) work on the labor supply effects of the EITC and welfare programs had a dramatic effect on the literature. The authors use CPS data for the years 1984-1996 to examine employment changes for single mothers relative to women without children. The time period covered in this analysis allows the authors to exploit the three major expansions to the EITC, changes in cash assistance programs,

and cross-state variation in these components during a given year. The EITC-effect is embedded in an "Income Taxes if Work" variable, which sums the taxes a woman would pay in a given year and state and for a given number of children. An employment probit is estimated as a function of federal/state taxes; AFDC, food stamp, and Medicaid benefits; and job training and child care expenditures. The authors find that a $1,000 reduction in taxes increases the employment probability by 4.2 percentage points for single mothers. In fact, simulations imply that the EITC accounts for 62 percent of their relative employment increase between 1984 and 1996 and 37 percent of the increase between 1992 and 1996.

Several aspects of the Meyer and Rosenbaum (1999; 2001) papers are noteworthy. First, as previously stated, the combination of reduced form and structural methods allows the sources of identifying variation to be explicitly stated, while maintaining the framework of traditional labor supply models. Second, the extensive time period over which data are collected allows the authors to model a sufficiently large number of tax and welfare policy changes with better precision. In addition, most previous work attempts to isolate the effects of one or two programs, whereas Meyer and Rosenbaum (1999; 2001) estimate nearly every major program in the U.S. arsenal. This allows for a more accurate picture of the work incentives faced by single mothers and reduces the potential bias from omitted variables. Third, by discretizing the hours and wage distributions into a large number of cells, the authors are able to capture complex non-linearities in tax and welfare programs. Finally, the authors' findings appear to be robust to changes in the definition of the dependent variable, the sample composition,

sources of identifying variation, the time period of the analysis, and the model's functional form.

The final cluster of studies on the EITC uses fully structural methods to arrive at labor supply estimates. This research accounts for the non-linear or kinked nature of tax and transfer programs. Much of it attempts to build upon earlier work by Burtless and Hausman (1978), Hausman (1980; 1985), Heckman and MaCurdy (1982), and Moffitt (1986; 1990). Labor supply in these models is usually defined as a continuous hours-of-work variable, but more recent work has dichotomized the hours' decision into part-time and full-time work statuses. Two important difficulties plague analyses involving kinked budget constraints. The first issue deals with the potential non-linear response of individuals to changes in the budget constraint. Second, and more important analytically, observationally-equivalent individuals no not reside on the same point of the constraint, even if they are faced with the identical budget set. This means that these individuals likely respond differently to changes in the budget constraint (Moffitt, 1990). Sources of unobserved heterogeneity therefore need to be accounted for in the model by allowing some part of the error term to vary across individuals.

Two primary estimation approaches have been used in the literature to deal with the above issues. Given the endogeneity of net wages and virtual income, the first method uses an instrumental variables strategy to construct an alternate wage based on the MTR workers would face if they worked 40 hours per week. While this and related approaches (see Hausman, Kinucan, & McFadden, 1979) account for endogenous after-tax wages, they do not exploit the non-linearities in federal income taxes or transfer programs. The second approach, which deals explicitly with sources of non-linearity, is

commonly called the dual error term model. As its name suggests, two sources of random error are allowed. One error term accounts for unobserved preferences for work across individuals, while the second is the optimization error, which picks up sources of measurement error. Conceptually, this method estimates the utility-maximizing choice of hours on each budget segment and the kink points by generating a probability for the observed hours of work and then choosing the set of parameters that maximizes this probability. A unique feature of this model is it allows researchers to simulate behavioral changes due to specific tax or policy shifts.

The EITC literature contains two papers that use fully structural methods (Keane, 1995; Keane & Moffitt, 1998). These authors define a sample of single women from the 1984 SIPP to estimate a labor supply equation jointly with welfare and food stamp participation. The authors examine three participation outcomes—non-work, part-time work, and full-time work—across three public assistance programs—AFDC, food stamps, and housing vouchers. The method of simulated maximum likelihood is used to analyze a wide range of policy reforms, including a reduction in the AFDC phase-out rate, wage and fixed cost subsidies, and expansions to the EITC. The authors find that a 30 percent EITC phase-in rate applied in 1984 would increase employment among single mothers by 8.4 percentage points from a base of 65.5 percent. Moreover, a 40 percent EITC phase-in rate would lead to a 10.1 percentage point increase in employment. Even though such expansions would reduce welfare and food stamp participation rates, the authors conclude that the EITC is less cost-effective at encouraging employment than subsidizing the fixed costs of working or providing work subsidies, simply because the EITC expansions would be so expensive.

TABLE 1.1: Characteristics of States' CCDF Plans, FY2004

State	Income Eligibility[1]	Income Eligibility[1]	Minimum Fee[2]	Maximum Fee[2]	Reimbursement Rate[3]	Quality Tier[4]
Alabama	43	19,020	$5 / week	$73 / week	$99.00 / week	Yes
Alaska	62	38,928	$13 / month	$766 / month	$880.00 / month	No
Arizona	54	24,156	$1 / day	$10 / day	$23.20 / day	No
Arkansas	60	23,520	0% of fee	100% of fee	$17.00 / day	No
California	75	35,100	$2 / day	$11 / day	$27.59 / day	No
Colorado	62	32,916	$6 / month	$560 / month	$28.00 / day	No
Connecticut	75	47,592	2% of inc	10 % of inc	$135.00 / week	No
Wash, DC	80	41,640	$0	$13 / day	$23.55 / day	No
Delaware	53	29,280	1% of cost	80% of cost	$86.25 / day	No
Florida	63	29,268	$0.80 / day	$11 / day	$90.00 / week	Yes
Georgia	85	42,828	$0	$45 / week	$80.00 / week	Yes
Hawaii	80	39,288	0%	20% of reim	$425.00 / month	No
Idaho	51	20,472	7% of cost	100% of cost	$396.00 / month	No
Illinois	39	21,816	$4.33 / month	$186 / month	$24.34 / day	No
Indiana	57	26,484	$0	9% of inc	$33.00 / day	Yes
Iowa	47	22,680	$0	$12 / day	$10.50 / half-day	No
Kansas	49	27,060	$0	$243 / month	$3.12 / hour	No
Kentucky	55	24,144	$0	$11 / day	$20.00 / day	Yes
Louisiana	60	24,924	30% of cost	70% of cost	$15.00 / day	No
Maine	85	36,456	2% of inc	10% of inc	$150.00 / week	Yes
Maryland	40	25,140	$4 / month	$146 / month	$433.00 / month	Yes
Massachusetts	50	28,969	$0	$120 / month	$31.50 / day	No
Michigan	47	26,064	5% of reim	30% of reim	$2.25 / hour	No
Minnesota	75	42,012	$5 / month	$741 / month	$55.00 / day	Yes
Mississippi	85	30,156	$10 / month	$180 / month	$77.00 / week	Yes
Missouri	42	17,784	$1 / day	$4 / day	$15.30 / day	No
Montana	51	21,948	$10 / month	$263 / month	$17.25 / day	Yes
Nebraska	53	25,260	$48 / month	$214 / month	$21.00 / day	Yes
Nevada	75	37,476	0% of benefit	85%	$30.00 / day	No
New Hampshire	62	31,776	$0	$0.50 / week	$24.40 / day	No
New Jersey	61	36,570	$0	$294 / month	$121.40 / week	Yes
New Mexico	78	29,256	$0	$205 / month	$386.48 / month	Yes
New York	61	29,256	Varies	Varies	$45.00 / day	Yes
North Carolina	75	34,224	10% of inc	10% of inc	$477.00 / month	Yes
North Dakota	69	29,556	20% of reim	80% of reim	$100.00 / week	No
Ohio	57	27,060	$1 / month	$203 / month	$113.00 / week	No
Oklahoma	53	23,232	$0	$263 / month	$13.00 / day	Yes
Oregon	60	27,060	$43 / month	$399 / month	$372.00 / month	No
Pennsylvania	58	29,256	$5 / week	$70 / week	$28.00 / day	No
Rhode Island	60	32,917	$0	14% of inc	$140.00 / week	No
South Carolina	47	21,948	$3 / week	$11 / week	$83.00 / week	Yes
South Dakota	44	21,948	$10 / month	15% of inc	$2.15 / hour	No
Tennessee	60	26,208	$1 / week	$47 / week	$90.00 / week	No
Texas	85	38,052	11% of inc	11% of inc	N.A.	No
Utah	56	26,928	$10 / week	$255 / week	$3.00 / hour	No
Vermont	77	31,032	0%	90% of reim	$20.81 / day	No
Virginia	50	27,060	10% of inc	10% of inc	$161.00 / week	No
Washington	63	32,916	$15 / month	$50 / month	$26.50 / day	No
West Virginia	75	28,296	$0	$5.75 / child	$18.00 / day	Yes
Wisconsin	51	27,060	$4 / week	$55 / week	$5.50 / hour	Yes
Wyoming	58	27,060	$0.40 / day	$4 / day	$2.43 / hour	No

Source: ACF (2004) *Child Care and Development Fund Report of State Plans FY 2004-2005* and ACF (2003) *Child Care and Development Fund Report to Congress*.

Notes: [1] Expressed as a percent of state median income (SMI). Income eligibility figures come from FY2002-2003 CCDF State Plans and are based on a family of three (two children). [2] Fee assumes full-time care for a 3-person family. Fees are based on a family of three with no infants or children with special needs. If states have differential fee schedules based on the number children, just the fee for the first child is reported. [3] Reimbursement rates are based on services for preschool-age children in center-based settings for the state's largest urban area. [4] This indicates whether the state has a differential reimbursement rate schedule for child care with higher standards of quality than those meeting the basic licensing requirements.

TABLE 1.2: States' CCDF Allocations and Expenditures

State	CCDF Allocation[1]	TANF Transfer	State MOE	Quality Set-Aside (%)	Waiting List[2]	CCDF Expenditures per Child[3]
Alabama	59.5	18.7	6.9	4.0	4,500	2,336
Alaska	11.7	16.3	3.5	4.0	No	5,114
Arizona	93.8	0.0	10.0	4.0	No	3,984
Arkansas	43.9	6.0	1.9	6.0	853	4,985
California	517.0	563.6	85.6	5.5	250,000	6,495
Colorado	55.7	30.0	8.9	6.0	567	3,822
Connecticut	51.2	0.0	18.7	4.0	No	9,605
Wash, DC	10.7	18.5	4.6	6.0	9,236	2,119
Delaware	13.5	0.0	5.1	5.0	No	5,153
Florida	225.9	131.6	33.4	4.0	40,000	4,478
Georgia	151.2	28.2	22.2	4.0	13,166	3,167
Hawaii	19.5	23.9	4.9	8.8	No WL	3,801
Idaho	21.5	8.1	1.2	4.0	No	2,784
Illinois	202.7	N.A.	56.9	4.0	No	2,385
Indiana	155.4	4.1	15.4	4.0	14,043	3,754
Iowa	42.3	28.4	5.1	16.0	No	3,302
Kansas	44.1	20.4	6.7	16.0	No	3,628
Kentucky	72.9	36.2	7.3	4.0	No	3,226
Louisiana	96.7	49.9	5.2	4.0	No	3,441
Maine	16.7	7.3	1.7	11.7	2,100	11,028
Maryland	79.0	0.0	23.3	4.0	No	6,428
Massachusetts	103.8	91.9	45.0	5.1	21,000	7,142
Michigan	139.5	N.A.	24.4	8.9	No	4,291
Minnesota	77.9	23.4	19.7	5.0	4,714	5,438
Mississippi	59.4	N.A.	1.7	4.0	11,200	7,244
Missouri	92.8	20.7	16.6	8.0	No	3,244
Montana	13.9	2.0	1.3	4.0	No	2,157
Nebraska	31.4	9.0	6.5	9.9	No	3,392
Nevada	24.3	N.A.	2.6	6.2	No	4,372
New Hampshire	16.1	0.0	4.6	4.0	No	4,516
New Jersey	109.2	78.8	26.4	4.0	8,724	5,329
New Mexico	37.7	33.8	2.9	4.0	No WL	2,719
New York	316.0	N.A.	102.0	16.0	No WL	5,326
North Carolina	172.1	79.6	37.9	4.0	22,616	3,440
North Dakota	10.1	N.A.	1.0	4.0	No	2,005
Ohio	198.4	0.0	45.4	4.6	No	2,735
Oklahoma	74.1	29.5	10.6	18.0	No	2,078
Oregon	58.7	0.0	11.3	4.0	No	2,195
Pennsylvania	181.2	124.5	46.6	15.4	2,599	5,186
Rhode Island	17.6	8.7	5.3	4.0	No	7,445
South Carolina	67.9	1.5	4.1	4.0	No WL	3,607
South Dakota	12.0	N.A.	0.8	18.0	No	3,604
Tennessee	111.5	50.6	19.0	7.0	12,500	3,095
Texas	392.1	0.0	27.7	4.0	37,000	3,608
Utah	46.5	N.A.	4.5	15.8	No WL	2,621
Vermont	10.3	9.2	2.7	9.0	No	5,232
Virginia	86.8	9.4	21.3	4.0	2,962	7,898
Washington	106.7	95.0	38.7	4.0	No	4,776
West Virginia	31.2	0.0	2.9	4.0	No	3,367
Wisconsin	83.2	63.2	16.4	4.0	No	5,355
Wyoming	6.0	3.7	1.6	17.0	No	3,191

FY2001 average monthly number of *Source:* ACF (2004) *Child Care and Development Fund Report of State Plans FY 2004-2005* and ACF (2003) *Child Care and Development Fund Report to Congress*.

Notes: All dollars are in millions, except for spending per child. [1] Includes only the federal CCDF allocation. [2] Waiting list as of March/April 2002. "No WL" indicates that the state does not maintain a waiting list. [3] These figures are derived by dividing FY2003 federal and state (including MOE) direct service expenditures by children served by CCDF funds. N.A. = Data are not available.

TABLE 1.3: Characteristics of Children and Families Served by CCDF Funds

State	Monthly Children Served[1]	Children in Family-based Providers[1]	Children in Center-based Providers[1]	Children Served in Unregulated Settings[1]	Families Receiving AFDC[2]	Co-pay (% of income)[3]
Alabama	34,000	14	81	23	7	7.3
Alaska	6,300	45	44	44	13	6.5
Arizona	28,100	20	72	13	20	4.9
Arkansas	9,300	23	76	0	39	7.2
California	202,000	33	54	27	20	3.0
Colorado	24,500	34	58	22	18	8.7
Connecticut	13,700	6	47	47	21	5.1
Wash, DC	7,500	2	98	52	2	3.6
Delaware	13,500	38	56	21	15	8.7
Florida	80,500	12	87	10	16	6.0
Georgia	57,800	14	82	7	18	4.6
Hawaii	8,900	45	50	85	56	N.A.
Idaho	9,700	43	42	45	2	5.1
Illinois	103,000	35	35	53	25	6.0
Indiana	38,100	58	38	56	10	2.6
Iowa	15,300	50	35	24	44	6.5
Kansas	14,900	17	36	16	9	6.9
Kentucky	37,700	27	69	23	10	7.2
Louisiana	38,700	16	69	31	14	6.6
Maine	2,100	47	46	22	N.A.	N.A.
Maryland	21,000	45	40	25	13	6.9
Massachusetts	32,700	9	67	10	14	7.8
Michigan	50,100	44	16	66	18	3.1
Minnesota	26,400	52	36	37	N.A.	4.1
Mississippi	8,400	11	78	20	15	2.3
Missouri	35,900	48	48	41	26	3.6
Montana	7,200	29	35	12	22	3.3
Nebraska	12,800	49	40	28	25	9.9
Nevada	7,000	13	86	24	23	12.0
New Hampshire	6,600	N.A.	N.A.	N.A.	N.A.	0.1
New Jersey	44,200	28	69	17	16	8.0
New Mexico	22,800	52	42	51	25	6.5
New York	180,800	46	33	49	41	5.5
North Carolina	81,700	16	83	3	8	7.8
North Dakota	4,700	43	28	6	10	12.7
Ohio	84,000	39	61	0	23	4.9
Oklahoma	38,700	18	82	0	19	6.8
Oregon	25,600	76	21	55	19	8.0
Pennsylvania	65,100	36	53	37	9	7.7
Rhode Island	4,300	30	64	16	34	4.8
South Carolina	20,300	16	77	15	20	3.1
South Dakota	3,400	53	35	15	8	8.4
Tennessee	59,600	18	76	12	26	1.7
Texas	105,500	14	76	18	16	8.7
Utah	9,900	57	35	48	20	5.3
Vermont	3,500	50	43	23	20	4.9
Virginia	15,900	38	61	13	29	9.5
Washington	51,200	39	41	32	27	5.2
West Virginia	7,800	49	48	8	9	3.3
Wisconsin	26,300	38	61	0	8	7.1
Wyoming	3,200	39	30	39	85	5.6

Source: ACF (2003) *Child Care and Development Fund Report to Congress* and unpublished data.
Notes: [1] These figures are for FY2001 and are expressed as percents. [2] This figure is for FY2000 and is expressed as a percent.
[3] This is calculated for families with a co-pay and income greater than zero and is for FY2000. N.A. = data are not available.

TABLE 1.4: Earned Income Tax Credit Parameters, 1975 – 2003

Year	Phase-in Rate (%)	Phase-in Range ($)	Maximum Credit ($)	Phase-out Rate (%)	Phase-out Range ($)
1975-1978	10.0	0-4,000	400	10.0	4,000-8,000
1979-1984	10.0	0-5,000	500	12.5	6,000-10,000
1985-1986	11.0	0-5,000	550	12.22	6,500-11,000
1987	14.0	0-6,080	851	10.0	6,920-15,432
1988	14.0	0-6,240	874	10.0	9,840-18,576
1989	14.0	0-6,500	910	10.0	10,240-19,340
1990	14.0	0-6,810	953	10.0	10,730-2,0264
1991	16.7[1]	0-7,140	1,192	11.93	11,250-21,250
	17.3[2]		1,235	12.36	11,250-21,250
1992	17.6[1]	0-7,520	1,324	12.57	11,840-22,370
	18.4[2]		1,384	13.14	11,840-22,370
1993	18.5[1]	0-7,750	1,434	13.21	12,200-23,050
	19.5[2]		1,511	13.93	12,200-23,050
1994	23.6[1]	0-7,750	2,038	15.98	11,000-23,755
	30.0[2]	0-8,245	2,528	17.68	11,000-25,296
	7.65[3]	0-4,000	306	7.65	5,000-9,000
1995	34.0[1]	0-6,160	2,094	15.98	11,290-24,396
	36.0[2]	0-8,640	3,110	20.22	11,290-26,673
	7.65[3]	0-4,100	314	7.65	5,130-9,230
1996	34.0[1]	0-6,330	2,152	15.98	11,610-25,078
	40.0[2]	0-8,890	3,556	21.06	11,610-28,495
	7.65[3]	0-4,220	323	7.65	5,280-9,500
1997	34.0[1]	0-6,500	2,210	15.98	11,930-25,750
	40.0[2]	0-9,140	3,656	21.06	11,930-29,290
	7.65[3]	0-4,340	332	7.65	5,430-9,770
1998	34.0[1]	0-6,680	2,271	15.98	12,260-26,473
	40.0[2]	0-9,390	3,756	21.06	12,260-30,095
	7.65[3]	0-4,460	341	7.65	5,570-10,030
1999	34.0[1]	0-6,800	2,312	15.98	12,460-26,928
	40.0[2]	0-9,540	3,816	21.06	12,460-30,580
	7.65	0-4,530	347	7.65	5,670-10,200
2000	34.0[1]	0-6,920	2,353	15.98	12,690-27,415
	40.0[2]	0-9,720	3,888	21.06	12,690-31,152
	7.65[3]	0-4,610	353	7.65	5,770-10,380
2001	34.0[1]	0-7,140	2,428	15.98	13,090-28,281
	40.0[2]	0-10,020	4,008	21.06	13,090-32,121
	7.65	0-4,760	364	7.65	5,950-10,710
2002	34.0[1]	0-7,370	2,506	15.98	13,520-29,201[4]
	40.0[2]	0-10,350	4,140	21.06	13,520-33,178[4]
	7.65[3]	0-4,910	3,762	7.65	6,150-11,060[4]
					14,520-30,201[5]
					14,520-34,178[5]
					7,150-12,060[5]
2003	34.0[1]	0-7,490	2,547	15.98	13,730-29,666[4]
	40.0[2]	0-10,510	4,204	21.06	13,730-33,692[4]
	7.65[3]	0-4,990	382	7.65	6,240-11,230[4]
					14,730-30,666[5]
					14,730-34,692[5]
					72,40-12,230[5]

Source: 2004 Green Book, Committee on Ways and Means, U.S. House of Representatives.
Notes: [1] Taxpayers with one qualifying child. [2] Taxpayers with two or more qualifying children. [3] Single (childless) taxpayer. [4] Phase-out range for non-joint tax filers. [5] Phase-out range for joint tax filers.

TABLE 1.5: EITC Expenditures and Claimants, 1975-2003

Year	Total Expenditures ($ in millions)	Refunded Portion of Credit ($ in millions)	Number of Families (millions)	Average Credit per Family ($)
1975	1,250	900	6,215	201
1976	1,295	890	6,473	200
1977	1,127	880	5,627	200
1978	1,048	801	5,192	202
1979	2,052	1,395	7,135	288
1980	1,986	1,370	6,954	286
1981	1,912	1,278	6,717	285
1982	1,775	1,222	6,395	278
1983	1,795	1,289	7,368	224
1984	1,638	1,162	6,376	257
1985	2,088	1,499	7,432	281
1986	2,009	1,479	7,156	281
1987	3,391	2,930	8,738	450
1988	5,896	4,257	11,148	529
1989	6,595	4,636	11,696	564
1990	7,542	5,266	12,542	601
1991	11,105	8,183	13,665	813
1992	13,028	9,959	14,097	924
1993	15,537	12,028	15,117	1,028
1994	21,105	16,598	19,017	1,110
1995	25,956	20,829	19,334	1,342
1996	28,825	23,157	19,464	1,481
1997	30,389	24,396	19,391	1,567
1998	32,340	27,175	20,273	1,595
1999	31,901	27,604	19,259	1,656
2000	32,296	27,803	19,277	1,675
2001	33,376	29,043	19,593	1,704
2002	35,784	31,769	19,795	1,808
2003	34,412	30,869	19,284	1,784

Source: 2004 *Green Book*, Committee on Ways and Means, U.S. House of Representatives.

TABLE 1.6: Distribution of EITC Filers and Payments, 2001

Adjusted Gross Income	All EITC Filers		EITC Filers With One Child		EITC Filers With Two or More Children		EITC Filers Without Children	
	% of Filers	% of Payments	% of Filers	% of Payments	% of Filers	% of Payments	% of Filers	% of Payments
$1 - $4,999	14.8	5.7	11.5	7.4	6.5	3.3	41.5	42.2
$5,000 - $9,999	23.3	23.0	20.1	28.3	15.0	18.6	49.9	55.4
$10,000 - $14,999	18.4	31.5	20.2	29.6	21.7	33.8	6.7	0.8
$15,000 - $19,999	16.8	22.9	21.4	22.6	19.6	23.9	N.A.	N.A
$20,000 - $24,999	15.1	12.5	19.0	10.6	18.0	14.2	N.A	N.A
$25,000 and over	10.9	4.0	7.4	1.2	18.9	6.0	N.A	N.A

Source: U.S. Department of the Treasury, Internal Revenue Service: http://www.irs.gov/taxstats/article/0,,id=96586,00.html. These figures are based on the author's calculations.
Notes: N.A. = Not Applicable.

TABLE 1.7: Summary of Empirical Work on the Labor Supply Effects of Child Care Costs

Author(s) (Year)	Data	Sample Characteristics	Outcome Variable	Child Care Price Variable	Estimation Approach	Elasticity
Blau and Robbins (1988)	1980 EOPP	Married; women < 45; at least one child < 14	Multi-category: employment-child care choice	Geographic-specific weekly expenditure	A) Selection-corrected wage equation; B) multinomial logit	-0.38
Blau and Robbins (1991)	1982 – 1986 NLSY	Single/Married women; ages 21 – 28 (by 1986); at least one child < 6	Binary: employed in four weeks prior to survey	Predicted cost per hour of care (per child)	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	0.04
Ribar (1992)	1984 SIPP	Married; at least one child < 15	Binary: employed	Predicted cost per hour of care (per child)	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.74
Blau and Hagy (1998)	1990 NCCS	Households in which the youngest child is < 7	Multi-category: child care mode-employment-payment choice	Geographic-specific cost per hour of care	A) Selection-corrected wage/spouse wage equations; B) multinomial logit	-0.20
Connelly and Kimmel (2001)	1992 – 1993 SIPP	Single-mothers; at least one child < 6	Binary: employed	Predicted cost per hour of work (for the youngest child)	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.76
Kimmel (1995)	1987 – 1988 SIPP	Married and single mothers below the FPL	Binary: employed	Predicted cost per hour of work	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.35[a] -1.36[b] -0.35[c]
U.S. GAO (1994)	1990 NCCS	Married/single mothers ages 18 – 64; at least one child < 13	Binary: employed	Predicted weekly expenditure	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.50[d] -0.34[e] -0.19[f]
Connelly (1992)	1984 SIPP	Married mothers ages 21 – 55; at least one child < 13	Binary: employed	Predicted cost per hour of work	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.20
Baum (2002)	1988 – 1994 NLSY	Women below the FPL who had given birth between 1988 and 1994	Binary: employed	A) Predicted cost per hour of work; B) predicted cost per hour of care	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.59[g] -0.52[h]
Han and Waldfogel (2001)	1991 – 1994 CPS and SIPP	Married/single mothers ages 15 – 55; at least one child < 6	Binary: employed	Predicted cost per hour of work	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.31 -0.21
Ribar (1995)	1984 SIPP	Married; at least one child < 15	Multi-category: employment	Predicted monthly expenditure	A) Selection-corrected wage and child care cost	-0.09[i] -0.09[j]

			payment choice		equations; B) multinomial logit	
Anderson and Levine (2000)	1990 – 1993 SIPP	Married/single mothers; at least one child < 13	Binary: employed	Predicted cost per hour of work	A) Selection-corrected wage and child care cost equations; B) bi-variate probit	-0.69[k] -0.23[l] -0.73[m] -0.21[n]
Averett, Peters, and Waldman (1997)	1986 NLSY	Married women ages 21 – 29; at least one child < 6	Continuous: annual hours of work	Effective wage (net of child care costs and child care tax credit)	A) Selection-corrected wage and child care cost equations; B) Tobit, IV, and dual-error term hours of work equations	-0.78
Michalopou-los, Robins, and Garfinkel (1992)	1984 SIPP	Single and married women; at least one child < 18	Continuous: hours of work	Predicted weekly expenditure	A) Selection-corrected wage and child care cost equations; B) non-linear least squares	0.002[o] 0.001[p]
Connelly and Kimmel (2003)	1992-1993 SIPP	Single and married women; at least one child < 6	Multi-category: part-time/full-time work status	Predicted cost per hour of care for the youngest child	A) Selection-corrected wage and child care cost equations; B) ordered probit employment equation	-0.45[q] -0.75[r] -0.98[s] -1.29[t]
Tekin (2002)	1997 NSAF	Single women; at least one child < 13	Multi-category: part-time/full-time work status – payment status – subsidy status	Predicted cost per child per hour of care, adjusted for the child care subsidy amount under CCDF rules	A) Two selection-corrected wage equations (part-/full-time work) and a selection-corrected child care cost equation; B) multinomial choice model	-0.15 [u] -0.07 [v] -0.12 [w]

Notes: [a] full sample of single mothers below poverty; [b] black sample of single mothers below poverty; [c] white sample of single mothers below poverty; [d] poor women; [e] near-poor women; [f] non-poor women; [g] poor mothers one year after childbirth; [h] poor mothers two years after childbirth; [I] married women with children under 15; [j] married women with children under 6; [k] single women with less than a high school education and children under 13; [l] single women with more than a high school education and children under 13; [m] single women with less than a high school education and children under 6; [n] single women with more than a high school education and children under 6; [o] married mothers; [p] single mothers; [q] married/any employment; [r] married/employed full-time; [s] single/any employment; [t] single/employed full-time; [u] full-time employment; [v]part-time employment; [w] overall employment.

TABLE 1.8: Summary of Empirical Work on the Labor Supply Effects of Child Care Subsidies

Author(s) (Year)	Data	Sample Characteristics	Outcome Variable	Child Care Subsidy Variable	Estimation Approach	Elasticity/ Findings
Berger and Black (1992)	Survey and administrative data from two Kentucky subsidy programs	Single mothers; those receiving a subsidy and those on the waiting list	Binary: employed; continuous: hours worked	Binary variable for whether a woman received a subsidy (women on the waiting list were the comparison group)	A) Bi-variate probit; B) selection-corrected hours of work equation	Employment rate of women receiving a subsidy was 12 percentage points higher; no effect on hours of work
Blau and Tekin (2001)	1997 NSAF	Single mothers; at least one child < 13	Binary: employed	Probability of subsidy receipt, calculated from a first-stage subsidy LPM	A) First-stage receipt-of-subsidy LPM; B) second-stage employment LPM	Subsidy receipt is associated with a 5 – 11 percentage point increase in Pr(Emp)
Meyers, Heintze, and Wolf (2002)	1992 and 1995 AFDC Household Survey of four California counties	Single mothers receiving AFDC; at least one child < 15	Binary: employed	Probability of subsidy receipt, calculated from a first-stage subsidy probit	A) First-stage receipt-of-subsidy probit; B) second-stage employment probit	As the probability of subsidy receipt goes from 0.0 to 0.5, Pr(Emp) goes from 0.21 to 0.73
Gelbach (2002)	1980 Decennial Census	Single mothers < 50; youngest child was 5 at time of Census	Weeks and hours of work; employment status	Public school enrollment	OLS and 2-SLS, using child's quarter of birth as an instrumental variable	Public school enrollment is associated with an additional 4 weeks of work, 3 hours of work/week, and a 5 percentage point increase in Pr(Emp)
Tekin (2004)	1999 NSAF	Single mothers; at least one child < 6	Multi-category: employment child care choice	Probability of subsidy receipt, calculated from a first-stage subsidy logit	A) First- stage receipt-of-subsidy logit; B) multinomial logit	Subsidy receipt increases the Pr(Emp) by 15.3 percentage points and increases the likelihood of using center care, relative to other modes

TABLE 1.9: Summary of Empirical Work on the Labor Supply Effects of the EITC

Author(s) (Year)	Data	Sample Characteristics	Outcome Variable	EITC Variable(s)	Estimation Approach	Findings/ Elasticity
Eissa and Liebman (1996)	1985-1987 and 1989-1991 CPS	Single women ages 16 – 44; at least one child < 19 and those without children	Binary: employed; Continuous: hours of work	TRA1986 increased the phase-in rate, increased the maximum income level for the phase-in, and decreased the phase-out rate	D-in-D: compare the labor supply change among single women with kids before/after TRA86, relative to the change among single women without kids	TRA86 increased employment by 6.1 percentage points for a low-education sub-sample; no consistent hours effect
Eissa and Hoynes (1998; 2004)	1985-1997 CPS	Married couples ages 25 - 54; < 12 years of education	Binary: employed; Continuous: hours of work	(1) OBRA1993 created differential phase-in rate increases for families of varying sizes; (2) net of tax wage	(1) D-in-D: compare labor supply among married couples with and without kids before and after OBRA93; (2) reduced form labor supply equations: rely on individual variation in tax rates	(1) D-in-D: OBRA93 increased men's labor supply by 1 percentage point and decreased women's labor supply by 3.1 percentage points; (2) Elasticity of labor supply wrt net wages is 0.03 for men and 0.29 for women
Ellwood (2000)	1975-1999 CPS	Married and single women; ages 18 - 44	Binary: employed	Predicted wage quartiles are created for every year between 1975 and 1999 based on a 1998 wage equation, which captures groups most likely affected by EITC changes	D-in-D: compare labor supply changes for single/married women with/without children across the predicted wage quartiles in 1986 and 1999	Single mothers in the lowest wage quartile are 18 percentage points more likely to work in 1999; the comparable figure for married mothers is a 1 percentage point decline[1]
Hotz, Mullin, and Scholz (2003)	1986-1998 administra-tive data systems	Longitudinal sample of California welfare recipients followed between	Binary: employed	Dummy variable for whether a family has two or more children; exploits the	Reduced form LPM of employment as a function of EITC/year interactions, local labor market	Employment rates for families with 2+ children increase more relative to families with

		1993 and 1997 (as part of CWPDP)		differential expansion by family size throughout the 1990s	conditions and demographics	1 child, but the former does not claim the EITC at higher rates
Meyer and Rosenbaum (1999; 2001)	1985-1997 CPS	Single women (with and without children); ages 19 - 44	Binary: employed	"Income Taxes if Work" variable captures changes in federal/state taxes in a given year and for a given family size	Quasi-structural employment probit as a function of federal/state income taxes and welfare, job training, and child care policies	$1K reduction in taxes increases the probability of employment (last week) by 4.2 percentage points among high school dropouts; EITC explains 62% of the relative increase in employment for single mothers
Dickert, Houser, and Scholz (1995)	1990 SIPP	Married and single women; at least one child < 18	Binary: Employed	A net-wages variable is calculated, which is the product of predicted wages and one minus the explicit tax rate.[2] The EITC effect is implied to work through the net-wage variable.	Employment probit as a function of net-wages, AFDC/food stamp benefits; and demographic characteristics	A 10% increase in net-wages increases the probability of working by 2 percentage points for single parents. This implies that the 1993 EITC expansion would increase the participation probability by 3.3 percentage points.
Keane (1995) and Keane and Moffitt (1998)	1984 SIPP	Single women; ages 18-64; at least one child < 18; omits women with high assets and earnings	Trichoto-mous: Employed 0, 20, or 40 hours per week	Net-wages and earnings at 20 and 40 hours of work per week	Structural hours-of-work equation (Simulated Maximum Likelihood) as a function of preferences and constraints	A 30% EITC applied in 1984 would increase employment by 8.4 percentage points from a base of 65.5%. Wage elasticities vary between 1.82 and 1.94.

Notes: [1] These are the D-in-D estimators and are relative to the change in employment rates within the top quartile of predicted wages between 1986 and 1999. [2] Tax rate calculations are based on the change in net-of-tax wages if an individual moves from 0 hours of work to 20 hours of work.

FIGURE 1.1: Summary of Major U.S. Welfare, Child Care, and Tax Policies with Implications for Single Mothers, 1975-2003

Timeline	Policy Acronym	Policy's Full Name	Description
1975	TRA75	Tax Revenue Act of 1975	Created the refundable Earned Income Tax Credit: provided a 10% wage subsidy up to a maximum credit of $400 to be phased out between AGI $6K and $8K
	CCTC76	Child Care Tax Credit of 1976	Non-refundable credit of up to $4,800 (2+ children); 30% credit rate up to AGI $10K, then declines 1 percentage point every $2K until AGI hits $28K, where rate is 20%
	RA78	The Revenue Act of 1978	Gave the EITC permanent status; increased the maximum credit (to $500) and the eligibility limit (to $10K); stipulated the credit would count toward determining eligibility and benefit amounts in mean-tested Federal and state programs
1980	OBRA81	Omnibus Budget Reconciliation Act of 1981	Changed the AFDC earnings disregard to the first $30 plus 33.3% of each additional dollar of earnings; lowered deductions for child care expenses; decreased the asset ceiling to $1,000; lowered income eligibility
1985	TRA86	Tax Reform Act of 1986	Increased the personal exemption and standard deduction; expanded the EITC by indexing it for inflation, increasing the phase-in rate (to 14%), lowering the phase-out rate (to 10%), raising maximum credit to $850
	FSA88	Family Support Act of 1988	Created JOBS program; required states to provide work supports and employment activities; increased earnings disregards for AFDC eligibility and child care benefits; required AFDC-UP parents to work 16 hours/week; expanded Medicaid coverage; tightened child support Created AFDC Child Care and Transitional Child Care; the former was an open-ended entitlement for AFDC recipients; the latter provided aid to former recipients for 1 year after exiting welfare
1990	OBRA90	Omnibus Budget Reconciliation Act of 1990	Mandated that the EITC was not to be counted as income in determining eligibility for means-tested programs; increased the phase-in rate for families with 1 child to 23% by 1994; created a separate rate schedule for families with 2+ children, increasing from 14% to 25% by 1994 Created At-Risk Child Care and the Child Care and Development Block Grant; the former subsidized costs for families at risk of using AFDC; the latter provided matching funds for quality-improvement and consumer education
	OBRA93	Omnibus Budget Reconciliation Act of 1993	Created a separate EITC schedule for childless workers; increased the one-child credit rate to 34% by 1995; raised the two-child credit rate to $40%, for a maximum credit of $3,370 by 1996
1995	N.A.	Welfare Waivers of 1993-1996	Federal government granted 43 states a waiver to experiment with work requirements, time limits, and family caps

	PRWORA96	Personal Responsibility and Work Opportunity Reconciliation Act of 1996	Ended the legal entitlement to aid; pays fixed, close-ended block grants to states; allows states to impose family caps; imposes work requirements after two years on welfare and a 60-month time limit on cash assistance; allows states to sanction families; provides incentives to reduce illegitimacy rate Created the Child Care and Development Fund; consolidated four child care programs; sets eligibility at 85% of SMI; directs states to use 70% of funds to help welfare families (30% go to the working poor); permits states to transfer 30% of TANF grant to the CCDF; grants states authority over subsidy issues
2000	TRA97	Taxpayer Relief Act of 1997	Created a child tax credit (non-refundable) of $500, which was not indexed for inflation Improved compliance on the EITC by developing a recertification program that allows taxpayers to prove their eligibility after an initial disallowance; denies benefits for two years among those who fraudulently claim the credit and imposing due diligence on tax preparers
	EGTRRA01	The Economic Growth and Tax Relief Reconciliation Act of 2001	Created a 10% bracket; increased the child tax credit to $1,000, made it refundable for those earning over $10K, and phased it in at the same income level Created separate EITC flat and phase-out regions for married taxpayers who file jointly; the maximum credit applies to an additional $1,000 of earnings and therefore extends the phase-out range by the same amount
2003	JGTRRA03	The Jobs and Growth Tax Relief Reconciliation Act of 2003	Increased the child tax credit to $1,000 per child for 2003 and 2004; expanded the 10% tax bracket over the same years; granted tax breaks for married couples

CHAPTER 2: WHY IS TAKE-UP FOR CHILD CARE SUBSIDIES SO LOW?

2.1 Introduction

The recent overhaul of the U.S. welfare system through the 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) included equally dramatic changes in the way the federal government provides child care assistance to low-income families. Congress consolidated the patchwork child care subsidy system into a single block grant called the Child Care and Development Fund (CCDF). The explicit goal of the new unified system is to help families transition from welfare to work and to keep employed families from becoming welfare dependent. An important consequence of these changes has been the steady growth in federal allocations for child care subsidies: from $935 million in 1996 to $4.8 billion in 2004 (Administration for Children and Families [ACF], 2005).

Although states are granted substantial flexibility in designing and implementing their subsidy regimes, the bulk of CCDF funds go toward direct services for child care assistance.[19] Indeed, expenditures on direct services represent a large and growing share of states' total expenditures in the period following welfare reform.[20] The growth in spending, however, raises several questions about the extent to which eligible families receive child care assistance—hereafter called the take-up rate—and why those who are eligible do not. Early estimates suggest that the take-up rate for subsidies is low relative to other targeted work supports, such as the Earned Income Tax Credit (EITC). For example, a 1999 ACF report found that 12 percent to 15 percent of eligible children

[19] There are some federal requirements, however. For example, PRWORA stipulates that states must spend no less than four percent of their CCDF allocation on quality improvement activities.
[20] In FY1999, spending on direct services constituted 82% of states' total expenditures, compared to 85% by FY2004.

receive subsidies, while fully 80 percent to 86 percent of eligible taxpayers receive the EITC (ACF, 1999; Scholz, 1994).

However, to my knowledge, no study has thus far described the characteristics of the eligible non-recipient subsidy population, nor has there been a systematic treatment of potential explanations for why many eligible households do not receive child care assistance. The aim of this chapter, therefore, is to provide new estimates on eligibility and take-up rates for CCDF child care subsidies, and to explore factors related to take-up. In doing so, the analysis proceeds in three broad steps. First, it simulates state-specific eligibility rules for a sample of households with children under age 13, and calculates eligibility and take-up rates for several policy-relevant sub-groups. Second, the chapter provides a descriptive portrait of demographic, economic, and child care characteristics for eligible recipient and non-recipient households. Finally, the chapter explores in a multivariate context the correlates of household eligibility and take-up, with a focus on state policies that influence both outcomes.

To focus the chapter, much of the analysis and discussion concentrates on several propositions often advanced to explain why many eligible households do not receive child care subsidies. The first explanation is that eligible non-recipient households are different from their recipient counterparts in ways that make subsidies unnecessary or undesirable. Examples of such differences include the presence of relatives or another adult that provide free child care. A second reason deals with the way states structure their eligibility and benefit policies. Specifically, states face a trade-off between the breadth of eligibility and the depth of benefits, such that regimes with more generous benefit structures are likely to be matched with more stringent eligibility policies. Third,

states are not aggressively promoting awareness of subsidy programs, and the current strategies are largely ineffective. A final reason put forth is that many states do not have the financial resources to keep pace with the demand for subsidies—as evidenced by the presence of waiting lists—and therefore states must ration benefits in a way that makes some eligible households more likely to receive subsidies than other households.

The analyses use data from the 2002 National Survey of America's Families (NSAF) collected by the Urban Institute. This dataset is ideal for the goals of this chapter, since it oversamples low-income households and collects detailed information on subsidy receipt and child care arrangements. Eligibility for child care subsidies is simulated based on state policies in 2001, and focuses on rules defining "acceptable" work activities and income eligibility limits.

I find that although 28 percent of households with children under age 13 are eligible for child care subsidies, take-up is just 14 percent, well within the range of previous estimates. There is, however, substantial variation across household-types. For example, fully 70 percent female-headed households receiving TANF are eligible for subsidies, with a take-up rate approaching 30 percent. I also find important differences in the distribution of demographic, economic, and child care characteristics between eligible recipient and non-recipient households. Eligible recipient households are more likely to be headed by young, single females with fewer relatives but greater numbers of young children in the household. Interestingly, eligible recipients are simultaneously more likely to be engaged in a work activity and have an attachment to another means-tested program, such as TANF or food stamps. Furthermore, a higher proportion of these households use paid sources of child care, are more likely to pay for child care, but when

they do, pay less than their eligible non-recipient counterparts. Finally, there is evidence to support the claim that states substitute some generosity in eligibility for additional generosity in benefits, and that financially constrained states appear to be rationing subsidies in a way that targets specific household characteristics.

The remainder of the chapter is organized as follows. Section 2.2 provides an overview of current child care subsidy policy and summarizes related research on take-up rates. Section 2.3 introduces the data sources and discusses the process by which eligibility is simulated. Section 2.4 presents the results, and Section 2.5 concludes.

2.2 Overview of U.S. Child Care Subsidy Policy and Related Research

The barrier to employment posed by child care costs gained increased prominence in the wake of historic welfare reform passed in 1996. The PRWORA eliminated the legal entitlement to cash welfare and child care assistance for low-income families. Congress repealed Aid to Families with Dependent Children (AFDC), which was the primary public assistance program for nearly 60 years, and replaced it with Temporary Assistance to Needy Families (TANF). The legislation imposes strict work requirements on recipients, places a 60-month lifetime limit on welfare, sanctions families that fail to comply with work activities, and devolves to states substantial authority to develop their own reform approaches.

Due to its strong work mandates, the 1996 PRWORA restructured the federal government's role in providing child care assistance. Congress repealed the AFDC-CC, TCC, and ARCC programs, and along with CCDBG money, consolidated these funding

streams into a single Child Care and Development Fund (CCDF).[21] There are three primary elements to CCDF funding. Each state receives a pre-determined share of federal *mandatory* funds, which remain constant over time. States also qualify for *matching* grants, provided they meet certain Maintenance of Effort (MOE) requirements (i.e. maintain or exceed pre-CCDF spending levels). Finally, the legislation authorizes nearly $1 billion in *discretionary* money that does not require a state match (Long & Clark, 1997). Overall, PRWORA allocated $21 billion of child care over a seven year period, 70 percent of which must be targeted at direct services for families receiving TANF or transitioning from welfare into work (Greenberg, Lombardi, & Schumacher, 2000).

Eligibility for CCDF funds is set at 85% of the state median income (SMI), although states can and do establish lower ceilings. In fact, just three states currently set income eligibility at or above 85% of SMI (Schulman & Blank, 2005).[22] States are also given substantial flexibility in designing their subsidy systems, including being able to transfer up to 30 percent of their TANF block grant to the CCDF, setting reimbursement and co-payment rates, and defining acceptable work activities. However, PRWORA stipulates that states must spend no less than four percent of their annual CCDF allocation on quality improvement activities. Furthermore, a market rate survey must be conducted every two years so as to ensure that subsidy families have "equal access" to high-quality providers. Results from the survey are used to set payment rates at or greater than the 75th percentile of what the local market is charging. The law also suggests that co-

[21] The acronyms are as follows: AFDC Child Care, Transitional Child Care, At-Risk child Care, and Child Care and Development Block Grant.
[22] The three states are Maine, Mississippi, and Texas. However, in Texas, local jurisdictions set their own eligibility thresholds, leading to a range between 50% and 85% of SMI.

payments are considered affordable if families do not spend more than 10 percent of their income on child care.

Data on subsidy take-up are starting to emerge from various sources. Although it appears that states are serving a large number of children in any given month, recent evidence suggests that only 12 percent to 15 percent of eligible children currently receive assistance (ACF, 1999). Findings from a recent U.S. General Accounting Office (GAO) (1999) study confirm this, estimating that states are serving no more than 15 percent of the CCDF-eligible population. More recent work based on a microsimulation model suggests that as of October 1999 9.7 million children and 5.8 million families were eligible for subsidies, although take-up rates were not calculated. (Oliver, Phillips, Giannarelli, & Chen, 2002).

Rates of subsidy receipt have also been estimated for various sub-groups. For example, Schumacher and Greenberg's (1999) analysis of welfare leaver studies found that less than half of employed leavers receive subsidies in all states examined and less than 30 percent in a majority of states. This is corroborated by Loprest (1999), who found that 20 percent of welfare leavers received a subsidy in the first three months after exiting. Other research estimates that 21 percent of low-income families receive assistance from the government (or other organization), compared to eight percent among higher-income families (Giannarelli, Adelman, Schmidt, 2003).[23] These authors also found that 28 percent of single-parent families and 34 percent of TANF families receive child care assistance from government or organizational entities. Finally, using data from the 1999 NSAF, Tekin (2004a) estimates that approximately 13 percent of employed

[23] The authors define "help from government assistance or other organization" as that which comes from paying for child care on a sliding scale, paying less because of family income, assistance from welfare or social services agencies, and help coming from sources other than individuals or an employer. Note that government assistance through the tax code, specifically the Child Care Tax Credit, was omitted by the authors. Low-income was defined as family income below 200% of the FPL.

single mothers receive a child care subsidy, which appears to be a comparatively low estimate.

2.3 Data and Methods for Simulating Eligibility

Data Sources

Data for this chapter come from several sources, principally the 2002 wave of the National Survey of America's Families (NSAF) collected by the Urban Institute.[24] The 2002 NSAF was conducted during the early part of 2002, focusing on the economic, health, and social characteristics of children, adults under the age of 65, and households more generally. Interviews were conducted with over 40,000 families, producing detailed information on over 100,000 individuals. The survey is representative of the civilian, non-institutional population under age 65. Among the distinctive sampling features of the NSAF are its foci on families in 13 states and families below 200 percent of the federal poverty line.

This chapter draws extensively from the NSAF's "focal child" file, which contains information on subsidy receipt and child care arrangements and expenditures. This file is structured such that up to two randomly selected focal children were targeted during the initial household screening. Information was then gathered on one child under the age of 6 and another child between ages 6 and 17.[25] Questions on all non-parental child care arrangements—including child care centers, family-based providers, relatives, and Head Start—were directed at respondents with children ages 0 to 12, regardless of the caretaker's employment status. This chapter focuses on the regular, primary child

[24] Appendix 2.4 provides a detailed description of all data sources used in this chapter.

[25] Irrespective of the number of children in each age group, just one child per age category was sampled. Data on the focal children were collected from the "most knowledgeable adult," the individual in household who knows the most about each child's health and education. Often, but not always, the MKA is the householder, and there are cases in which each child has a different MKA.

care arrangement, defined as the one used at least once per week during the past month and in which the focal child spent the greatest number of hours while the respondent worked. Questions on child care expenditures were also asked of each respondent, but the reported amounts reflect what was paid for all child care arrangements and all children in the household.

As noted in Appendix 2.4, data on state-specific eligibility rules come from multiple sources. The Children's Defense Fund's *A Fragile Foundation* (2001) report provided information on work requirements, while the *State Developments* report yielded information on income and earnings deductions. Income eligibility limits and other state-specific eligibility data were gathered from the Child Care Bureau's biennial *State Plans* report, as well as unpublished data from the Bureau.

The final analysis sample consists of 19,066 households with at least one child under age 13.[26] Table 2.1 provides summary statistics for the sample of NSAF households. Approximately 88 percent of household heads are employed, and 14 percent of households receive TANF, food stamps, or both. Not surprisingly, female-headed households are much more likely to receive public assistance (36 percent). In addition, these women are slightly younger and have fewer years of education than other household heads. A similar proportion of households have younger children (ages 0 to 5) and older children (ages 6 to 17)—approximately 38 percent—but fewer households have children in both age groups (25 percent). Slight differences exist across household-types, with female-headed households less likely to have younger children and more likely to have older children than other households. Table 2.1 also presents descriptive statistics

[26] Deletions from the sample were made for the following reasons: the householder was under age 18 or over age 64; total household earnings were less than zero; and the householder's marital status was unknown.

for selected characteristics of states' subsidy regimes. Two-thirds of households are located in states with a waiting list, while nearly three-quarters reside in states that guarantee subsidies for TANF households. Finally, the average state sets its weekly reimbursement rate for infant care at $164.

Simulating Eligibility for Child Care Subsidies

This section describes the process by which NSAF households were deemed eligible for CCDF child care subsidies.[27] The methodology described here produces a measure of "technical eligibility," meaning that states' rules are applied strictly, consistently, and without regard to budget status or administrative idiosyncrasies.[28] As previously stated, this chapter simulates state-specific work activity and income eligibility rules for 2001. Evidence suggests that states began responding to deteriorating fiscal conditions around this time by making significant changes to their subsidy regimes (GAO, 2003).[29] Therefore, some of the eligibility rules applied in this chapter likely changed at some point during 2001, and so the forthcoming simulations should be viewed as a snapshot of states' subsidy regimes.

Eligibility is determined along three dimensions: the age of the child in question, parental work status, and household income. Generally speaking, a child must be under age 13, but special needs children are eligible until they reach age 19. States also stipulate that parents must be involved in an acceptable work activity. Significant variation exists in types of work activities that are deemed acceptable, the households to

[27] Figure 2.1 provides additional information on the steps taken to determine eligibility for child care subsidies. Appendix 2.5 provides detailed information on how the indicator of child care subsidy receipt was created.
[28] Only published and clearly-defined eligibility rules are applied in this methodology. It ignores requirements that are presented inconsistently or are indiscernible in published materials, and it obviously does not account for the informal and idiosyncratic procedures applied by states.
[29] For example, 23 states altered eligibility and benefits rules that lead to decreases in the availability of child care assistance. Among these changes include lowering income eligibility limits, initiating waiting lists, and raising co-payment rates.

which these activities apply, and the number of hours per week that a parent must participate in a given activity. Generally speaking, states accept formal employment and job search activities, as well as enrollment in post-secondary education and job training programs. Furthermore, states treat TANF and non-TANF households quite differently when defining acceptable work activities and the amount of time one must spend performing it. The final set of rules deals with household income. States first determine countable income by applying income/earnings deductions and disregards, which is then compared to, and must be lower than, its income eligibility threshold. As noted in the previous section, federal rules dictate that household income cannot exceed 85 percent of SMI, but states may set their eligibility threshold lower than the federal limit.

It is important to note at this point that the unit of analysis is the household, and therefore eligibility is determined at the household level. This nomenclature is slightly different from previous studies, which define subfamilies as separate family units (Giannarelli, Adelman, & Schmidt, 2003; Oliver, et al., 2002). However, given the small number subfamilies in the NSAF and my assumption that primary and secondary families function as one "economic unit," determining eligibility at the household level appears to be a reasonable approach. Moreover, this approach is bolstered by the fact that a plurality of states consider income from "all household members" when determining eligibility, as opposed to income from just the parents or legal guardian (ACF, 2002). The primary implication of this nomenclature is that just one eligible child must be present for the entire household to be deemed eligible, even if that child is unrelated to the householder or resides in a separate subfamily.

Another critical point, stated in Oliver, et al. (2002), is that in practice eligibility for CCDF subsidies is determined on a monthly basis. Although states authorize payments for six or 12 months, after which the household undergoes a recertification process, some states require households to report changes in employment and income on a monthly basis. This stands in contrast to the present study, which considers the householder's employment status at a single point in time and sums income over 12 months. The unavailability of monthly employment and income data means that I will classify as ineligible some high-income households with very small incomes in some months; conversely, I will classify as eligible some low-income households with very large incomes in some months. Clearly, it would be imprudent to assume from the results in this chapter that a given household was eligible for the entire year.

Figure 2.1 displays the process by which NSAF households were determined to be eligible for CCDF child care subsidies. Since the sample includes only households with at least one child under age 13, every household meets the first major eligibility criterion. Nearly every state allows special needs children ages 13 and over (but under 19 years old) to receive subsidies, and at least one study attempted to include these children in its eligibility calculations (Oliver, et al., 2002). However, the official language defining "special needs" is convoluted, making it difficult to operationalize in the NSAF dataset. This study therefore focuses on eligibility among children under age 13, irrespective of the child's disability status.

The first major task was to split up the sample according to whether the household receives TANF and/or food stamps, and then simulate states' rules for acceptable work activities. Splitting up the sample in this manner is necessary because, as shown in

Figure 2.1, states' work requirements are quite different for TANF and non-TANF households. This study focuses on the work participation of the householder, and it simulates the following activities: formal employment, job searching, participation in post-secondary education, and enrollment in a job training program.[30] Note that several work activities (post-secondary education and job training) require participants to be employed as well, and many states specify a minimum number of work hours per week in order to maintain eligibility. However, this study simulates only participation in formal employment, and not hours of participation, among those in post-secondary education and job training. If the householder fulfills the work requirements in his/her state of residence, income eligibility rules are then applied to the household's income, a process described next. Householder's who do not meet the state's work activity rules are deemed ineligible for subsidies.

The second step involved the application of states' income eligibility rules to households that met the work requirements described above. As shown in Figure 2.1, two steps characterize this process: first, countable household income was calculated by applying income deductions and disregards, and second, countable income was compared to state-specific income eligibility limits. Households with total countable income below a given state's eligibility threshold were considered eligible for child care subsidies. Deductions and disregards are used by states to lower a household's countable income. The former typically subtracts a flat percent of earned income or medical expenses, while the latter excludes sources of non-wage income, such as cash assistance and child support. In 2001, five states used an income deduction, and nearly every state

[30] In some cases, the householder is not the biological parent of the child in question. However, this is of no consequence because CCDF rules provide a very broad definition of "parent" in its final ruling: "a parent by blood, marriage, or adoption…also a legal guardian, or other person standing in loco parentis" (http://www.acf.hhs.gov/programs/ccb/policy1/current/finalrul/fr072498.pdf).

disregarded at least one source of income. Once countable income was calculated for each household, states' income eligibility thresholds—which vary by family-size—were compared to household income.[31] Households meeting the work activity *and* income eligibility rules for a given state were coded as being eligible for CCDF child care subsidies.

2.4 Results

This section begins by presenting evidence on eligibility and take-up for child care subsidies among NSAF households with at least one child under age 13. Eligibility and take-up rates are calculated for several household-types and across several policy-relevant sub-groups. The discussion then turns to the issue of explaining why take-up for child care subsidies is relatively low. It does so by presenting a descriptive portrait of eligible recipient and non-recipient households, with comparisons provided for demographic, economic, and child care characteristics. It ends with the estimation of eligibility and take-up probits, and a simulation of these outcomes based on several household and policy scenarios.

Eligibility and Take-up Rates for Child Care Subsidies

As shown in Table 2.2, nearly three in 10 households (28 percent) are eligible for child care subsidies, but take-up is just 14 percent. Not surprisingly, female-headed households are more likely to be eligible and take-up (52 percent and 23 percent, respectively) than their male-headed and two-parent counterparts. Eligibility and take-up rates are also higher among TANF households and those below the poverty line. A

[31] Unfortunately, the income eligibility data only cover households with up to five members. Although it would be ideal to have these data for households of all sizes, I am still able to cover approximately 90% of all NSAF families with the available information. Households of six and over are assigned the same income eligibility limit as those with five members.

substantial proportion of households between 100 percent and 200 percent of the poverty line remain eligible (70 percent, with take-up around 13 percent), but these figures decline precipitously among households with incomes above 200 percent of poverty. Interestingly, a nontrivial proportion of TANF leavers as a whole are eligible for and take-up child care subsidies, but important differences exist by the stated reason for leaving welfare. While nearly identical proportions of "decision" and "cut-off" leavers are eligible (around 70 percent)—indicating similar levels of need—decision leavers are much more likely to take-up: 30 percent compared to 21 percent.[32] This suggests that households forced off TANF by the welfare office either feel stigmatized and will not attempt to secure additional government benefits, or they are under the impression that the receipt of child care subsidies is tied to the receipt of welfare. The latter reason appears to coincide with evidence documenting a decline in food stamp enrollments among welfare leavers, because many individuals believe they are no longer eligible for such benefits (Zedlewski, 2004).[33] Finally, the findings in Table 2.2 imply that subsidy take-up decreases as the child's age increases: 16 percent of eligible households with children ages 0 to 5 (only) receive subsidies, compared to a take-up rate of nine percent among households with children ages 6 to 12 (only).

A close examination of Table 2.2 reveals fairly low take-rates for child care subsidies, markedly lower than other targeted work supports, such as the EITC. The low take-up rates persist across household-type, in many cases even among female-headed households. In fact, the vast majority of estimates provided in Table 2.2 suggest that take-up is solidly in the range of 15 percent to 25 percent, whereas eligibility often

[32] As stated in Table 2.2, "cut-off" leavers are those who were forced off TANF by the welfare office, while "decision" leavers are those who left on their own.
[33] The food stamp caseload declined 40 percent between 1994 and 2000, but has recently started growing again.

exceeds 60 percent. The remainder of this section therefore explores factors related to subsidy take-up, focusing on several propositions that have been advanced to explain why many eligible households do not receive such assistance.

Descriptive Analyses of Eligible Recipient and Non-recipient Households

Tables 2.3-2.5 provide information on the distribution of demographic, economic, and child care characteristics of eligible households. The first column in each table displays the eligibility and take-up rate for a given household attribute, while the remaining columns provide data on the distribution of that attribute across eligible households. Comparisons between eligible recipient and non-recipient households are given in the fourth and fifth columns. These comparisons will guide the forthcoming discussion.

As shown in Tables 2.3-2.5, I find significant differences between eligible households that receive (recipient) and do not receive (non-recipient) child care subsidies. Looking first at Table 2.3, I find that although 40 percent of all eligible households are headed by a single female, fully 64 percent of recipient and just 35 percent of non-recipient households are headed by single women. This suggests that significantly fewer two-parent households are being offered child care subsidies, or conditional on an offer, are more likely to turn them down, opting instead to use one of the parents to provide child care. Householders in eligible recipient households tend to be younger and more likely to be minority than their non-recipient counterparts. Interestingly, recipient householders appear to be more skilled: 42 percent of these householders have at least some college education, while 34 percent of non-recipient householders have such training. This indicates the practice of "creaming" by state administrators. Moreover,

consistent with the belief that subsidies are targeted at households with young children, I find that 44 percent of recipient households have at least one child under age 5, but only 21 percent of these households have a child ages 6 to 12. The comparable numbers for eligible non-recipient households are 37 percent and 36 percent, respectively. Finally, there is evidence to suggest that non-recipient households are more likely to have access to informal child care providers, thereby obviating the need for subsidies. Non-recipient households tend to be larger and have a greater number of relatives on average than their recipient counterparts. Perhaps most importantly, a significantly higher proportion of non-recipient households contain an older adult (other than the parent).

Turning now to Table 2.4, I find equally dramatic differences with respect households' economic characteristics. Consistent with the "strings attached" nature of child care subsidies, as well as much empirical evidence, a significantly greater proportion of eligible recipient households are involved in at least one work activity. The story changes, however, when we consider the extent of work effort. Part-time work is more prevalent among recipient households (33 percent versus 26 percent), and full-time work is more prevalent among non-recipient households (74 percent versus 67 percent). This finding coincides with economic theory on the incentives created by child care subsidies: as earnings grow, co-payment rates—acting as implicit taxes—also increase, thereby creating a disincentive to increase work effort (or hours of work).[34] However, the inverse interpretation may also be true, in the sense that as co-payments rise (because earnings increase) households are more likely to leave the subsidy system and switch to informal, unpaid sources of child care. Finally, eligible recipient households appear to be

[34] Given that these findings are based on simple percentages (and not conditioned on other factors), the above interpretation should be viewed as preliminary.

more attached to other sources of government assistance. For example, fully 36 percent of such households are insured by a public program, compared 20 percent among non-recipient households. Rates of TANF and food stamp receipt are also significantly higher among households receiving child care subsidies, and interestingly, a higher proportion of recipient households receive income from child support. These findings again imply several interpretations. One is that households already involved with the cash assistance system do not feel as stigmatized about participating in another program. Another interpretation is that once households are enrollment in one public program, it is easier for agencies to identify other programs for which it might be eligible or need. A final interpretation is it simply reflects states' preferences to target child care subsidies at households receiving cash assistance, so they eventually work their way off welfare.[35]

The final table, Table 2.5, focuses on the child care arrangements and expenditures of eligible recipient and non-recipient households. Given the evidence that child care arrangements vary dramatically by the age of the child, three sets of findings are presented: those for children ages 0 to 4, children age 5, and children ages 6 to 12 (Sonenstein, Gates, Schmidt, & Bolshun, 2002). Across all three age groups, we find that recipient households are more likely to use paid sources of child care, such as center- and family-based services. For example, fully 40 percent of eligible recipient children ages 0 to 4 are in a center-based environment, while just 18 percent of eligible non-recipient children use these services. The predominant child care mode among non-recipient households is parent care. These findings, although descriptive, are consistent with economic models of child care subsidies, as well as much empirical evidence, which

[35] Indeed, Blau and Tekin (2001) find that child care subsidies simultaneously increase the likelihood that single mothers are employed and receiving welfare. Some of the effect is due to a true behavioral relationship, but undoubtedly some part of the effect is also due to the fact that state agencies are targeting benefits at those who are either employed or receiving public assistance.

suggest subsidies create an incentive to switch to paid sources of child care (Blau, 2001; Tekin, 2004b).[36] This interpretation should be evaluated against the possibility that recipient households were already using paid sources of care prior to receiving a subsidy, and therefore subsidies became an attractive method for defraying child care costs. Not surprisingly, given the above findings, a much higher share of recipient households pay some amount for child care services. As shown in Table 2.5, three-fourths of such households with children ages 0 to 4 pay for child care, while just one-quarter of their non-recipient counterparts do. But among households in both groups that do pay something for child care, recipient households pay less per month on average: $261 versus $314.[37]

In sum, I find substantial differences between eligible recipient and non-recipient households. Many of these differences persist across demographic, economic, and child care characteristics. Specifically, recipient households are more likely to be headed by young, single women with slightly more education, and more likely to have young children. Moreover, a greater share of eligible recipient householders are engaged in at least one work activity, including formal employment, but are less likely to work full-time. Participation in other means-tested programs is higher among recipient households, suggesting that states view them as "priorities." Finally, I find support for several arguments advanced by others to explain the low take-up rate. Eligible non-recipient households tend to be larger, have a greater number of relatives, and are more likely to

[36] This appears to be corroborated by the multivariate results, which will be discussed in the next section. Appendices 2.1 – 2.3 estimate the eligibility and take-up equations that include controls for the type of child care arrangement used by the household. Specifically, Appendix 2.3 shows that take-up is significantly higher among households using center- and family-based services (parent care is the omitted category).

[37] It is important to note that the NSAF does not collect child care expenditure data on a per-child or per-child care arrangement basis. Rather, expenditures are reported for all children and across all arrangements. Therefore, the expenditures in Table 2.5 should not be interpreted as the amount paid for just the child in a given age group; it is the total amount paid by a household with a child in a given age group.

have an older adult present—all of which suggest that non-recipient households have greater access to unpaid sources of child care. This argument is bolstered by the fact that non-recipient households are more likely to use parent and relative care, while recipient households appear to be using center- and family-based services.

Correlates of Household Eligibility and Take-up

This section explores in a multivariate context factors related to household eligibility and take-up for child care subsidies. Table 2.6 provides estimates from the eligibility model, and Tables 2.7 and 2.8 provide results from the take-up model. All equations are estimated with probit regression, and robust standard errors are calculated to correct for heteroskedasticity. Marginal effects are displayed in the tables for ease of interpretation. This section concludes with a series of policy simulations, the results of which are presented in Table 2.9. As in the previous section, much of the discussion will focus on testing several explanations for why many eligible households not receive child care assistance. Specifically, I attempt to discern whether states trade-off generosity in eligibility with the generosity of benefits; whether states' policies—especially those aimed at increasing awareness of subsidy programs—are related to eligibility and take-up; and whether states ration benefits according to specific household characteristics.

It should be noted that the results presented in this section are purely descriptive in nature. The equations are not derived from a formal theoretical model, and therefore the parameter estimates should not be viewed as having some underlying behavioral

meaning.[38] Many of the included predictors, however, match those originating in formal models of subsidy receipt, including the one developed by Tekin (2004a).

Results from the subsidy eligibility equation are presented in Table 2.6. The model is estimated on the full sample of NSAF households. The first column presents marginal effects for a model that includes only household characteristics, while the second column adds work activities for the householder. The last two columns include estimates of state policies. Formally, the probit equation is specified as follows:

[2.1] $\Pr[eligible_i = 1 \mid \mathbf{x}] = \Phi\{\alpha + \beta_1 H_i + \beta_2 E_i + \beta_3 P_i + \mu_r + \varepsilon_i\}$,

where $eligible_i$ is a binary indicator for whether the i^{th} household is eligible for child care subsidies, and H_i, E_i, and P_i represent matrices of household characteristics, the householder's employment status, and state policies, respectively. The β's are estimated parameters, μ_r, is a matrix of region fixed effects, and ε_i is a disturbance term.

Since the CCDF delivers its benefits through means-testing (i.e., household income is a major determinant of eligibility), parameter estimates derived from [2.1] can usefully be thought of as indicators of economic *need* for child care subsidies. However, as will be shown, state policy choices also affect the likelihood a household will be eligible, even after accounting for its level of need.

Nearly all of the coefficients in Table 2.6 take on the expected sign and are statistically significant at conventional levels. Single, female-headed households and

[38] Even predictors derived from a theoretical framework are problematic. Recent research, including Tekin (2004a), treat subsidy receipt as a "choice" variable, that is, the *decision* to receive a child care subsidy is modeled as a function of household characteristics and state policies. As such, the parameter estimates from this model imply some underlying behavioral meaning. However, for several reasons, I do not believe subsidy receipt should be treated as a choice variable. Receipt of a child care subsidy is conditional on an *offer* made to a household by a state agency. Although it is difficult, if not impossible, to know the offer rate for subsidies (itself a problem), intuition and indirect evidence suggest that offer rates are very low. First, if offer rates were higher, take-up rates would also likely be higher. Second, nearly half of all states currently have waiting lists, thus limiting states' ability to make offers to eligible households. Finally, the nature of CCDF funding (close-ended block grants) suggests that states cannot substantially increase (or decrease) offer rates in response to changing demand or economic conditions. For these reasons, it is difficult to believe that subsidy take-up is a matter of choice for households, and therefore the parameter estimates derived from a subsidy equation cannot reflect an underlying set of household preferences for child care subsidies.

those headed minorities are more likely to be eligible for child care subsidies. Not surprisingly, the likelihood of eligibility decreases as the householder's educational level increases, and as non-wage income increases. Receipt of public assistance (TANF/food stamps) is associated with a 27 – 37 percentage point increase in the probability of being eligible for subsidies, depending on the model, suggesting that most of these household fulfill the income and work activity requirements. As shown in the second column, householder participation in all three work activities is related to eligibility, especially those involved in non-employment activities (job training and education, for example). This most likely reflects the fact that household income is extremely low, and that a majority of states count job training and education as acceptable work activities.

Looking at columns three and four, I find that several state polices are significantly related to eligibility, although sometimes in unexpected ways. Households in states that exempt any income when determining eligibility and which guarantee subsidies for TANF families are significantly more likely to be eligible. However, this latter effect appears to be offset by the lower eligibility propensity among households in states that give TANF families "priority," a somewhat surprising result. In addition, states' awareness and access strategies appear to have mixed results. Although a nontrivial proportion of NSAF households are "exposed" to one or more of these strategies, the use of mass media to distribute subsidy information is the only one with a positive and significant association with eligibility.[39]

Finally, the last three variables in column four—states' use of tiered reimbursement rates for odd-hour and quality care and the waiver of co-payments for

[39] Fully 40 percent of the NSAF sample resides in states that use mass media; 32 percent are in states that post subsidy information on its website; and 27 percent allow households to complete/submit an application over the over web or through the mail.

poor families—represent an indirect test of whether states trade-off generosity in eligibility for additional generosity in benefits. Each policy is an indicator of states' *benefit* generosity, and so its inclusion in an *eligibility* equation tests the existence and direction of such a trade-off. Indeed, the results suggest there is evidence for the proposition that households residing in states with more generous benefit regimes are less likely to be eligible, *ceteris paribus*. In fact, the coefficient on each variable suggests that households in states with all three policies are 14 percentage points less likely to be eligible for child care subsidies.

Results from the subsidy receipt and take-up equations are presented in Tables 2.7 and 2.8.[40] Table 2.7 presents marginal effects for the basic receipt and take-up equations, while Table 2.8 estimates the take-up probit separately for states with (WL) and without (NWL) a waiting list. Using the presence of a waiting list as a proxy for states' financial constraints, this model explores whether WL states ration benefits according certain household characteristics. The subsidy receipt equation is estimated on the full sample of NSAF households, and the take-up equation includes only the sub-sample of eligible households. Several other papers describe results from subsidy receipt equations, and so this discussion will focus on take-up (Tekin, 2004a; Tekin, 2004b).

Looking at the last two columns in Table 2.7, it is immediately clear that fewer variables are statistically significant than in the eligibility equation, a clear indication that many eligible households do not receive child care subsidies. In fact, states appear to be targeting very specific types of households: single, female-headed households and those headed by blacks; households with younger children (ages 0 to 5) as opposed to older children (ages 6 to 12); households receiving public assistance; those participating in at

[40] Since the form of the receipt/take-up probit is identical to the eligibility probit, the will model will not be re-stated here.

least one major work activity; and to a lesser extent households transitioning off welfare. Interestingly, conditional on eligibility, increases in non-wage income are not related to take-up. Neither household size nor the presence of another older adult are related to take-up propensity, suggesting that states do not favor households without access to informal child care.[41] For those eligible households offered a subsidy, this finding could also mean that child care subsidies are equally desirable to those with and without sources of informal care.

States' policy choices, moreover, appear to have mixed effects on take-up. The presence of a waiting list decreases take-up propensity by 6.5 percentage points, ostensibly because offer rates are lower in states with budget constraints. There is some evidence that states with more generous benefits also have higher take-up rates: eligible households in states that waive co-payments for poor families and that have tiered reimbursement rates are more likely to receive a child care subsidy. Conditional on being eligible, however, states' awareness strategies do not appear to be associated with subsidy receipt. This finding, coupled with the results from the eligibility equation, suggest that states' awareness and access strategies are largely ineffective.

Table 2.8 displays the results of take-up probit estimated separately for NWL and WL states. The purpose of this analysis is to explore whether the correlates of subsidy take-up differ across households according to their waiting list environment. As previously stated, the presence of a waiting list is assumed to indicate a state's limited financial ability to meet its demand for child care subsidies. If the parameter estimates are indeed different between the models, there are likely "structural" dissimilarities

[41] The number of relatives in the household was also tested in the model (in place of household size) and was found to be non-significant as well.

across these states' policy environments. One manifestation of such a structural difference is that states with a waiting list may ration benefits according to specific household characteristics.

The story emerging from Table 2.8 suggests that WL states are structurally different from NWL states, and therefore are likely rationing child care subsidies to certain households. Eligible minority households are significantly more likely to receive a subsidy in WL states, but they are no more likely to receive a subsidy in NWL states. Furthermore, there is an increased likelihood of take-up among higher-skilled households in WL states, implying that states are "creaming" as a method for distributing child care assistance. The presence of younger children (ages 0 to 5) is associated with greater take-up propensity in WL states, whereas in NWL states the age of the child does not matter. Larger households are less likely to receive a subsidy in WL states, suggesting that financially constrained states favor households without access to informal providers.[42] Employed householders are equally likely to take-up a subsidy in WL and NWL states, but those involved in at least one non-employment activity (job training or education, for example) are significantly more likely to take-up in WL states. There is, finally, some evidence that WL states are targeting benefits at recent TANF leavers, which again is indicative of "creaming."

Subsidy Eligibility and Take-up Simulations

To summarize the findings in the previous sections, I use the estimates from the eligibility and take-up probits to simulate the effect of changes in household characteristics and state policies. All simulations are conducted using the full model for

[42] Similar results were obtained when the number of relatives was included in the model (in place of household size).

both outcomes.[43] As shown in Table 2.9, the top panel presents the eligibility simulations, while the bottom displays the take-up simulations. I also conduct separate take-up simulations for states with and without a waiting list. For simplicity and ease of comparison, I use as baseline households those that are female-headed with at least one child under age 5.[44] Predicted probabilities are derived by holding all other variables at their mean value.

Consistent with the eligibility calculations and probit results, cash assistance households are highly likely to be eligible for child care subsidies (0.651). The typical employed householder is significantly less likely to be eligible (0.521), but those involved in non-employment work activities are virtually guaranteed to be eligible. Moreover, eligibility appears to be quite responsive to changes in states' policies, especially income exemptions and TANF guarantees. For example, the average single, female householder (who is employed and receiving cash assistance) in states with both policies has a 0.862 probability of being eligible, compared to 0.753 in states with neither policy. The generosity of states' subsidy benefits also has implications for the likelihood of eligibility, with more generous regimes associated with lower eligibility propensities. For example, working female-headed households in states with tiered reimbursement rates have an eligibility-probability of 0.404, compared to 0.547 in states without such benefits.

Turning to the take-up simulations, I find that female-headed households engaged in at least one work activity are favored by states over households receiving cash assistance. Take-up is predicted to be highest among those who are simultaneously

[43] Eligibility simulations are drawn from the fourth column in Table 2.6, and the take-up simulations use the coefficients from the fourth column in Table 2.7.

[44] In addition, this baseline household was chosen because reflects the group most likely affected by changes in child care subsidy policies, and is of primary interest to scholars and policymakers.

employed and involved in another work activity: 0.544 compared to 0.307 among TANF/food stamp recipients. Interestingly, despite the fact that an overwhelming majority of recent welfare leavers are eligible for subsidies, the likelihood of take-up for this group is just 0.269, well below that of welfare recipients. Eligible households with and without access to sources of informal child care are equally likely to receive a subsidy, suggesting that both household-types find it similarly desirable or necessary to use subsidies. Given the probit results, it is not surprising that the presence of a waiting list leads to significant reductions in the probability of take-up. Take-up is also quite responsive to other state policies. For example, a $100 increase in the weekly reimbursement rate (for infant care) increases take-up propensity among female-headed households to 0.354, from a baseline of 0.314. Moreover, the introduction of tiered reimbursement rates raises the probability of take-up to 0.398.

The final sections of Table 2.9 present simulation results based on the take-up probit estimated separately on WL and NWL states. As with previous simulations, it begins with a baseline household—in this case employed, low-skilled female-headed households with young children—and then simulates the effect of small changes.[45] Two things are immediately clear from comparing take-up propensities across WL and NWL states. First, fairly large take-up differences exist, and second, in nearly every case predicted take-up is actually *higher* in WL states. This may at first appear counterintuitive given that previous simulations revealed a lower take-up propensity in WL states. However, recall that the separate take-up probits also revealed substantial "structural" differences in the way WL and NWL states are targeting subsidies.

[45] This baseline household was chosen because it contains a set of characteristics that is easily observed by state administrative offices charged with making decisions about subsidy eligibility and offers. It is also a bundle of attributes that states likely target when "priority" households are identified.

Specifically, WL states appear to ration subsidies according to specific household characteristics, thereby making households with those characteristics *more likely* to receive a subsidy. Stated another way, overall take-up propensities are lower in states with a WL, but for those households with characteristics that are targeted by WL states, the take-up probability is actually higher.

2.5 Conclusion

The 1996 PRWORA increased substantially funding for child care assistance and consolidated four existing programs into a single CCDF. The primary purpose of the consolidation was to eliminate the fragmentation associated with the previous subsidy system, as well as to ease the transition of low-income households from welfare to work. The additional funding was also intended to meet the growing demand for child care services stemming from PRWORA's strict work requirements. Previous research on subsidy take-up, however, coupled with the fact that 20 states currently have waiting lists, suggest there is a large unmet need for child care assistance.

The purpose of this chapter, therefore, is to provide new estimates of eligibility and take-up rates for CCDF child care subsidies, and to explore factors related to why many eligible households do not receive such assistance. As noted throughout the chapter, much of the analysis and discussion is guided by several commonly cited propositions to explain the low take-up rate for subsidies: eligible non-recipient households differ in ways from their recipient counterparts that make subsidies unnecessary or undesirable; states trade-off breadth (increasing eligibility) for additional depth (increasing benefits) or vice versa; states' awareness and access strategies are

inadequate and ineffective; and states ration benefits to households with specific characteristics.

I find that although nearly 30 percent of households with children under age 13 are eligible for child care subsidies, just 14 percent receive assistance, well within the range of previous estimates. This estimate clearly masks substantial variation across various household-types and employment statuses, but a careful review of the evidence suggests that take-up is solidly in the range of 15 percent to 25 percent, whereas eligibility often exceeds 60 percent. Turning to potential explanations, I find substantial differences between eligible recipient and non-recipient households. Recipient households tend to be higher-skilled, have younger children, and simultaneously more likely to be engaged in a work activity and enrolled in another mean-tested program. Eligible non-recipient households, on the other hand, tend to be larger, have a greater number of number relatives, and are more likely to have an older adult present—all of which suggest that non-recipient households have greater access to unpaid sources of child care. States' policy choices are also related to eligibility and take-up. Specifically, states appear to be trading-off eligibility for additional generosity in benefits. The presence of waiting lists, furthermore, is associated with large reductions in take-up. Although most states use several awareness and access strategies, they are of limited value at increasing eligibility and take-up. In general, states appear to target specific household characteristics when distributing subsidies: minority, female-headed households with young children and those that are receiving cash assistance, transitioning from TANF, or engaged in at least one work activity. However, states with a waiting list

are rationing benefits more aggressively, usually in ways that simultaneously favor the least-skilled and most-skilled households.

The findings in this chapter come amid a fierce Congressional debate over the reauthorization of the 1996 welfare law. Changes to TANF and child care assistance (CCDF) are included in a budget reconciliation bill, which is currently working its way through conference committee. The legislation includes some of the largest and most aggressive changes to U.S. welfare and child care policy since the 1996 law. Most of these provisions impose new work requirements, while giving states very little additional money to support the new initiatives. For example, the bill seeks to penalize states that serve poor two-parent families, and it stipulates that 90 percent of two-parent families must participate in work activities for at least 35 hours per week (Parrott, Park, & Greenstein, 2005). Funding for child care subsidies, meanwhile, includes a $1 billion increase, apparently significantly less than what the Congressional Budget Office (CBO) projects is necessary to fund the new work requirements.

The commingling of these policy changes is expected to increase demand for child care services and subsidies, while lowering states' ability to meet the new demand and increasing child care costs for low-income households. Based on the results in this chapter, take-up rates for subsidies are predicted to fall dramatically if the proposed changes are adopted. In addition, states will have to ration benefits more aggressively, with low-income working households declining as a "priority" for assistance. Subsidy dollars will likely shift away from serving single, female-headed households and toward two-parent households, so that they can meet the new work requirements.

TABLE 2.1: Summary Statistics for NSAF Households with Children Under Age 13

Variable	All Households (N =19,066)	Two Parent Households (N = 14,199)	Female-Headed Households (N = 4,179)	Male-Headed Households (N = 688)
Employed (%)	0.876 (0.329)	0.888 (0.315)	0.829 (0.375)	0.892 (0.309)
Receives TANF/food stamps (%)	0.140 (0.347)	0.077 (0.266)	0.361 (0.480)	0.173 (0.378)
Household Headship (%)				
Two-parent	0.749 (0.433)	1.00	1.00	1.00
Single, Female-headed	0.208 (0.406)	1.00	1.00	1.00
Single, Male-headed	0.041 (0.200)	1.00	1.00	1.00
Householder's Age	36.70 (8.43)	37.01 (7.89)	35.35 (9.85)	37.85 (9.23)
Householder's Race/Ethnicity (%)				
White	0.632 (0.482)	0.684 (0.464)	0.452 (0.497)	0.607 (0.488)
Black	0.145 (0.352)	0.086 (0.281)	0.344 (0.475)	0.211 (0.408)
Hispanic	0.175 (0.380)	0.173 (0.378)	0.183 (0.387)	0.160 (0.366)
Other	0.046 (0.210)	0.055 (0.228)	0.019 (0.138)	0.021 (0.143)
Householder's Education (%)				
Less than High School	0.127 (0.333)	0.113 (0.316)	0.179 (0.383)	0.126 (0.332)
High School/GED	0.306 (0.460)	0.291 (0.454)	0.360 (0.480)	0.295 (0.456)
Some College	0.294 (0.456)	0.274 (0.446)	0.345 (0.475)	0.409 (0.492)
College+	0.271 (0.444)	0.320 (0.466)	0.114 (0.318)	0.168 (0.374)
Household's Non-Wage Income (/1,000) ($)	3.54 (7.61)	3.14 (7.67)	4.96 (7.44)	3.48 (6.56)
Total Household Income (/1,000) ($)	59.03 (44.77)	67.85 (45.67)	29.99 (27.04)	45.60 (33.29)
Household Size (No.)	4.10 (1.30)	4.30 (1.21)	3.54 (1.39)	3.34 (1.34)
No. Relatives in Household	2.95 (1.32)	3.20 (1.23)	2.27 (1.30)	1.86 (1.28)
No. Children Ages 0-5	0.860 (0.815)	0.904 (0.812)	0.768 (0.829)	0.539 (0.688)
No. Children Ages 6-17	1.17 (1.08)	1.16 (1.09)	1.22 (1.07)	1.13 (1.00)
Presence of Child Ages 0-5 (%)	0.381 (0.485)	0.392 (0.488)	0.352 (0.477)	0.319 (0.466)
Presence of Child Ages 6-12 (%)	0.373 (0.483)	0.344 (0.475)	0.438 (0.496)	0.561 (0.496)
Presence of Children Ages 0-5 and 6-12 (%)	0.245 (0.430)	0.262 (0.440)	0.209 (0.407)	0.119 (0.324)
Presence of Other Adult Ages 55+ (%)	0.034 (0.182)	0.036 (0.186)	0.027 (0.162)	0.034 (0.183)
Householder is U.S. Born (%)	0.826 (0.378)	0.810 (0.392)	0.877 (0.328)	0.877 (0.328)
Region of Residence (%)				
Northeast	0.189 (0.391)	0.187 (0.390)	0.204 (0.403)	0.146 (0.354)
South	0.359 (0.479)	0.347 (0.476)	0.396 (0.489)	0.383 (0.486)
Midwest	0.224 (0.417)	0.228 (0.419)	0.205 (0.404)	0.246 (0.431)
West	0.227 (0.418)	0.236 (0.425)	0.193 (0.394)	0.223 (0.416)
State Subsidy Policies (%)				
Waiting List	0.663 (0.472)	0.659 (0.473)	0.671 (0.469)	0.680 (0.466)
Guarantee for TANF HH's	0.725 (0.446)	0.729 (0.443)	0.709 (0.453)	0.729 (0.444)
Any Income Exemption	0.850 (0.356)	0.842 (0.363)	0.875 (0.330)	0.858 (0.349)
Weekly RR for Infants ($)	164.34 (60.29)	164.86 (60.43)	162.33 (60.22)	165.03 (58.14)

Source: Author's calculations from the 2002 NSAF.
Notes: Standard deviations are in parentheses. Data are weighted to obtain population averages.

TABLE 2.2: Simulated Eligibility and Take-Up Rates for Child Care Subsidies

	All Households (N = 19,066)	Two Parent Households (N = 14,199)	Female-Headed Households (N = 4,179)	Male-Headed Households (N = 688)
All Households				
Subsidy Receipt (%)	0.066	0.038	0.163	0.081
Eligible (%)	0.276	0.207	0.524	0.287
Take-Up (%)	0.139	0.079	0.225	0.138
TANF Households				
Subsidy Receipt	0.184	0.111	0.246	0.133
Eligible	0.639	0.547	0.711	0.617
Take-Up	0.218	0.109	0.286	0.175
Non-TANF Households				
Subsidy Receipt	0.047	0.032	0.116	0.070
Eligible	0.217	0.179	0.418	0.218
Take-Up	0.101	0.071	0.167	0.116
TANF Leavers[1]				
Subsidy Receipt	0.239	0.161	0.289	0.180
Eligible	0.707	0.573	0.788	0.678
Take-Up	0.266	0.151	0.316	0.252
"Cut-off" Leavers				
Subsidy Receipt	0.177	0.069	0.219	--
Eligible	0.690	0.495	0.778	--
Take-Up	0.207	0.070	0.234	--
"Decision" Leavers				
Subsidy Receipt	0.280	0.209	0.340	--
Eligible	0.719	0.614	0.794	--
Take-Up	0.303	0.185	0.373	--
Household Income < 100% of FPL				
Subsidy Receipt	0.138	0.072	0.196	0.138
Eligible	0.753	0.775	0.745	0.610
Take-Up	0.165	0.082	0.239	0.182
Household Income 100%-200% of FPL				
Subsidy Receipt	0.111	0.064	0.211	0.127
Eligible	0.703	0.664	0.784	0.732
Take-Up	0.128	0.077	0.223	0.117
Employed				
Subsidy Receipt	0.070	0.041	0.180	0.079
Eligible	0.299	0.226	0.582	0.300
Take-Up	0.142	0.079	0.236	0.148
Presence of Child Ages 0-5, Only				
Subsidy Receipt	0.078	0.044	0.206	0.120
Eligible	0.277	0.212	0.526	0.359
Take-Up	0.159	0.091	0.277	0.114
Presence of Child Ages 6-12, Only				
Subsidy Receipt	0.040	0.017	0.097	0.062
Eligible	0.242	0.166	0.469	0.192
Take-Up	0.089	0.034	0.135	0.180
Presence of Children Ages 0-5 and 6-12				
Subsidy Receipt	0.089	0.059	0.230	0.063
Eligible	0.328	0.254	0.635	0.545
Take-Up	0.168	0.102	0.293	0.111

Source: Author's calculations from the 2002 NSAF.

Notes: [1] A TANF leaver is defined as any individual in a given household (but in most cases is the householder or his/her spouse, if present) who reported receiving TANF at some point after 2000, but was not receiving TANF at the time of the survey (early 2002). All leavers are included here, irrespective of whether they left on their own or whether the "welfare office cut them off." Blank cells indicate that there are an insufficient number of observations on which to base the estimate.

TABLE 2.3: Demographic Characteristics of Households Simulated to be Eligible for Child Care Subsidies

Variable	Eligibility / Take-up Rate	All Eligible Households	Eligible Recipient Households	Eligible Non-Recipient Households
Household Headship (%)				
Two-parent	0.207 / 0.079	0.561	0.319	0.601***
Single, Female-headed	0.524 / 0.225	0.394	0.637	0.354***
Single, Male-headed	0.287 / 0.138	0.043	0.043	0.043
Householder's Age (%)				
18-27	0.467 / 0.209	0.234	0.351	0.215***
28-37	0.286 / 0.138	0.431	0.430	0.432
38-47	0.215 / 0.091	0.266	0.175	0.281***
48-57	0.183 / 0.072	0.055	0.028	0.059***
58+	0.186 / 0.160	0.011	0.013	0.011
Householder's Race/Ethnicity (%)				
White	0.183 / 0.108	0.418	0.324	0.434***
Black	0.432 / 0 .235	0.227	0.384	0.202***
Hispanic	0.510 / 0.113	0.322	0.262	0.332***
Other	0.185 / 0.126	0.031	0.028	0.031
Householder's Education (%)				
Less than High School	0.558 / 0 .095	0.260	0.175	0.274***
High School/GED	0.344 / 0.148	0.384	0.402	0.381
Some College	0.256 / 0.187	0.276	0.366	0.261***
College+	0.080 / 0.098	0.079	0.055	0.083***
Household Size (No.)	--	4.12	3.91	4.16***
No. Relatives in Household (No.)	--	2.93	2.77	2.96***
No. Children Ages 0-5 (No.)	--	0.97	1.13	0.94***
No. Children Ages 6-17 (No.)	--	1.27	1.16	1.29***
Presence of Child Ages 0-5 (%)	0.277 / 0.159	0.382	0.438	0.373***
Presence of Child Ages 6-12 (%)	0.242 / 0.089	0.326	0.209	0.345***
Presence of Children Ages 0-5 and 6-12 (%)	0.328 / 0.168	0.291	0.352	0.281***
Presence of Other Adult Ages 55+ (%)	0.209 / 0.104	0.025	0.019	0.027**
Householder's Place of Birth (%)				
U.S. Born	0.241 / 0.153	0.721	0.795	0.709***
Foreign Born	0.445 / 0.102	0.278	0.204	0.290***
Region of Residence (%)				
Northeast	0.269 / 0.156	0.184	0.206	0.180
South	0.305 / 0.129	0.396	0.366	0.401
Midwest	0.197 / 0.175	0.160	0.202	0.153
West	0.315 / 0.121	0.258	0.224	0.264

Source: Author's calculations from the 2002 NSAF.

Notes: All percents are weighted. *, **, *** indicate a statistically significant difference between eligible recipient and eligible non-recipient households at the 10%, 5%, and 1% levels, respectively. Tests of statistical significance are based on unweighted percentages. Blank cells indicate that the quantity is not possible to calculate.

TABLE 2.4: Economic Characteristics of Households Simulated to be Eligible for Child Care Subsidies

Variable	Eligibility / Take-up Rate	All Eligible Households	Eligible Recipient Households	Eligible Non-Recipient Households
Work Activities (%)				
Employed	0.299 / 0.142	0.948	0.969	0.944
Received Help Looking	0.473 / 0.198	0.075	0.107	0.070***
Job Training Courses	0.356 / 0.169	0.085	0.103	0.082
HS/GED Courses	0.672 / 0.167	0.025	0.031	0.025**
College Courses	0.280 / 0.201	0.074	0.107	0.069***
Weeks Worked (%)				
1-13 Weeks	0.618 / 0.155	0.061	0.066	0.060
14-26 Weeks	0.576 / 0.161	0.101	0.115	0.099*
27-39 Weeks	0.426 / 0.135	0.095	0.090	0.096
40-52 Weeks	0.261 / 0.139	0.741	0.727	0.743
Mean Weeks Worked	--	43.82	43.35	43.90
Weekly Hours Worked (%)				
1-35 Hours	0.436 / 0.175	0.269	0.332	0.259***
36+ Hours	0.268 / 0.130	0.730	0.667	0.740***
Mean Hours Worked	--	39.72	37.78	40.04***
Health Insurance (%)				
Uninsured	0.557 / 0.113	0.350	0.285	0.360***
Insured by Public Program[1]	0.635 / 0.224	0.222	0.358	0.200***
HH Public Assistance				
TANF (%)	0.636 / 0.250	0.124	0.223	0.108***
Amount Received	--	3,365	3,159	3,435
Food Stamps (%)	0.645 / 0.219	0.310	0.487	0.281***
Amount Received	--	2,096	2,024	2,119
SSI (%)	0.367 / 0.161	0.063	0.073	0.061
Amount Received	--	5,929	5,184	6,072
Unemployment Insurance	0.316 / 0.147	0.093	0.098	0.092
Amount Received	--	2,488	2,192	2,539*
Child Support (%)	0.374 / 0.212	0.196	0.298	0.179***
Amount Received	--	3,033	2,408	3,211***
Total HH Earnings	--	20,311	18,096	20,685***
Total HH Non-wage Income	--	4,428	4,415	4,436
Total HH Income	--	22,131	20,543	22,399***

Source: Author's calculations from the 2002 NSAF.

Notes: All percents are weighted. *, **, *** indicate a statistically significant difference between eligible recipient and eligible non- recipient households at the 10%, 5%, and 1% levels, respectively. Tests of statistical significance are based on unweighted percentages. Blank cells indicate that the quantity is not possible to calculate.

[1] This includes Medicaid, SCHIP, and state health insurance programs.

TABLE 2.5: Child Care Arrangements and Expenses of Households Simulated to be Eligible for Child Care Subsidies

Variable	Eligibility / Take-up Rate	All Eligible Households	Eligible Recipient Households	Eligible Non-Recipient Households
Children Ages 0 - 4				
Child Care Arrangements (%)				
Center-based	0.240 / 0 .309	0.217	0.399	0.179***
Family-based	0.214 / 0.271	0.079	0.128	0.069**
Nanny/Babysitter	0.242 / 0.170	0.030	0.031	0.030
Relative	0.332 / 0.196	0.276	0.325	0.267
Parent	0.359 / 0.048	0.396	0.114	0.453***
Paying for Care (%)	--	0.352	0.744	0.273***
Monthly Expenses ($)	--	296	261	314***
Share of HH Income (%)	--	0.253	0.287	0.235
Children Age 5				
Child Care Arrangement (%)				
Center-based	0.316 / 0.233	0.450	0.557	0.425***
Family-based	0.257 / 0.253	0.047	0.063	0.043**
Nanny/Babysitter	0.268 / --	0.036	0.035	0.037
Relative	0.308 / 0.212	0.186	0.210	0.180
Parent	0.265 / 0.072	0.264	0.101	0.301***
Before-/After-school Program	0.061 / --	0.014	0.031	0.010**
Paying for Care (%)	--	0.348	0.637	0.280***
Monthly Expenses ($)	--	301	257	324
Share of HH Income (%)	--	0.170	0.135	0.188
Children Ages 6 - 12				
Child Care Arrangement (%)				
Before-/After-school Program	0.219 / 0.372	0.129	0.356	0.093***
Family-based	0.287 / 0.232	0.064	0.110	0.056***
Nanny/Babysitter	0.245 / 0.252	0.035	0.065	0.030***
Relative	0.290 / 0.162	0.210	0.253	0.203
Parent	0.288 / 0.043	0.488	0.158	0.540***
Self-care	0.220 / 0.104	0.072	0.055	0.074**
Paying for Care (%)	--	0.301	0.713	0.238***
Monthly Expenses ($)	--	279	287	276
Share of HH Income (%)	--	0.176	0.188	0.171

Source: Author's calculations from the 2002 NSAF.

Notes: All percents are weighted. *, **, *** indicate a statistically significant difference between eligible recipient and eligible non-recipient households at the 10%, 5%, and 1% levels, respectively. Tests of statistical significance are based on unweighted percentages. Blank cells indicate that the quantity is not possible to calculate, or that there are insufficient observations on which to base the estimate.

TABLE 2.6: Estimated Marginal Effects from the Subsidy Eligibility Equation

Variable	∂Pr(Eligible)/∂x (Robust Standard Error)			
Age	-0.013	-0.016	-0.015	-0.016
	(0.004)***	(0.004)***	(0.004)***	(0.004)***
Age^2 (/100)	0.011	0.016	0.015	0.015
	(0.005)**	(0.005)***	(0.005)***	(0.005)***
Single, Female-headed HH	0.154	0.158	0.159	0.162
	(0.016)***	(0.016)***	(0.016)***	(0.016)***
Single, Male-headed HH	0.026	0.017	0.015	0.019
	(0.026)	(0.025)	(0.024)	(0.025)
Black	0.092	0.081	0.081	0.082
	(0.017)***	(0.017)***	(0.017)***	(0.017)***
Hispanic	0.123	0.124	0.106	0.106
	(0.017)***	(0.017)***	(0.017)***	(0.017)***
Other	0.012	0.008	-0.001	-0.0004
	(0.028)	(0.027)	(0.026)	(0.026)
Less than High School	0.353	0.429	0.433	0.435
	(0.025)***	(0.026)***	(0.026)***	(0.026)***
High School/GED	0.247	0.250	0.255	0.255
	(0.016)***	(0.016)***	(0.016)***	(0.016)***
Some College	0.174	0.166	0.165	0.166
	(0.015)***	(0.015)***	(0.015)***	(0.015)***
HH Non-wage Income	-0.010	-0.007	-0.007	-0.007
	(0.0009)***	(0.0008)***	(0.0008)***	(0.0008)***
HH Receipt of TANF/FS	0.270	0.364	0.369	0.365
	(0.019)***	(0.022)***	(0.022)***	(0.022)***
Household Size	-0.078	-0.085	-0.086	-0.085
	(0.008)***	(0.008)***	(0.008)***	(0.008)***
No. Children Ages 0-5	0.102	0.130	0.128	0.128
	(0.016)***	(0.014)***	(0.014)***	(0.014)***
No. Children Ages 6-17	0.113	0.126	0.127	0.127
	(0.010)***	(0.010)***	(0.011)***	(0.010)***
Presence of Child Ages 0-5	0.006	-0.002	-0.0008	-0.001
	(0.023)	(0.020)	(0.020)	(0.020)
Presence of Child Ages 0-5 and 6-12	0.012	0.004	0.006	0.004
	(0.022)	(0.019)	(0.019)	(0.019)
Presence of Other Adult Ages 55+	0.057	0.072	0.073	0.075
	(0.031)*	(0.032)**	(0.032)**	(0.033)**
U.S. Born	-0.143	-0.140	-0.144	-0.148
	(0.019)***	(0.018)***	(0.019)***	(0.019)***
Employed Only	--	0.377	0.376	0.376
		(0.012)***	(0.013)***	(0.013)***
Employed Plus At Least One Other Work Activity[1]	--	0.707	0.712	0.713
		(0.032)***	(0.032)***	(0.032)***
At Least One Other Work Activity Only[1]	--	0.712	0.719	0.722
		(0.033)***	(0.033)***	(0.033)***
State Exempts Any Income	--	--	0.039	0.038
			(0.012)***	(0.012)***
Subsidy Guarantee for TANF Families	--	--	0.062	0.065
			(0.011)***	(0.012)***
Subsidy Priority for TANF Families	--	--	-0.044	-0.047
			(0.015)***	(0.015)***
Subsidy Priority for Special Needs Children	--	--	-0.011	0.0001
			(0.018)	(0.017)
Use of Media to Distribute Information About Subsidies	--	--	0.039	0.043
			(0.013)***	(0.014)***
Subsidy Information Posted on State's Website	--	--	-0.068	-0.058
			(0.012)***	(0.013)***
Mail/Telephone Application	--	--	-0.036	-0.008
			(0.015)**	(0.019)

Tiered Rate: Odd Hour Care	--	--	--	-0.062 (0.019)***
Tiered Rate: Quality Care	--	--	--	-0.027 (0.011)**
Waiver of Co-payment for Families < the FPL	--	--	--	-0.056 (0.018)***
Log-Likelihood	-8,279.028	-7,483.346***	-7,400.628***	-7,378.027***
Number of Observations	18,821	18,821	18,821	18,821
McFadden's R^2	0.251	0.323	0.330	0.332
Percent Correctly Predicted	0.782	0.811	0.816	0.816

Source: Author's calculations from the 2002 NSAF.

Notes: [1] Other work activity includes formal help in obtaining employment and/or enrollment in high school/GED courses, college courses, or a job training program. All models are estimated with region dummies. *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, 1% level, respectively. The asterisk(s) adjacent to the log-likelihood indicate(s) that the additional variables provide statistically significant explanatory power to the model.

TABLE 2.7: Estimated Marginal Effects from the Subsidy Receipt and Take-up Equations

Variable	Receipt Equation		Take-up Equation	
	∂Pr(Receive or Take-up)/∂x (Robust Standard Error)			
Age	-0.003	-0.003	-0.003	-0.003
	(0.001)**	(0.001)**	(0.006)	(0.006)
Age^2 (/100)	0.005	0.004	0.001	0.002
	(0.002)**	(0.002)**	(0.008)	(0.008)
Single, Female-headed HH	0.062	0.061	0.096	0.094
	(0.009)***	(0.009)**	(0.019)***	(0.019)***
Single, Male-headed HH	0.038	0.035	0.051	0.041
	(0.019)**	(0.018)**	(0.050)	(0.043)
Black	0.067	0.068	0.064	0.065
	(0.011)**	(0.011)***	(0.020)***	(0.020)***
Hispanic	0.027	0.024	0.027	0.028
	(0.008)**	(0.008)***	(0.021)	(0.021)
Other	0.011	0.009	0.037	0.033
	(0.013)	(0.013)	(0.043)	(0.041)
Less than High School	0.015	0.016	-0.030	-0.028
	(0.011)	(0.011)	(0.026)	(0.025)
High School/GED	0.027	0.027	0.006	0.007
	(0.007)***	(0.007)***	(0.025)	(0.024)
Some College	0.036	0.035	0.043	0.042
	(0.008)***	(0.008)***	(0.028)	(0.027)
HH Non-wage Income	0.0002	0.0003	-0.001	-0.001
	(0.0003)	(0.0003)	(0.001)	(0.001)
HH Receipt of TANF/FS	0.046	0.046	0.064	0.065
	(0.010)***	(0.010)***	(0.018)***	(0.018)***
Household Size	0.0001	0.00003	-0.014	-0.015
	(0.003)	(0.003)	(0.012)	(0.011)
No. Children Ages 0-5	-0.0009	-0.0008	0.016	0.016
	(0.005)	(0.005)	(0.017)	(0.017)
No. Children Ages 6-17	0.001	0.002	0.017	0.017
	(0.004)	(0.004)	(0.013)	(0.013)
Presence of Child Ages 0-5	0.040	0.040	0.077	0.075
	(0.010)***	(0.010)***	(0.028)***	(0.028)***
Presence of Child Ages 0-5	0.051	0.051	0.090	0.092
and 6-12	(0.011)***	(0.011)***	(0.027)***	(0.027)***
Presence of Other Adult	-0.007	-0.006	0.023	0.026
Ages 55+	(0.010)	(0.010)	(0.045)	(0.045)
U.S. Born	-0.006	-0.006	-0.016	-0.017
	(0.007)	(0.007)	(0.021)	(0.021)
Employed Only	0.045	0.044	0.140	0.144
	(0.006)***	(0.006)***	(0.030)***	(0.028)***
Employed Plus At Least One	0.106	0.105	0.259	0.279
Other Work Activity[1]	(0.022)***	(0.022)***	(0.100)***	(0.099)***
At Least One Other Work	0.014	0.013	0.124	0.143
Activity Only[1]	(0.019)	(0.019)	(0.103)	(0.104)*
TANF Leaver	0.019	0.017	0.028	0.026
	(0.012)*	(0.012)*	(0.026)	(0.025)
State Has a Waiting List	--	-0.020	--	-0.065
		(0.010)**		(0.031)**
Waiver of Co-payment for	--	0.014	--	0.052
Families < the FPL		(0.009)*		(0.027)**
Tiered Rate: Odd Hour Care	--	0.024	--	0.059
		(0.012)**		(0.039)*
Tiered Rate: Quality Care	--	0.000	--	-0.005
		(0.005)		(0.018)
Weekly Reimbursement Rate for	--	0.0001	--	0.0002
an Infant		(0.00004)**		(0.0001)
Use of Media to Distribute	--	0.003	--	-0.018
Information About Subsidies		(0.006)		(0.019)

Use of CCDF Funds to Train Informal Providers	--	-0.011 (0.005)**	--	-0.0003 (0.016)
Relative Providers Subject to Same Regulations	--	-0.014 (0.007)*	--	-0.028 (0.023)
On-going Training Requirement for Staff	--	-0.014 (0.006)*	--	-0.050 (0.020)**
Log-Likelihood	-3,877.840	-3,849.099***	-2,018.954	-2,001.139
Number of Observations	18,807	18,807	5,567	5,567
McFadden's R^2	0.161	0.167	0.109	0.117
Percent Correctly Predicted	0.933	0.933	0.854	0.855

Source: Author's calculations from the 2002 NSAF.

Notes: [1] Other work activity includes formal help in obtaining employment and/or enrollment in high school/GED courses, college courses, or a job training program. All models are estimated with region dummies. *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, 1% level, respectively. The asterisk(s) adjacent to the log-likelihood indicate(s) that the additional variables provide statistically significant explanatory power to the model.

TABLE 2.8: Estimated Marginal Effects from the "Rationing" Equation

	Take-up: No Waiting List	Take-up: Waiting List
	∂Pr(Take-up)/∂x (Robust Standard Error)	
Age	0.006	-0.006
	(0.013)	(0.006)
Age^2 (/100)	-0.012	0.006
	(0.018)	(0.009)
Single, Female-headed HH	0.170	0.067
	(0.044)***	(0.019)***
Single, Male-headed HH	0.237	-0.002
	(0.152)*	(0.033)
Black	0.039	0.071
	(0.039)	(0.023)***
Hispanic	-0.017	0.051
	(0.047)	(0.022)**
Other	0.026	0.037
	(0.078)	(0.048)
Less than High School	-0.065	-0.004
	(0.053)	(0.026)
High School/GED	-0.067	0.042
	(0.045)	(0.027)*
Some College	-0.029	0.075
	(0.045)	(0.031)***
HH Non-wage Income	-0.004	0.0001
	(0.003)	(0.001)
HH Receipt of TANF/FS	0.112	0.046
	(0.033)***	(0.020)**
Household Size	0.014	-0.021
	(0.027)	(0.012)*
No. Children Ages 0-5	-0.010	0.024
	(0.036)	(0.018)
No. Children Ages 6-17	-0.001	0.019
	(0.030)	(0.013)
Presence of Child Ages 0-5	0.054	0.075
	(0.055)	(0.030)***
Presence of Child Ages 0-5 and 6-12	0.048	0.099
	(0.055)	(0.030)***
Presence of Other Adult Ages 55+	0.029	0.032
	(0.100)	(0.044)
U.S. Born	0.029	-0.025
	(0.056)	(0.021)
Employed Only	0.157	0.145
	(0.053)**	(0.027)***
Employed Plus At Least One Other Work Activity[1]	0.304	0.319
	(0.149)**	(0.119)***
At Least One Other Work Activity Only[1]	0.131	0.225
	(0.189)	(0.134)**
TANF Leaver	0.022	0.039
	(0.045)	(0.032)
Waiver of Co-payment for Families < the FPL	0.036	-0.006
	(0.066)	(0.028)
Tiered Rate: Odd Hour Care	0.107	0.098
	(0.081)	(0.204)
Tiered Rate: Quality Care	-0.002	-0.025
	(0.054)	(0.019)
Weekly Reimbursement Rate for an Infant	-0.00005	-0.00003
	(0.001)	(0.001)

Use of Media to Distribute Information	-0.028	-0.025
About Subsidies	(0.040)	(0.022)
Use of CCDF Funds to Train Informal	-0.135	0.052
Providers	(0.051)*	(0.020)***
Relative Providers Subject to Same	-0.092	0.011
Regulations	(0.060)	(0.031)
On-going Training Requirement for	-0.005	0.022
Staff	(0.111)	(0.049)
Log-Likelihood	-574.390	-1,375.558
Number of Observations	1,491	4,076
McFadden's R^2	0.169	0.117
Percent Correctly Predicted	0.844	0.861

Source: Author's calculations from the 2002 NSAF.

Notes: [1] Other work activity includes formal help in obtaining employment and/or enrollment in high school/GED courses, college courses, or a job training program. All models are estimated with region dummies. *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, 1% level, respectively. The asterisk(s) adjacent to the log-likelihood indicate(s) that the additional variables provide statistically significant explanatory power to the model.

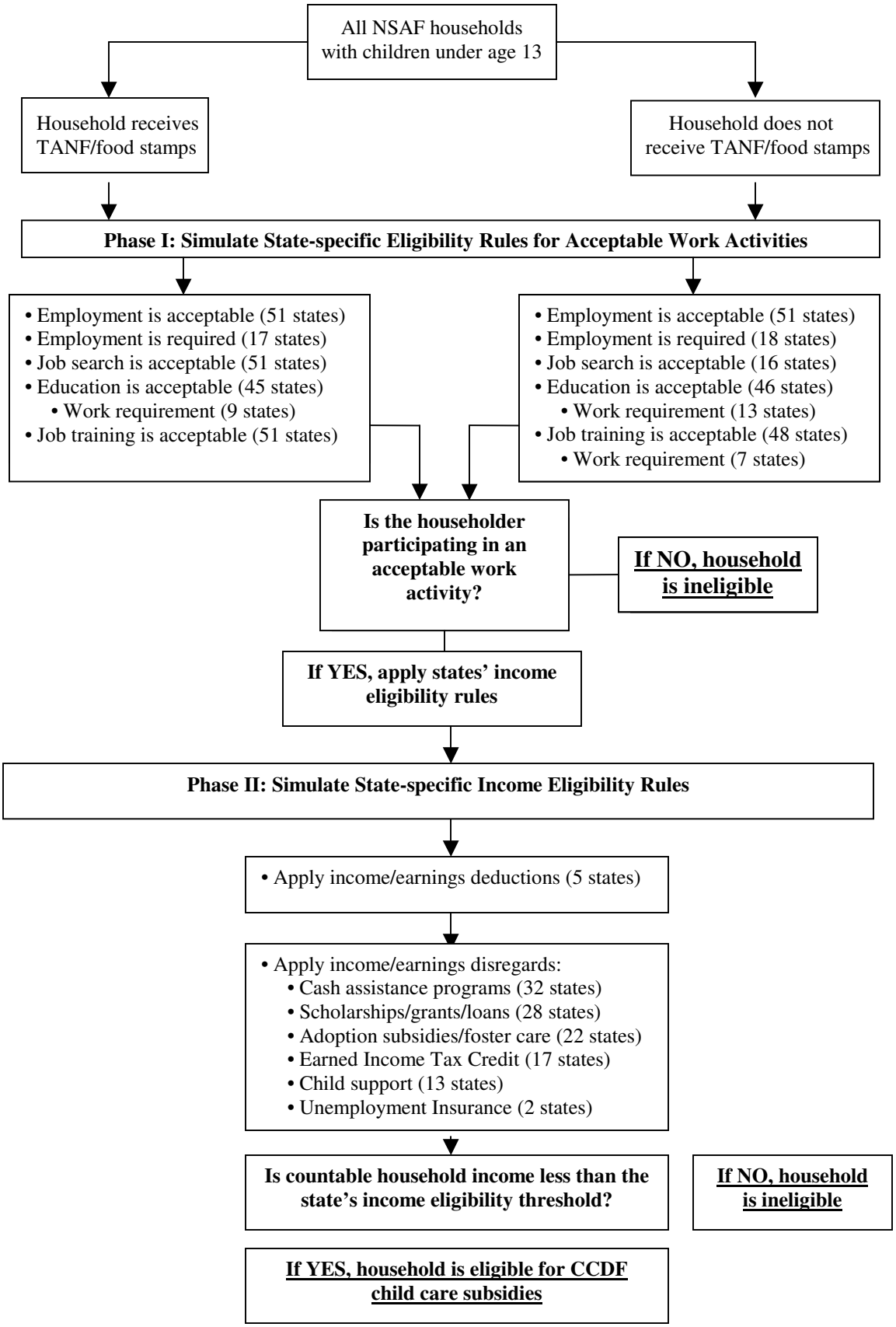
TABLE 2.9: Subsidy Eligibility and Take-up Simulations

Scenario	
Full Sample (Observed Mean: 0.276)	**Pr(Eligible)**
Predicted Mean From Full Model	0.189
Female-headed HH With At Least One Child Ages 0-5	
TANF/Food Stamp Recipient	0.651
Employed Only	0.521
Employed Plus At Least One Other Work Activity[1]	0.902
Other Work Activity Only	0.947
Employed Female-headed HH With At Least One Child Ages 0-5	
With No Other Adult Ages 55+ in HH	0.517
With Other Adult Ages 55+ in HH	0.616
Female-headed HH With At Least One Child Ages 0-5	
Employed and State Does Not Have an Income Exemption	0.472
Employed and State Has an Income Exemption	0.532
TANF/FS Recipient and State Does Not Have a TANF Guarantee	0.585
TANF/FS Recipient and State Has a TANF Guarantee	0.681
Employed/TANF/FS Recipient and State Has Neither Policy	0.753
Employed/TANF/FS Recipient and State Has Both Policies	0.862
Employed Female-headed HH With At Least One Child Ages 0-5	
State Does Not Have a Tiered RR for Odd-hour or Quality Care	0.547
State Has Tiered RR for Odd-hour and Quality Care	0.404
Full Sample (Observed Mean: 0.139)	**Pr(Take-up)**
Predicted Mean From Full Model	0.114
Female-headed HH With At Least One Child Ages 0-5	
TANF/Food Stamp Recipient	0.307
Employed Only	0.314
Employed Plus At Least One Other Work Activity	0.544
Other Work Activity Only	0.426
TANF Leaver	0.269
Employed Female-headed HH With At Least One Child Ages 0-5	
With No Other Adult Ages 55+ in HH	0.313
With Other Adult Ages 55+ in HH	0.360
Female-headed HH With At Least One Child Ages 0-5	
Employed and State Does Not Have a Waiting List	0.399
Employed and State Has a Waiting List	0.285
TANF/FS Recipient and State Does Not Have a Waiting List	0.391
TANF/FS Recipient and State Has a Waiting List	0.278
Employed Female-headed HH With At Least One Child Ages 0-5	
$100 Increase in the Weekly RR for Infants	0.354
State Does Not Have a Tied RR for Odd-hour or Quality Care	0.309
State Has Tiered RR for Odd-hour and Quality Care	0.398
Sub-sample of HH's in States Without a Waiting List	
Employed, Low-skilled Female-headed HH With At Least One Child Ages 0-5	
Employed Only	0.299
Employed Plus At Least One Other Work Activity	0.518
TAN/FS Recipient	0.323
TANF Leaver	0.244
Sub-sample of HH's in States With a Waiting List	
Employed, Low-skilled Female-headed HH With At Least One Child Ages 0-5	
Employed Only	0.351
Employed Plus At Least One Other Work Activity	0.627
TAN/FS Recipient	0.314
TANF Leaver	0.317

Source: Author's calculations from the 2002 NSAF

Notes: Simulations were conducted using the full model from the eligibility and take-up equations. Specifically, the eligibility simulations use coefficients from the fourth column in Table 2.6 (N=18,821), and the take-up simulations use coefficients from the fourth column in Table 2.7 (N=5,567). Simulations for states with and without a waiting list are derived from the models in Table 2.9 (N=4,076 and N=1,491, respectively). Predictions are derived by holding all other variables at their mean values. [1] Other work activity includes formal help in obtaining employment and/or enrollment in high school/GED courses, college courses, or a job training program.

FIGURE 2.1: Simulation of Technical Eligibility for CCDF Child Care Subsidies



CHAPTER 3: THE EFFECTS OF CHILD CARE COSTS AND TAXES ON THE EMPLOYMENT OF SINGLE MOTHERS: EVIDENCE FROM A SIPP-CPS MATCHING PROCEDURE

3.1 Introduction

The 1990s marked a watershed period in the evolution of U.S. social policy. Indeed, significant changes were introduced across a number of policy domains, each with the goal of increasing the incentive for single mothers to reduce welfare dependency and enter the labor force. Additional funding for child care subsidies and the Earned Income Tax Credit (EITC) are among the most prominent vehicles through which the federal and state governments have eased the transition from welfare to work. Expenditures on child care subsidies increased from $168 million in 1990 to $9.4 billion in 2004, owing in large part to the 1996 passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) and the creation of the Child Care and Development Fund (CCDF) (Besharov & Higney, 2006). Similarly, dramatic expansions of the EITC in 1990 and 1993 increased funding from $10.5 billion to $33.8 billion over the same period (Green Book, 2004). With annual expenditures exceeding those of the Temporary Assistance to Needy Families (TANF) program, the EITC is now the single largest antipoverty program in the U.S. and the fastest growing item in the federal budget.

Concurrent with these policy changes has been the explosion in employment among single mothers and a rapid decline in the welfare rolls. Specifically, between 1990 and 2004, the employment rate for single women with children (ages 0-12) increased from 68.9 percent to 76.6 percent, peaking at 81.7 percent in 2000. Conversely, after reaching 5.0 million families in 1994, welfare caseloads declined to approximately 2.2 million, its lowest level in 30 years. Welfare participation rates among

single mothers fell over 40 percentage points throughout the decade, from 58 percent to 15 percent.

Given the recent changes to child care and tax policy, a growing empirical literature has attempted to estimate their causal effects on the employment of single mothers. Isolating these policies is a difficult task for several reasons. First, at the same time that reforms to child care and tax policies were implemented, other changes occurred that created similar incentives for single mothers to work. States began experimenting with welfare reforms in the early 1990s that ultimately became the basis for the 1996 PRWORA. Distilling the effects of welfare reform has been challenging in and of itself because states often made many changes simultaneously. In addition, the strong economy throughout the 1990s increased real earnings for low-skilled workers for the first time in nearly two decades, providing an unambiguous incentive to leave welfare for work. Second, although a substantial literature examines the labor supply effects of child care prices and taxes separately, to date no study has done so within a modeling framework that accounts for both factors simultaneously. Given that previous research demonstrates the importance of prices and taxes for single mothers, excluding one of these factors might lead to an omitted variables problem.

However, estimating child care prices and taxes is complicated because these variables are endogenous to the work decision and are observed only among employed single mothers. Therefore, a large number of supporting equations must be specified in order to handle these issues. A further complication arises from the fact that nationally representative surveys either do not collect data on child care expenditures (Current Population Survey, CPS) or do not contain large samples of single mothers (Survey of

Income and Program Participation, SIPP). The limited availability of child care data for low-income populations creates challenges for exploiting cross-state and year-to-year changes in child care and other policies, leaving most studies in the literature with a single cross-section of data and a small number of policy and economic controls.

Accordingly, this chapter makes a number of important contributions. First, I join together empirical techniques from previous child care and EITC studies to simultaneously estimate the effects of prices and taxes on the labor supply of single mothers. A unique dataset is created by merging child care expenditure data from multiple panels of the SIPP with demographic and economic data from the 1990 to 2004 March CPS. This is accomplished by first constructing SIPP and CPS samples in an identical manner and then creating an imputation procedure that assigns a potential child care expenditure to single mothers in the CPS. These data are supplemented by detailed state-level information on welfare policies as well as child care regulations, wages, and labor supply. The construction of a rich dataset over a significant time period allows for a more rigorous test of the effect of child care prices and taxes than previous work.

The creation of explicit measures for child care expenditures and net-wages over a 15-year period allows me to examine a previously unexplored issue: whether, and to what extent, the responsiveness of single mothers to child care prices and taxes changed throughout the 1990s. Specifically, I compare the labor supply response to prices and taxes across one- and multiple-child families before and after major federal expansions of child care subsidies and the EITC. The intuition for such a model stems from the fact that child care subsidies and the EITC became increasingly generous toward multiple-child families over the study period, especially after the passage of PRWORA in 1996

and OBRA in 1993. Therefore, one might expect these single mothers to become comparatively *less* sensitive to child care expenditures and *more* sensitive to net-of-taxes wages. Such findings would strengthen the conclusion that child care subsidies and the EITC have the hypothesized effects. My approach, moreover, represents a significant improvement over previous research, in which policy effects are simply inferred by the differential employment growth of multiple-child families.

A third contribution of this chapter is to compare the simulated effect of expansions to subsidies and the EITC. Policy simulations in previous child care studies are severely flawed because they focus on the employment-effects of linear, universal subsidy programs when in fact states' CCDF regimes are non-linear, means-tested programs. None of the EITC studies conduct explicit employment simulations on single mothers. My policy simulations therefore expand previous work by examining plausible benefit schedules and focusing on populations for whom child care subsidies and the EITC likely have the greatest influence.

Finally, this study employs a new methodology to account for the endogeneity of child care expenditures by using a tri-variate sample selection framework estimated via simulated maximum likelihood. A three-equation sample selection procedure more accurately reflects not only the decision-making process that leads researchers to observe child care costs for some mothers, but also the censoring in the SIPP survey design. Furthermore, given that previous child care studies neglect careful specification checks, I assess the robustness of price-effects by comparing estimates from tri-variate and bi-variate sample selection models with those that do not assume selection bias, and by

drawing upon characteristics of states' child care regulations and labor markets for alternative exclusion restrictions.

Estimates from the main employment model suggest that the labor supply of single mothers is indeed sensitive to child care costs and taxes. I find that a one percent increase in costs and net-wages are associated with a 5.4 percentage point decrease and a seven-percentage point increase in employment, respectively. These translate to an elasticity of employment (last year) with respect to child care expenditures of -0.174 and an elasticity of employment with respect to net-of-taxes wages of 0.711. One of the central implications of this finding is that child care price-effects are considerably smaller than what is commonly found in the literature, whereas the tax-effects are solidly within the range of previous estimates. Most child care studies find price elasticities in the range –0.45 to –0.75, while previous EITC work estimates elasticities in the range 0.59 to 1.16. In addition, I find low-skilled single mothers and those with young children are moderately more responsive to child care prices and the returns to work. These main results are corroborated by my alternative modeling strategy: single mothers with multiple children became comparatively less sensitive to child care prices and more sensitive to net-wages over the study period, especially after expansions to child care subsidies and the EITC were enacted. Robustness tests indicate that child care price-effects are not sensitive to tri-variate versus bi-variate sample selection procedures, nor are the estimates particularly sensitive to the identifying instruments in the expenditure equation. However, estimated price-effects appear to be very sensitive to the use of repeated cross-sectional data and the inclusion of additional policy controls. Finally,

policy simulations imply that a system of generous, targeted work supports generate more employment than one that provides limited, universal assistance.

The remainder of this chapter is organized as follows. Section 3.2 provides an overview of the policy changes between 1990 and 2004 that have implications for single mothers' work incentives. It also reviews the relevant empirical literature across each policy domain. Section 3.3 introduces the data and empirical strategy, discusses the construction of key policy variables, and provides a brief description of the theoretical effects of each policy variable. Section 3.4 presents results from several employment models and conducts a number of policy simulations. Finally, conclusions and policy implications are discussed in Section 3.5.

3.2 Review of Policy Changes and Relevant Literature

In this section, I describe the primary child care, tax, and welfare policies with implications for the employment of single mothers. Across each policy domain, I first highlight important federal and state legislation enacted between 1990 and 2005 (shown in Figure 3.1), followed by a discussion of how each policy altered labor supply incentives for single mothers (shown in Table 3.1). Finally, I summarize previous empirical work on child prices, taxes, and welfare policy.

Child Care Subsidy Policy

Throughout the early-1990s, the federal government operated four major child care assistance programs aimed at low-income families. The 1988 Family Support Act created the first federal child care entitlements through Aid to Families with Dependent Children Child Care (AFDC-CC) and Transitional Child Care (TCC). The AFDC-CC program guaranteed child care benefits so that welfare recipients could participate in the

Job Opportunities and Basic Skills Training program, which enrolled able-bodied individuals into employment and job training activities. The TCC subsidized child care costs for families that lost AFDC eligibility because of employment or earnings growth. This program partially offset child care costs for up to 12 months after leaving welfare. Child care subsidy policy was expanded once again in 1990 with the passage of the Omnibus Budget Reconciliation Act (OBRA90). It created the landmark Child Care and Development Block Grant and the At-Risk Child Care program, which aimed to increase quality and serve low-income families disassociated with the welfare system.

Recognition of the employment barriers posed by child care costs took center stage with the passage of PRWORA in 1996. This legislation eliminated the legal entitlement to cash welfare and child care assistance and consolidated existing funding streams into a single Child Care and Development Fund (CCDF). One of the key features of the CCDF is that subsidy recipients must be engaged in a state-defined "acceptable" work activity. In addition, states can serve a broad population of non-TANF families, and are given significant latitude in the design of their subsidy regimes. Overall, PRWORA allocated $21 billion for child care assistance over a seven year period, 70 percent of which must be used to subsidized costs for families receiving TANF or transitioning from welfare to work (Greenberg, Lombardi, & Schumacher, 2000).[46]

Table 3.1 outlines the effects of changes to child care subsidy policy throughout the 1990s. Expenditures on the programs that eventually became the CCDF grew steadily in the period 1990 to 1996, but exploded after the passage of welfare reform. By 2004, approximately $9.4 billion was spent on child care subsidies through the CCDF,

[46] Eligibility for CCDF subsidies is set at 85 percent of a state's median income (SMI), although states are able to establish a lower ceiling. States are given substantial flexibility in designing their subsidy systems, including being able to transfer up to 30 percent of their TANF block grant to the CCDF, setting reimbursement and co-payment rates, and defining acceptable work activities.

compared to $168 million in 1990. This led to a steep rise in the number of subsidy dollars available per child under age 5, the age group targeted by child care assistance programs. Consistent enrollment data prior to 1995 cannot be computed, but the available evidence shows a moderate increase in the (monthly) number of children served by CCDF subsidies: from 1.4 million in 1995 to 1.7 million in 2004. The 1990s, moreover, witnessed equally important changes in the broader child care market. Demand for nonparental child care services rose during this period largely in response to increasing employment among women with children. However, private child care wages, which are a good proxy for prices, remained basically unchanged.[47] That wage growth was flat in the face of increased demand suggests that the demand for child care labor is highly elastic (Blau, 1993; 2001). This appears to be corroborated by the data in Table 3.1: whereas private child care earnings (in an average state) increased 25 percent between 1990 and 2004, the private child care workforce grew 83 percent.

A large body of research examines the relationship between child care costs and women's work decisions. Non-experimental evidence comes from two primary sources: studies on price effects and studies of actual subsidy programs. The review herein focuses on the former type, given its relevance to this study.[48] The most common methodological approach to examining price effects includes a discrete choice participation probit with predicted child care costs and wages as the key right-hand-side variables. Both measures are derived from OLS models that control for sample selection bias on employment and the decision to pay for child care (expenditures only). This

[47] The production of child care is a very labor intensive process, accounting for nearly 70 percent of the price of child care (Helburn, 1995).

[48] Labor supply studies of subsidy programs include Berger and Black (1992), Gelbach (2002), Meyers Heintz, and Wolf (2002), Blau and Tekin (forthcoming), and Tekin (2004a; 2004b). Every study finds that receipt of a child care subsidy increases substantially the probability of employment. Two studies investigate the labor supply effects of the Dependent Care Tax Credit (DCTC) (Averett, Peters, & Waldman, 1997; Michalopoulos, Robins, & Garfinkel, 1992). The former study finds an elasticity of hours worked of -0.78, while the latter estimates elasticities of essentially zero.

basic approach is quite common in the literature, and the results are surprisingly uniform (Baum, 2002; Blau & Robbins, 1991; Ribar, 1992, Connelly & Kimmel, 2001; 2002; 2003; Kimmel, 1995, U.S. GAO, 1994; Connelly, 1992; Han & Waldfogel, 2001; Anderson & Levine, 2000). Although nearly every study finds a negative relationship between child care costs and mothers' labor supply, the range of elasticities is large (from 0.06 to -1.36). However, there appears to be a recent convergence of estimates centering on -0.40.

Federal and State Tax Policy

Arguably the most important change to work incentives faced by single mothers comes from the EITC.[49] Enacted in 1975 as part of the Tax Reduction Act (TRA), expenditures on the EITC increased dramatically throughout the 1990s. By 2003, foregone revenue due to the credit totaled $33.8 billion, up from $10.5 billion in 1990. Claimant families also grew steadily during this period, from 12.5 million to 19.3 million. Single-parent families comprise 48 percent of all claimants, and 76 percent of EITC dollars go to these families (Liebman, 1999; Green Book, 2004).

The EITC received three major expansions, but this discussion focuses on those occurring during the 1990s.[50] With the passage of the 1990 Omnibus Budget Reconciliation Act, a second benefit schedule was created for families with two or more children. The phase-in rate was set initially at 17.3 percent of earnings up to $7,140, for a maximum credit of $1,235. Families with one child received a wage subsidy of 16.7

[49] The EITC introduces a complicated set of labor supply incentives for low-income workers. Because the program comprises three credit regions, it is useful to think of it as three separate programs. The first region is called the phase-in range, which, due to its negative marginal tax rate, operates like a wage subsidy by increasing workers' net-of-taxes wages. The plateau range, where the credit rate is zero for each additional dollar earned, acts like a lump sum transfer. Finally, the phase-out range is essentially a negative income tax because of the way it gradually phases out benefits as earnings rise.

[50] The first expansion came with the passage of the 1986 Tax Reform Act (TRA86). This legislation indexed the EITC for inflation, increased the phase-in rate, and decreased the phase-out rate.

percent over the identical earnings range, thereby yielding a maximum credit of $1,192. A third expansion to the EITC occurred through the 1993 Omnibus Budget Reconciliation Act (OBRA93). This legislation increased the differential phase-in rate and maximum credit for one- versus two- (or more) child families. By 1996, when the changes were fully phased in, families with one child received a wage subsidy of 34 percent, while families with two or more children received a subsidy of 40 percent. The maximum credit available to both families was, respectively, $2,152 and $3,556.

President Bush's Economic Growth and Tax Relief Reconciliation Act of 2001 and the Jobs and Growth Tax Relief Reconciliation Act of 2003 introduced several potentially important changes for single mothers. It lowered the bottom tax bracket to 10 percent (from 15 percent) and expanded the Child Tax Credit (CTC). Enacted in 1997, the CTC originally provided a $500 credit to families with children under age 17. The program was of limited value to low-income families because it was non-refundable. However, the 2001 and 2003 tax leglislation increased the credit to $1,000 per eligible child and made it partially refundable.[51] The cumulative effects of these expansions made the CTC the single largest cash assistance program aimed at children (Burman & Wheaton, 2005).

State-level tax policy was also altered in substantial ways throughout the 1990s. Specifically, the introduction and proliferation of state EITC's further eased the tax burden for single mothers. By 2004 18 states developed an EITC—compared to seven in 1994—13 of which make it refundable like the federal credit. These credits simply "piggyback" onto the federal EITC by using its eligibility rules and computing credits as

[51] For a single mother with three children, for example, the credit phases in at a rate of 15 percent between $11,000 and $31,000, after which the full credit is available until earnings reach $75,000.

a percentage of its benefits.[52] Annual foregone revenue from state EITC's ranges from $17 million in Vermont to $591 million in New York (Nagle & Johnson, 2006).

The cumulative effects of changes to federal and state tax policy over the 1990s are summarized in Table 3.1. Two of the most important developments are the decrease in the bottom income MTR and the increase in the federal EITC's phase-in rate and maximum credit. The income tax liability for the average single mother with one child fell $928 between 1990 and 2004. A single mother with two or more children experienced a decline of $2,034. Overall the amount of income taxes paid by the average single mother in 2004 was 160 percent less than the amount paid in 1990. Most of the decline can be attributed to the decreased federal MTR, the 1993 federal EITC expansion, and the proliferation of state EITCs.

A growing body of research evaluates the labor supply effects of the EITC. A majority of this work focuses on analyzing major changes to the EITC embedded in tax laws (Ellwood, 2000; Hotz, Mullin & Scholz, 2005; Eissa & Liebman, 1996; Meyer & Rosenbaum, 1999; 2000; 2001) or geographic disparities in the generosity of state EITC's (Cancian & Levinson, 2005). The basis for this approach is to observe participation rates for a sample of individuals most likely affected by an EITC expansion before and after passage of the law, relative to changes in a comparison group. Results from these studies as a whole find strong, positive effects of EITC expansions on the labor supply of single mothers. Another set of studies use a structural approach, drawing on economic theory to suggest parameterizations of policy and budget constraint variables that enter the work decision. Most of this research focuses on estimating

[52] Wisconsin's EITC provides a striking example. Introduced in 1995, the Wisconsin EITC supplements the federal credit by 4 percent for families with one child, 14 percent for families with two children, and 43 percent for families with three or more children. This translates to a maximum credit that is $1,107 larger for Wisconsin's two-child families and $1,641 larger for three-child families (Cancian & Levinson, 2006).

employment models at the extensive margin (Looney, 2005; Meyer & Rosenbaum, 1999; 2001; Grogger, 2003; 2004, Neumark & Wascher, 2000), while others concentrate on the intensive margin (Dickert, Houser, & Scholz, 1995; Hoffman & Seidman, 1990; Keane, 1995; Keane & Moffitt, 1998). Results from these studies find elasticities of employment with respect to the return to work in the range 0.59 to 1.16. Policy simulations suggest that the EITC accounts for one-third of the employment increase among single mothers throughout the 1990s (Meyer & Rosenbaum, 2001; Grogger, 2004).

Welfare Policy

The final set of policy changes deals with those made to the primary cash assistance program in the U.S., Aid to Families with Dependent Children (AFDC). Enacted as part of the Social Security Act of 1935, AFDC was originally intended to provide financial assistance to widowed mothers and their children. Over time, however, growing caseloads and expenditures coupled with low employment rates among women receiving AFDC led to concerns that the program created strong work disincentives. These concerns prompted calls from across the political spectrum that AFDC required a significant overhaul. Precursors to this overhaul came from the flurry of state welfare wavier programs enacted throughout the early-1990s.[53]

Several important reforms grew out of this period. This discussion focuses on two that are of particular importance for this analysis. First, many states experimented with changes to their earnings disregards when computing benefits for employed recipients. Under AFDC states exempted the first $30 of earnings and 33 percent of the

[53] Section 1115 of the Social Security Act stated that the Secretary of Health and Human Services (HHS) could under certain conditions waive the rules for AFDC. This would allow states to experiment with alternative approaches to running their welfare regimes. Prior to the 1990's such waivers were not sought out. By 1992, however, 30 waivers from 26 states were approved; another 83 waivers from 43 states were approved during the first term of the Clinton administration. On the eve of welfare reform, all but five states were given approval for at least one welfare waiver.

remainder when calculating monthly benefits. Benefits would therefore be reduced at a rate of 67 percent for each additional dollar earned, leading many to argue that such high implicit tax rates would increase the incentive to remain out of work. Therefore, by 1996, 18 states implemented changes that increased the initial exemption and lowered the benefit phase-out rate.[54] The second set of waivers came from placing time limits on the receipt of welfare. Beginning in 1993, 15 states implemented policies that limited the amount of time a mother could receive cash assistance. These time limits ranged from 21 months in Connecticut to 60 months in Hawaii, after which either the adult portion or the entire family grant was terminated (other states enacted work requirements).

With most states already experimenting with AFDC reforms, the stage was set for the passage of PRWORA in 1996. This law repealed the AFDC program, replacing it with the Temporary Assistance for Needy Families (TANF), and eliminated the legal entitlement to cash assistance. A central change embodied by the TANF program is its "work first" philosophy. States are required to move welfare recipients into work (or other work-related activities) within two years of benefit receipt, but 20 states have chosen to enforce the work requirement immediately. Families that fail to comply with work requirements face either a partial or full-family benefit sanction. By 1996 nine states imposed full-family sanctions, rising to 30 states in 1998 (and beyond). Finally, the legislation places a 60-month lifetime time limit on welfare receipt, although states are allowed to establish stricter limits.

Table 3.1 provides a summary of the effects of changes to federal and state welfare policy throughout the 1990s. The maximum welfare benefit available to

[54] In some cases, these changes were dramatic. Connecticut, for example, disregarded 100 percent of earnings up to the poverty line. Others, like Illinois, disregarded a flat percentage of all earnings (67 percent).

unemployed families fell 25 percent (in real dollars) between 1990 and 2004, with states experiencing declines as large as 32 percent in the period after welfare reform. Single mothers were also increasingly exposed to states' waiver programs. By 1996, fully 61 percent of single mothers lived in states that implemented at least one statewide welfare reform, while 25 percent lived in a state that implemented a time limit. Along with these policy "sticks" states also provided a number of "carrots." Raising the generosity of earnings disregards became the main vehicle for doing so, as seen in Table 3.1. Employed single mothers in 1990 could expect the first $6,254 (or 34 percent) of earnings to be exempt when calculating benefits. By 2004, the average amount of disregarded earnings increased to $13,129 (or 67 percent of earnings).

There is surprisingly little research on the labor supply effects of welfare reform policy. Of the eight studies completed, two focus exclusively on evaluating waiver-based reforms (Meyer & Rosenbaum, 2001; Moffitt, 1999), while the remainder includes a combination of pre- and post-PRWORA data (Fang & Keane, 2005; Looney, 2005; Grogger, 2003; Kaushal & Kaestner, 2001; O'Neill & Hill, 2001; Schoeni & Blank, 2000). There is, in addition, substantial variation in the types of reforms studied. Five estimate the effects of "any waiver" or "any statewide reform," finding employment-effects in the range of essentially zero to 11 percentage points. Other studies evaluate the effects of specific reforms. Two studies investigate states' earnings disregards, with one finding that a $1,000 increase in welfare benefits for employed recipients is associated with a 5.7 percentage point increase in employment. Another four studies look at time limits, reporting employment-effects in the range of 2.3 to 15.8 percentage points.

3.3 Empirical Implementation

The forthcoming discussion introduces the primary data sources used in the analysis, and then describes the process by which child care expenditure data from the SIPP are merged with demographic and labor market information from the CPS. Next, I discuss the two main modeling strategies. The first approach estimates the effects of child care expenditures, net-of-taxes wages, welfare policies, and macro-economic conditions on the employment of single mothers over the period 1990 to 2004. The second approach exploits policy variation in the treatment of one- and multiple-child families to explore whether single mothers became more or less responsive to child care prices and taxes throughout the 1990s. I then describe the construction of key policy variables. I focus on adjustments to child care expenditures and net-of-taxes wages because, as previously mentioned, both variables are endogenous to the work decision and therefore require a number of supporting equations. Finally, I end with a brief discussion of the theoretical effect of each policy variable on the employment of single mothers.

Data Sources and SIPP-CPS Matching Procedure

Data for this research are drawn from multiple sources, principally the March Current Population Survey (CPS) and the Survey of Income and Program Participation. The CPS is a nationally representative survey of approximately 60,000 households, providing detailed data on labor market behavior, income, and demographic characteristics for individuals ages 15 and over. March CPS surveys for years 1991 to 2005 are used, yielding information on employment and income for the years 1990 to 2004. I include in the sample single women (widowed, separated, divorced, and never

married) ages 21 to 64, who have at least one child ages 12 or under. The sample is limited to children in this age range because it is the one most relevant to simultaneous eligibility for child care subsidies, the EITC, and welfare. Single mothers from census-defined families comprise the unit of analysis. I include not only independent female-headed families (primary families), but also female heads of related sub-families and (unrelated) secondary families. Defining families in this manner provides the closest match to a tax-filing unit, which is crucial for determining eligibility for the EITC and other means-tested programs. After applying a number of standard exclusions on the sample composition, the final analysis sample consists of 74,043 single mothers with at least one child ages 0 to 12.[55]

Table 3.2 presents summary statistics for selected years of the CPS sample. The human capital and demographic variables include age, educational attainment, race, marital status, non-wage income, and the presence and number of children in various age groups. A few observations about the data are worth making. First, the average skill level of single mothers increased during the observation period, as evidenced by the upward shift in educational attainment. Specifically, the fraction of single mothers with some college experience increased nearly 10 percentage points throughout the 1990s. Second, marital behavior within the population of single mothers changed dramatically. Never married mothers comprised about 41 percent of all single mothers in the early-1990s, but their representation grew to 51 percent by 2004. This increase was offset by reductions in the number of separated and divorced mothers.[56]

[55] Exclusions to the sample include women in the armed services; women with negative earnings, negative non-labor income, positive earnings but zero hours of work, or positive hours of work but zero earnings; and women with hourly wages over $150. Also, approximately one-fourth of single mothers appear in the sample for two consecutive years, given the CPS structure.

[56] The changes in composition might be indicative of a larger issue. Grogger (2003) notes that constraining a sample to only single mothers in the context of studying the effects of welfare and tax policies could lead to a type of sample selection bias. Such policies

A major drawback of the CPS is that it does not collect data on child care costs. Therefore, I must draw from various panels of the SIPP to impute child care expenditures for the CPS sample. The SIPP comprises a series of national panels, with sample sizes ranging from approximately 14,000 to 37,000 households.[57] Although the majority of SIPP survey content focuses on a "core" of labor force, program participation, and income questions, the survey is supplemented by several "topical" modules, one of which covers child care. A typical child care module collects data on all child care arrangements for children under age 15. Detailed information is ascertained on the type of child care used, the number of hours per week a child spends in care, and the cost associated with purchasing it.

Since the SIPP collects much of the same information as the CPS, it is possible to define both samples in exactly the same manner.[58] A critical step in this process is to achieve a close temporal match between the collection of SIPP child care data and CPS labor market and earnings data.[59] Fortunately, the SIPP introduces a child care module at several points throughout the sampling period. Specifically, I draw from the 1990, 1991, 1992, 1993, 1996 (Waves 4 and 10), and 2001 panels to conduct the match in the following manner:

---

have altered marriage and fertility incentives, leaving the population of female heads after the policy changes to appear significantly less employable. Of course, this assumes that success in the marriage and labor markets are positively correlated, but if they are, it could lead to conservative estimates of the effects of EITC and welfare policies on labor supply.

[57] The duration of each panel ranges from 2.5 to four years. Households included in a given panel are divided into four rotation groups, each of which is interviewed in successive months. The four-month period required to interview each rotation group is called a wave.

[58] Appendix 3.1 presents summary statistics for the employment, demographic, and child care characteristics of the SIPP sample of single mothers.

[59] Obtaining a close temporal match between the datasets is justified because the structure of child care prices likely changed in important ways over the sampling period. First, employment growth among single mothers lead to an increase in the demand for and supply of child care. A by-product of increased demand for child care services is the growing demand for child care labor, which accounts for 70 percent of child care prices (Helburn, 1995). Finally, public policies aimed at lowering costs and increasing quality have also contributed to a changing price structure.

SIPP Panel/Wave for the Child Care Module	Calendar Months to Which the SIPP Child Care Data Apply	CPS "Data" Year(s) Matched to the SIPP Child Care Expenditure Data
1990 Panel, Wave 3	9/90 – 12/90	1990
1991 Panel, Wave 3	9/91 – 12/91	1991, 1992
Overlapping 1992 Panel, Wave 6 and 1993 Panel, Wave 3	9/93 – 12/93	1993, 1994
1993 Panel, Wave 9	9/95 – 12/95	1995, 1996
1996 Panel, Wave 4	3/97 – 6/97	1997, 1998
1996 Panel, Wave 10	3/99 – 6/99	1999, 2000, 2001
2001 Panel, Wave 4	1/02 – 4/02	2002, 2003, 2004

For example, characteristics of single mothers from SIPP's 1990 panel (wave 3) are used to assign child care expenditures to a similarly constructed sample of single mothers in the 1990 CPS. Since the child care module is not implemented every year, there are several years during the study period that a single wave of child care data is applied to multiple years of CPS data. This is particularly the case during the latter part of the study period, when SIPP child care modules were not carried out as frequently. After both samples are created, I estimate a separate OLS child care expenditure equation for each SIPP child care module, yielding a total of seven equations. I do so to allow for shifts in the price structure over the study period. Variables included in this model are age, educational attainment, race, non-wage income, the number of children in various age groups, urban residence, and southern residence. I also include measures of states' child care regulatory environment, private child care wages, and the number of private child care establishments. Parameter estimates associated with each variable are then applied to the corresponding attribute in the appropriate CPS sample. It is important to note that SIPP child care data are observed only if a single mother is employed and paying for child care. To predict child care expenditures for all single mothers, as is my goal for the

CPS, several supporting equations must be estimated prior to the expenditure model. I describe this process in a forthcoming section.

Estimating the Model

The Main Employment Equation. I now describe the primary modeling strategy. Using CPS data over the period 1990-2004, I examine the effects of child care prices and taxes, along with changes to welfare policy and the economy, on the employment decisions of single mothers. Therefore, I estimate a discrete choice participation equation that uses parameterizations of budget constraint, policy, and economic variables thought to influence the relative utility from employment. The primary right-hand-side variables in this model are hourly child care expenditures and net-of-taxes hourly wages, both of which are endogenous to the work decision. Stated formally, the estimated employment probit is:

$$[3.1] \quad \Pr[emp_{ist} = 1 \mid \mathrm{x}] = \Phi\{\alpha + \beta_1 \mathrm{E}[\ln E_{ist}^*] + \beta_2 \mathrm{E}[\ln w_{ist}^*(1-\tau)] + \mathbf{P}_{ist}'\gamma + \mathbf{X}_{ist}'\theta + \varepsilon_{ist}\}$$

for $i = 1, \ldots, N_{si}$; $s = 1, \ldots, S$; $t = 1, \ldots, N$, where *emp* is the employment status for the i^{th} mother in state s at time t. The variables $\ln E^*$ and $\ln w^*(1-\tau)$ are, respectively, the natural logarithms of predicted hourly child care expenditures and net-of-taxes wages. Recall that child care expenditures are imputed from the SIPP using the procedure described above. The $\mathbf{P}'$ is a vector of policy and economic controls. Included here are states' maximum AFDC/TANF benefits available to a family of three; a dummy variable that equals one for all state-years after the initial implementation of any statewide waiver or welfare reform; a dummy variable that equals one for all state-years after the

implementation of a time limit[60]; the predicted amount of disregarded earnings when calculating welfare benefits for employed single mothers; the AFDC/TANF participation rate for female-headed families; and the unemployment rate.[61] Child care expenditures, net-wages, and disregarded earnings are allowed to vary across women, state of residence, and year, while the remaining policies vary across state-year cells. The $\mathbf{X}'$ is a vector of human capital and demographic controls, including age (and age-squared), education, marital status, race, non-wage income, and the presence and number of children in various age groups. I also include a number of controls for sources of unobserved heterogeneity.[62] State fixed-effects capture state-specific, time-invariant determinants of child care, tax, and welfare policy that are also related to the work decision. A set of year dummy variables is also included to net out time-varying factors affecting all states. Finally, I control for national and state-specific time-varying unobservables by experimenting with both general and state-specific linear time trends.

Identification of policy-effects is achieved through a number of channels. Single mothers face different child care price structures and tax rates depending on the state of residence and sample year. These *individual* sources of variation are further exploited by the timing and intensity of federal and state changes to child care and tax policy. Recall that the sampling period covers the creation of two large child care subsidy programs in the early-1990s and major shift in child care policy in 1996. These policy changes,

[60] As expected, the welfare reform dummy variables are highly correlated because states often made many changes simultaneously. But a multicolinearity problem should be mitigated by the fact that I interact the time limit variable with the age of the mother.
[61] Appendix 3.2 provides a detailed description of how the key policy variables are constructed and the theoretical effect of each on the employment of single mothers.
[62] Policy endogeneity (a manifestation of unobserved heterogeneity) is a concern for all evaluations of public policies. Grogger's (2003) explicit discussion is quite helpful in highlighting the problem. Simply stated, policy endogeneity occurs when unobserved attributes of states' single mothers are correlated with both the timing (and intensity) of policy changes *and* the propensity for employment. Another manifestation occurs when the effects of policies cannot be distinguished from other factors, such as the unemployment rate, because the onset of policy changes co-occurs with trends in economic conditions. Nearly every study in the literature deals with this issue through use of state fixed-effects, year dummies, and state-specific time trends. I do the same in this chapter.

coupled with the evolution of the child care market (shown in Table 3.1), have produced significant interstate and temporal variation in child care markets with which to identify child care-price effects. The federal and state tax structures have undergone similar dramatic changes over the sampling period. The creation and expansion of a separate EITC schedule for families with two (or more) children allows me to compare families of different sizes over time. Furthermore, a reduction of the bottom MTR and the growing generosity of the CTC provide additional identifying variation. Proliferation of state EITCs allows me to compare the tax treatment of single mothers across states and over time. Finally, for the welfare variables, I rely on the gradual phasing-in and increased intensity of states' welfare reform efforts throughout the early-1990s, culminating in a major shift in federal welfare policy through the 1996 PRWORA.

Alternative Specifications. In alternative specifications, I make more explicit use of the differential policy treatment of families with different numbers of children. Specifically, I estimate a number of models that include three-way interactions between the child care expenditure (and wage) variables, a dummy variable that equals one if the family has two or more children ages 0 to 18, and the set of year dummies. Stated formally, the employment probit is given by:

$$[3.2]\quad \Pr[emp_{ist} = 1 \mid x] = \Phi\{\alpha + \beta_1 E[\ln E_{ist}] + \beta_2[kids_{ist}] + \boldsymbol{year}_t'\beta_t + \varphi_t[E(\ln E_{ist}) * kids_{ist} * year_t] + \mathbf{P}_{ist}'\gamma + \mathbf{X}_{ist}'\theta + \varepsilon_{ist}\},$$

where ln$E$ is the mother's predicted child care expenditure, *kids* is the dummy variable for two or more children, *year* is a dummy variable for year t, and [ln$E$ ∗ *kids* ∗ *year*] is the three-way interaction. The identical model is estimated for wages, substituting ln$w$(1-

τ) for child care expenditures on the right-hand-side.[63] I omit the year dummy for 1997—the first year of PRWORA's implementation—in the model with child care expenditures, thereby treating it as the comparison year. Therefore, the coefficient on the three-way interaction, φ, should be interpreted as the differential employment-effect of child care expenditures for families with two (or more) children in year *t*, relative to 1997. Omitted from the model for wages is the 1993 dummy—representing the tax year before the differential acceleration of EITC benefits for families with two (or more) children. In this case, the coefficient on the interaction term is interpreted as the differential sensitivity to net-wages among multiple-child families in year *t*, relative to 1993. The intuition for these models stems from the fact that child care subsidies and the EITC became increasingly generous toward multiple-child families over the study period (particularly after the passage of PRWORA96 and OBRA93).[64] Therefore, one should expect such families to become *less* sensitive to child care expenditures and *more* sensitive to the returns to work.

Construction of Key Policy Variables

Procedure for Adjusting Child Care Expenditures. Recall that one of the drawbacks of the CPS is that child care data are not collected. I therefore use the SIPP to impute child care expenditures for similar samples in the CPS. As previously mentioned, a number of adjustments are made to child care expenditures ($\ln E^*$) before estimating the employment models. These adjustments are required for several reasons. First, idiosyncrasies in the SIPP survey design coupled with the underlying decision-making

[63] In addition to estimating this model separately for child care expenditures and net-taxes, I experimented with including both sets of interactions at the same time. The results were very similar.

[64] The differential generosity of the EITC toward multiple-child families is well-known. However, a number of states now treat such families differently with respect to child care subsidies. Maryland provides an example. Subsidy co-payments are highest for the youngest child in a given family, slightly lower for the second and third children, and do not exist for four or more children.

process of single mothers leads researchers to observe child care expenditures if the following conditions are met: the mother is employed, using a SIPP-defined source of paid child care, and paying for that care. It is therefore necessary to assign a potential child care expenditure to mothers with missing data, because the cost structure faced by working mothers may not reflect that of non-working mothers had they been employed. In other words, the single mothers for whom these data are non-missing are likely a self-selected group. Second, child care expenditures are endogenous in the presence of unobserved factors related to the work decision. Unobserved child care quality is a common example: quality is related to the decision to use paid care, which in turn affects how much is spent and ultimately the employment decision.

To deal with these issues, I estimate four supporting equations: first-stage employment, use-of-paid child care, and pay-for-care equations, followed by a predicted hourly child care expenditure equation. The three first-stage equations are used to construct sample selection terms for the expenditure model; that is, child care expenditures are corrected for selectivity on employment and the joint decision to use a paid source of child care and pay for that care. It is important to note that I estimate these models separately for each SIPP child care module implemented during the observation period, yielding a total of seven sets of supporting equations [i.e., one for each of the following SIPP panels and (waves): 1990 (3), 1991 (3), overlapping 1992 (6) and 1993 (3), 1993 (9), 1996 (4), 1996 (10), and 2001 (4)].

As previously stated, the introduction of a tri-variate sample selection framework represents an important innovation in the child care literature. Previous research uses a bi-variate selection correction, controlling only for selection into employment and paying

for child care. However, this framework ignores a common skip pattern in SIPP's questionnaire as a potential third source of selection bias. Specifically, the SIPP child care module is designed such that child care payment questions cover only a subset of arrangements, making the child's participation in one of these arrangements a requirement before expenditure data are ascertained.[65] Accounting for all three factors leads to a modeling strategy that reflects both the mechanical and behavioral processes that lead researchers to observe child care expenditures for only some women. Stated formally, joint estimation of the tri-variate sample selection framework is given by the following multivariate probit model:

[3.3] $\Pr[emp_{ist}] = \Pr[z_1 = 1 \mid \mathbf{x}) = \mathbf{X}_{ist}'\pi_1 + \mu_{ist1}$

$\Pr[paidcare_{ist}] = \Pr[z_2 = 1 \mid z_1 = 1, \mathbf{x}) = \mathbf{X}_{ist}'\pi_2 + \mu_{ist2}$

$\Pr[pay_{ist}] = \Pr[z_3 = 1 \mid z_1 = 1, z_2 = 1, \mathbf{x}) = \mathbf{X}_{ist}'\pi_3 + \mu_{ist3}$,

where *emp* in [3.3] represents the dichotomous employment decision; *paidcare* is the decision to use a SIPP-defined source of paid child care; *pay* represents whether the mother pays for care; and μ_{ist1}, μ_{ist2}, and μ_{ist3} are disturbance terms distributed multivariate normal with a mean of zero and a standard deviation of unity. The $\mathbf{X}'$ in [3.3] is a vector of demographic and human capital characteristics of the mother and one-year lags of the state unemployment rate and maximum welfare benefit. Variables included in these models reflect single mothers' underlying preferences for work and non-maternal child care, including martial status, the availability of informal arrangements, ages of children, and disposable income. Since algorithms to evaluate multivariate normal integrals are not readily available, I rely on simulated maximum likelihood methods to jointly estimate

[65] The SIPP-defined modes of paid child care include relatives, non-relatives, center-based care (including pre-school), and other school-based programs.

[3.3]. Specifically, I use the Geweke-Hajivassilioiu-Keane (GHK) smooth recursive simulator.[66] The GHK simulator exploits the computational tractability and accuracy of the univariate normal by approximating the multivariate normal as the product of sequential univariate normal distribution functions (Cappellari & Jenkins, 2003).[67]

I then estimate the following OLS model on the sub-sample of single mothers with positive child care expenditures, the coefficients from which will be applied to single mothers in the CPS:

[3.4] $\ln E_{ist}^{*} = \mathbf{X}_{ist}'\theta + \lambda_{1\text{-}3} + \nu_{ist}$,

where $\ln E$ is the natural logarithm of child expenditures per hour of employment. To construct this variable, I sum expenditures across all child care arrangements for the three youngest children in a family, and then divide this amount by total hours worked during the reference week. This definition deviates from others in the literature, which includes expenditures covering only the primary arrangement of the youngest child. However, the approach taken in this chapter is preferable because it exploits all available information on mothers' child care use, and it assumes that employment decisions depend on total expenditures (and not just those of a single child). The $\mathbf{X}'$ is a vector of exogenous determinants of child care costs, including age, education, race, non-wage income, the number of children in various age groups, metropolitan residence, and region. Variables such as age, education, and race control for individual preferences in the choice of child care services, while children's age groupings account for the fact that market prices vary

[66] For reviews of the GHK simulator, see Greene (2003), Keane (1994), and Stern (1997). The GHK simulator is widely acknowledged as one of the fastest and most accurate simulators available. It also has a number of desirable properties: the simulated probabilities are unbiased, they are bounded within 0, 1, and the simulator is a continuous function of the model's parameters. As with all simulation methods, the GHK estimator is consistent and unbiased as the number of replications and observations increases. However, it has been shown that for the GHK, simulation bias is reduced substantially even for a moderate number of replications (Cappellari & Jenkins, 2003).

[67] It derives values for each error term by randomly drawing values from truncated normal distributions and then recursively computing simulated multivariate probability values. The process is repeated R times (as set by the analyst), with each iteration producing a value for the contribution to the simulated log-likelihood function.

according to the age of the child. Finally, selection bias is accounted for through the inclusion of three inverse Mill's ratio terms ($\lambda_{1\text{-}3}$) derived from the set of first-stage equations.

A key estimation issue is the identification of child care expenditures in the main employment model ([3.1]). To do so, at least one statistically significant variable appearing in [3.4] must be omitted from the main equation. I draw upon the most recent work by Anderson and Levine (2000) and Connelly and Kimmel (2003) for guidance on an appropriate set of exclusion restrictions. Some specifications rely on the number of children in various age groups, assuming that the number of children affects labor supply only through its effect on the accumulation of child care expenses. In addition, I experiment with several alternative sources of identifying variation that are often neglected in the literature. Specifically, detailed data on state-level child care regulations, private child care establishments, and private child care workers' wages provide a rich set of instruments to identify [3.4]. One must assume that these variables reflect structural attributes of states' child care markets, and are therefore associated with market prices but have no direct effect on employment.[68] To assess the sensitivity of price-effects in [3.1], I estimate several permutations of the expenditure equation, each one varying the exclusion restrictions and the assumptions regarding selection bias.

To illustrate the results from estimating [3.3] and [3.4], Table 3.3 presents estimates using the 1990 SIPP. While space limitations preclude a full discussion of the results, they are consistent with those found in the literature. In addition to this *baseline*

[68] Several studies find that more stringent regulations lead to higher prices for child care (Blau, 2002; Heeb & Kilburn, 2004; Hotz & Kilburn, 1995), with either a small or statistically insignificant effect on employment (Blau, 2003; Ribar, 1992; Heeb & Kilburn, 2004; Hotz & Kilburn, 1995). To date, only a handful of studies use child care regulations as instruments in the expenditure equation, and in each case, regulations are strongly related to prices. These results suggest that child care regulations influence labor supply indirectly and only through their influence on child care prices.

expenditure equation, I estimate a number of models that alter the exclusion restrictions and sample selection framework, the results of which are shown in Table 3.4. The effects of minimum standards are consistent with theoretical predictions and recent empirical work. Higher child-staff ratios and educational requirements are associated with lower child care expenditures. Both results accord with the findings in Hotz and Xiao (2005), whose estimates indicate that private child care firms gain when state regulations mandate lower child-staff ratios but lose from increased educational requirements. Results in Table 3.4 also suggest that raising salaries for and the supply of private child care workers are associated with greater expenditures among single mothers, confirming theoretical predictions.

Procedure for Adjusting Wages. Non-linearities arising from federal and state income taxes and transfer programs plague empirical work on labor supply, because the average low-income worker faces a large number of plausible tax rates, all of which are endogenous to the amount of labor supplied. As Moffitt (1986; 1990) points out, it is difficult to discern how changes to the budget set affect the movement of individuals from one segment to another or cause individuals to bunch at kink points.[69] Moreover, it appears that workers facing an identical set of tax rates choose very different locations on the budget constraint. This suggests a large role for unobserved work preferences in explaining the labor supply decision.

A number of methods have been used to attempt to surmount this issue (Meyer & Rosenbaum, 1999; 2001; Eissa & Hoynes, 2004; Dicket-Conlin, Houser, & Scholz, 1995). In this chapter, I develop a simple approach that closely resembles those proposed

[69] Recent work by Saez (2002) suggests that there is little evidence of bunching at kink points. Even the large, discontinuous jumps in MTR's caused by the ETIC do not appear to be associated with bunching.

by Hausman, Kinnucan, and McFadden (1981) and Heckman and MaCurdy (1981). Specifically, I rely on a set of instrumental variables to net out selection bias arising from the decision to choose a given location on the budget constraint, and I rely on a set of exogenous characteristics to predict a net-of-taxes hourly wage for CPS single mothers. This approach exploits the general sample selection framework developed by Heckman (1979).

I begin by adjusting observed annual earnings in the CPS for federal (and state) income and payroll taxes using the NBER's TAXSIM calculator. TAXSIM is a micro-simulation model capable of generating income tax rates and liabilities to a fairly high degree of accuracy. I then create a net-of-taxes hourly wage variable by dividing net-earnings by annual hours worked. Next, the goal is to predict an exogenous net-wage for workers and the sub-sample of single mothers for whom wage data are not observed. This is accomplished through a two-step Heckman wage procedure, with the first step modeling the participation decision and the second step estimating an OLS net-of-taxes wage equation of the form:

$$[3.5] \quad \ln w_{ist}(1-\tau) = \mathbf{X}_{ist}'\psi + \lambda + \zeta_{ist},$$

where $\mathbf{X}'$ is a vector of exogenous characteristics of the mother (age, race, and education), controls for state-level economic conditions, and state fixed-effects. The λ is a sample selection term constructed from a first-stage participation probit. Variables used to identify the participation equation include dummies for the youngest child in the family, the number of children ages 0 to 18, and non-wage income. The sample selection term controls for differential employment tastes across mothers, and by extension, the propensity to choose a segment on the budget constraint. A separate wage equation was

estimated for every year in the sampling period to allow for shifts in the wage structure. Table 3.5 presents an example of the results from this procedure using the 1991 CPS. These results accord well with those from previous studies.

3.4 Estimation Results from the Employment Model

Main Results

Results from the main labor supply equation are presented in Table 3.6, while those from the alternative modeling strategy are depicted in Figures 3a and 3b. As for the main results, I begin by reproducing the employment model estimated by others in the child care literature. I then present a number of estimates based on the full specification, followed by sub-samples of low-skilled mothers and those with children ages 0 to 5. For each model, two sets of results are shown based on the exclusion restrictions in the child care expenditure equation ([3.4]). The first column shows price-effects derived from the *baseline* expenditure model (results shown in Table 3.3), while the second column shows price-effects derived from the richer set of child care instruments (results shown in Table 3.4).[70]

Results presented in columns (1a) and (1b) are derived from the 1995 March CPS, and are meant to recreate a typical model in the child care literature. Such models are estimated on a single cross-section of data from the pre-PRWORA period, and include only the policy variables listed in each column as well as several demographic

[70] In addition to the variables shown in Table 3.6, all models control for age, race, marital status, education, age ranges for the youngest child in the family, presence of a child ages 13-17, and number of children ages 0 to 5. All variables are correctly signed and statistically significant. In addition, recall that the richer set of child care instruments includes measures of minimum quality standards, the supply of private child care establishments, private child care earnings.

variables.[71] These models are also estimated without controls for unobserved heterogeneity. A comparison of columns (1a) and (1b) shows that the coefficients on hourly child care expenditures are very similar, indicating that price-effects are not sensitive to the choice of exclusion restrictions in the expenditure equation.[72] The estimates in column (1b) imply that a one percent increase in hourly child care expenditures is associated with an 18.5 percentage point decrease in the probability of employment (last year), while a similar increase in net-of-taxes wages increases the probability of employment by 40 percentage points. Although these estimates appear to be rather large, they are quite close (and even slightly below) those commonly found in the child care literature.

Columns (1c) and (1d) provide estimates from the full specification and sampling period. Added to these models are the complete set of policy variables and a number of controls for unobserved heterogeneity. Comparing the model in (1d) with the one in (1b) it is immediately clear that the estimates of child care expenditures and net-of-taxes wages experience a significant reduction. Marginal effects imply that a one percent increase in hourly child care costs decreases employment by 5.4 percentage points, and a similar increase in net-wages increases employment by seven percentage points. These coefficients indicate elasticities of employment with respect to hourly child care expenditures of –0.174 and net-of-taxes wages of 0.711.

One of the primary implications of these findings is that child care price-effects are considerably smaller than what is commonly found in the literature, whereas as the tax-effects are within the range of previous estimates. Most child care studies find price

[71] There are exceptions to this, however. Anderson and Levine (2000) use three years of SIPP data, Connelly and Kimmel (2003) use two years of SIPP data, Han and Waldfogel (2001) use fours years of CPS data, and Tekin (2002) uses a single cross-section of NSAF data.

[72] The interpretations presented hereafter will focus on the second set of marginal effects [columns (1d), (2b), (3b)].

elasticities in the range –0.45 to –0.75, while previous EITC work estimates elasticities in the range 0.59 to 1.16. Several factors likely account for the discrepancy in price-effects, the most important of these being the use of repeated cross-sectional data over a significant time period, a rich set of policy variables, and controls for unobserved heterogeneity. It is interesting to note that a comparison of columns (1c) and (1d) shows once again that price-effects are not sensitive to additional instruments in the expenditure equation. The consistency of these results suggests that the use of additional instruments is not responsible for the difference between my results and those of earlier studies.

The next several variables summarize the effects of various components of state and federal welfare reform efforts. Specifically, I include parameterizations of the maximum welfare benefit available to non-workers, the expected amount of disregarded earnings when computing benefits for employed recipients, implementation of any statewide welfare reform and time limits, and states' AFDC/TANF participation rate. As expected, the monthly maximum welfare benefit shows a negative association with employment, but the amount of disregarded earnings shows a positive association. Interestingly, the size of states' maximum welfare grant appears to be a greater negative work incentive than the positive incentive introduced by the generosity of welfare benefits to working recipients. However, it does appear that increasing the initial earnings disregard and lowering the benefit reduction rate generates a sizable work incentive: a one percent in disregarded earnings is associated with a 1.4 percentage point increase in the probability of employment. Only one other observational study has attempted to capture the generosity of states' earnings disregards for employed welfare

recipients, and it also found significant positive effects (Meyer & Rosenbaum, 1999; 2001).

Turning to the welfare reform dummy variables, I find that the implementation of any statewide welfare reform is associated with a 1.7 percentage point increase in the probability of employment. Some caution must be used when interpreting this coefficient, because states often began several reforms simultaneously. This makes it impossible to disentangle the effects of individual reforms, but the positive coefficient accords with the theoretical prediction for most of the individual changes and reflects the overarching goal of welfare reform to increase employment. Building on research by Grogger (2003) and Grogger and Michalopoulos (2003), I capture the effects of time limits through a dummy variable and its interaction with the age of the mother. Allowing the effect of time limits to vary by age accounts for the possibility that mothers save their welfare benefits until an employment shock occurs. Indeed, the theoretical model developed by Grogger and Karoly (2005) suggests that forward-looking mothers will not draw upon their benefits today, opting instead to save them for future use.[73] The results in Table 3.6 corroborate this previous work: the coefficient on the time limit-age interaction suggests that this policy leads to smaller increases in employment as the mother ages. For example, time limits are associated with a 2.1 percentage point increase in employment among single mothers who are 25 years old [0.046 + (25 x -0.001)], but only a 1.1 percentage point increase among 35-year-olds.

Finally, I estimate the effect of stigma costs and changes to the culture of states' welfare offices through the AFDC/TANF participation rate. This variable is the fraction

[73] The precise relationship between time limits and employment depends on the age of the mother's youngest child. Beginning with the observation that AFDC/TANF eligibility ends when her youngest child reaches age 18, a five-year time limit does not influence work decisions when the youngest is between ages 13 and 17. However, the younger the younger the youngest child is below age 13, the stronger the incentive to "bank" welfare benefits for future use.

of single mothers in a given state-year who receive welfare benefits. Recall (from Table 3.1) that this measure reached a peak of around 58 percent in 1992 and 1993, but declined dramatically thereafter. Therefore, one would expect much stigma higher costs associated with welfare participation in recent years. This decline, however, also captures important changes to the culture of states' welfare offices. Indeed, it is argued that welfare offices transformed from "check writing" to "people changing" entities throughout the 1990s. This changing philosophy is borne out by the fact that several states now operate formal diversion programs that provide welfare applicants with small cash grants (and even loans) if they agree to stay off welfare. My findings suggest that higher psychic or transaction costs to welfare participation are associated with increased employment propensities. In fact, the coefficient on the AFDC/TANF participation rate suggests that a one-percentage point decrease in the participation rate is expected to increase employment among single mothers by 14 percentage points.

Table 3.6 also presents separate estimates for two policy-relevant sub-groups: low-skilled single mothers, defined as those with a high school degree or less, and single mothers with young children. Generally speaking, one would expect the effect of the policy variables to be greater among these sub-samples. The evidence supports these predictions, especially for mothers with low educational attainment. Low-skilled single mothers and those with young children are moderately more responsive to child care expenditures and the returns to work, as evidenced by the larger elasticities. In addition, both groups appear to be more sensitive to states' maximum welfare benefits and earnings disregards. Interestingly, the marginal effect associated with "any statewide welfare reform" is negative, but statistically insignificant, for low-skilled mothers. In

other analyses not shown, I find that welfare reform is associated with a significant four-percentage point increase in employment among mothers with some college or above. This suggests that states' welfare offices are "creaming" or that policy reforms are most successful among women already likely to be employed. However, this finding contradicts the work of others, which typically finds a larger role for welfare reform among less-skilled women (Moffitt, 1999; Meyer & Rosenbaum, 1999; 2001). Additional work is needed to resolve this issue.

Given the interest in the relative contributions of recent policy changes and the economy, it is worthwhile to discuss briefly the effect of the unemployment rate. The marginal effect in column (1d) implies that a one-percentage point increase in the unemployment rate decreases employment among single mothers by 0.7 percentage points. This coincides with what others have found. In other analyses not shown, I also include an interaction of unemployment with a dummy variable that equals one if the mother has two or more children. The coefficient on the interaction is the differential effect of the economy on multiple-child families, and the results suggest that these families are indeed more responsive to changes in the macro-economy. This is somewhat of a concern, because this chapter and others use one-child families as a comparison group.

Alternative Specifications

As previously stated, I estimate alternative specifications of the main employment model that include three-way interactions of child care expenditures (and wages) with a dummy variable that equals one if the mother has two or more children and the set of year dummy variables. The goal of this exercise is to test whether these families became

more or less responsive to prices and taxes in the period after an expansion of child care subsidies and the EITC.

The results of this analysis are presented in Figure 3.2a (expenditures) and 3.2b (net-wages). As shown in the figures, the employment differential between multiple- and one-child families was dramatic during the early-1990s, with employment rates among the former dipping as much as 19 percentage points below the latter by 1993. By 2004, however, the employment rate for multiple-child families was just five-percentage points below that of one-child families. Previous research attributes this development to the differential tax and transfer treatment of families with different numbers of children, whereby policies accelerated benefits for multiple-child families. If this is the case, one might also expect these families to become *less* sensitive to child care costs but *more* sensitive to taxes over time, relative to their one-child counterparts.

The results in Figure 3.2a and 3.2b lend support to this idea. Throughout the early-1990s, multiple-child families were more responsive to child care costs and equally responsive to taxes. However, over the course of the decade and especially after the passage of PRWORA96 (which increased child care assistance) and OBRA93 (which increased the EITC), multiple-child families became equally responsive to prices and more responsive to taxes. This is shown by plotting the coefficient on the three-way interaction term, which is the differential effect of child care expenditures (and net-wages) among multiple-child families. The interaction coefficient for child care expenditures is statistically significant in the years prior to PRWORA96, as shown in Figure 3.2a, but then becomes non-significant following passage of the law. Conversely, the coefficients in Figure 3.2b are non-significant in the period before OBRA93, but then

become significant after its passage. Figures 3.2a and 3.2b also show that changes in the differential responsiveness to prices and taxes track closely observed changes in the differential employment rate, thus providing additional evidence that these policies are at least partially responsible for closing the employment gap between one- and multiple-child families. Effects such as these are expected when child care subsidy policy and the EITC have evolved in a way that provides additional benefits to families with greater numbers of children.

Sensitivity Tests

Estimates from the main employment probit are subjected to extensive sensitivity tests to determine whether price- and wage-effects are robust to changes in the specification. Results from this exercise are shown in Table 3.7. Generally speaking, the estimates do not appear to be sensitive to a wide range of specification issues. Given space limitations, I consider only a few below.[74]

Columns (1) and (2) alter the assumptions regarding the selectivity of mothers for whom child care expenditures are observed. In the first case, I estimate a bi-variate sample selection framework (employment and paying for care) and in the second I assume the absence of selection bias. Both estimates remain negative and statistically significant at conventional levels, although the latter estimate is substantially lower than the others. These results coupled with the fact that price-effects are also robust to changes in the exclusion restrictions are contrary to Kimmel's (1998) work. My results suggest that price-effects are instead sensitive to additional policy controls, the inclusion

[74] For a complete listing of all sensitivity tests, refer to the notes under Table 3.7.

of fixed-effects, and the use of repeated cross-sectional data. Additional work is needed, however, to fully resolve this issue.

The next several models restrict the analysis period to the years before PRWORA96, the years after its implementation, and the deletion of years during which the economy was growing slowly or in a recession (1990-1993 and 2001-2004). Although the results are fairly robust to changes in the sampling period, two issues warrant some attention. First, price-effects become statistically insignificant when the analysis is conducted on the post-PRWORA period; second, wage-effects become insignificant when the analysis omits the years during the most recent economic slowdown. This suggests there might be unobserved factors related to the enormous shift in welfare policy or the economy that are commingled with the price- and wage-effects. On the other hand, it could be an indication that the policy variables differentially affect employment depending on macro-economic conditions. Resolving this issue requires substantial future work.

Given the drawbacks of SIPP child care data and their attending criticisms, it is instructive to examine the sensitivity of price-effects to changes in child care expenditures. One of the primary drawbacks of the SIPP is that analysts cannot uniquely identify nine states in the early panels. More recent data reduce this number to five states. This is a potentially serious omission that preclude even multiple cross-sections of data from taking full advantage of state-by-state variation in policies and child care prices. Therefore, the estimates in column (7) are derived from a model that deletes from the CPS the nine states that cannot be uniquely identified in the SIPP. Fortunately, the results remain unchanged. In addition, recent work by Besharov, Morrow, and Shi

(2006) point out a number of problems with SIPP child care data "that make it largely unusable for most analyses." I deal with this issue by substituting a proxy for hourly expenditures: states' weekly wage for private child care workers. Although this reduces substantially the available variation to identify price-effects, the results are once again unchanged, as shown in column (8).

One final set of sensitivity tests is described. The analysis sample for this research comprises all single mothers, regardless of marital status. In addition to never-married mothers, I include those who are divorced, separated, and widowed at the time of the survey. However, this group is heterogeneous with respect to a number of labor market, human capital, and demographic characteristics. Never-married mothers, in particular, tend to be younger (and have younger children), are lower skilled, have less education and work experience, and are more welfare prone than their previously married counterparts. From a policy perspective, never-married mothers appear to be a more relevant group for the analysis, and so I estimate the employment model with only these mothers included. As expected, never-married mothers are more responsive to child care expenditures and net-of-taxes wages. The coefficients imply a price elasticity of –0.245 and a wage elasticity of 1.504.

Policy Simulations

To summarize the findings in the previous sections, I use the estimates from the full employment model [column (1d) in Table 3.6] to conduct a number of policy simulations. As shown in Table 3.8, the top panel presents a number of child care subsidy simulations, and the bottom panel simulates the effects of changes to tax and EITC parameters. Most of the simulation results are compared to the baseline predicted

probability of employment for the full sample of single mothers (0.780). The remaining comparisons are relative to a baseline probability for a specified sub-sample.

The first three subsidy simulations provide estimates of the anticipated employment-effect from subsidy programs that do not take income into account. That is, they simulate the effects of universal child care subsidy programs that reduce expenditures by 25 percent, 50 percent, and 75 percent, respectively, for all single mothers. With one-quarter of child care costs subsidized, the employment probability rises marginally to 0.795, an increase of 1.5 percentage points. However, a government subsidy that covers three-quarters of child care costs is expected to increase employment by 6.6 percentage points, to 0.846.

The next three policy experiments conceive child care subsidy benefits in relation to earnings. An abundance of evidence shows that low-income families pay a much larger share of their earnings on child care services than their high-income counterparts (Giannarelli, Adelman, & Schmidt, 2003). Moreover, CCDF language states that low-income families have "equal access" to high-quality providers if they do not spend more than 10 percent of their income on child care. It is therefore instructive to examine the employment-effects of subsidy regimes that limit payments to specified percentages of total income. As shown in Table 3.8, a child care subsidy that decreases costs to 10 percent of net-of-taxes wages is expected to raise the employment probability by 5.6 percentage points. Interestingly, a subsidy program that reduces expenses to 15 percent of net-earnings results in a 3.8 percentage point increase in employment. This indicates that the average single mother spends more than 15 percent of hourly wages on child care.

There are a number of flaws, however, with the above simulations. First, employment-effects are derived from a universal subsidy program, whereas CCDF subsidies are means-tested, restricting eligibility to 85 percent of SMI. Second, these simulations are based on linear benefit schedules, whereas CCDF subsidies are non-linear and provide the greatest benefits to families with the lowest incomes. Therefore, the final policy experiment attempts to mimic a targeted, non-linear subsidy system comprised of six benefit segments.[75] It provides free child care to families with incomes no greater than $5,000, and then reduces the subsidy in increments of 15 percentage points until income exceeds $30,000. At this point, the family is no longer eligible for subsidies.[76] Results from this policy experiment imply a dramatic increase in employment among single mothers. Approximately 90 percent of mothers are predicted to be employed under this non-linear subsidy system, an increase of 11.7 percentage points. If one assumes that all single mothers are about equally sensitive to child care expenditures, it appears that a generous, targeted subsidy system generates more employment than one that provides limited, universal assistance.

The simulations presented in Panel B begin by showing the effects of similar percent increases in the net returns to work. Specifically, it focuses on a 25 percent, 50 percent, and 75 percent increase in net-of-taxes hourly wages for the full sample of single mothers. The predicted employment response is generally smaller than for child care subsidies, which is surprising in light of the fact that wage elasticities are much larger than price elasticities. A partial explanation for these results—borne out by several

[75] It is common for states' subsidy systems to have several piecewise linear segments. Maryland's subsidy system, for example, has 10 segments that increase in approximately $2,000 to $3,000 increments. The system is furthered complicated by separate benefit and co-payment schedules for families of different sizes.

[76] This reflects quite well the chosen the break-even point among states. In 2004, the average state set its eligibility limit (for a family of three) at $29,184.

studies—is that low-income women are more sensitive to taxes than high-income women. I assess this explanation in the last two tax experiments by disaggregating the employment response to a 50 percent increase in net-earnings by wage decile and EITC benefit segment. These results show substantial heterogeneity across the wage distribution. Employment is predicted to increase 10.7 percentage points over the bottom three wage deciles, compared to 5.6 percentage points over the top three deciles. Similar results are found when the simulations are conducted across the 2003 EITC benefit schedule.

3.5 Conclusions and Policy Implications

Throughout the 1990s, significant changes were enacted across a number of social policy domains that increased the incentive for single mothers to work. Two of the most significant policy shifts were expansions to child care subsidy programs and the EITC. Each of these changes was implemented against a backdrop of federal and state welfare reform initiatives and unprecedented economic growth. As these events unfolded, single mothers experienced a dramatic increase in employment and a decline in welfare use. The purpose of this chapter, therefore, is to examine the effects of child care prices and taxes, controlling for welfare reform polices and macro-economic conditions, on the employment of single mothers between 1990 and 2004.

Results in this study suggest that the employment decisions of single mothers are sensitive to child care expenditures and taxes. Estimates in my preferred specification imply elasticities of employment with respect to child care expenditures and net-of-taxes wages of -0.174 and 0.711, respectively. These main results are corroborated by my alternative modeling strategy: single mothers with multiple children became

comparatively less sensitive to child care prices and more sensitive to net-wages over the study period, especially after expansions to child care subsidies and the EITC were enacted. In addition, federal and state welfare reform initiatives—especially time limits and increased earnings disregards—appear to have made important contributions to moving single mothers from welfare to work. Finally, demand-side factors such as improved macro-economic conditions played a substantial role in raising employment among single mothers.

One of the primary implications of my findings is that child care price-effects are considerably smaller than what is commonly found in the literature, whereas as the tax-effects are within the range of previous estimates. For example, most child care studies find price elasticities in the range –0.45 to –0.75, while previous EITC work estimates elasticities in the range 0.59 to 1.16. This study makes several data and methodological improvements over previous research that likely account for the differences in estimated price-effects. First, I merge empirical techniques from previous child care, EITC, and welfare studies to jointly estimate multiple policies alongside controls for macro-economic conditions and a rich set of demographic characteristics. Given that previous employment research demonstrates the importance of child care prices, taxes, and welfare reform for single mothers, excluding one of these factors might lead to significant omitted variables bias. Second, whereas as previous child care studies use a single section cross-section of data and a small number of observations, this is the first study to estimate employment models that take full advantage of cross-state and temporal variation in child care policies and markets. Specifically, I combine detailed data on child care regulations and labor markets with a large micro dataset over a 15-year period.

As a result, I rely on significantly more sources of exogenous variation to estimate price-effects. Third, I develop a methodological approach that characterizes more accurately the self-selection of single mothers into employment and the use of paid child care. Each of these improvements is made possible by the construction of a rich dataset that for the first time merges child care expenditure data from one survey (SIPP) with demographic and labor market data from another survey (CPS) over a substantial time period.

Policy implications of this research are borne out by the simulation results. I compare the employment response of universal increases in child care subsidies and decreases in taxes to a system that provides generous, targeted assistance. Specifically, I examine the amount of employment generated by a non-linear child care subsidy system (that includes means-testing) and increases in the EITC over the program segments. Results in each exercise suggest that a system of generous, targeted work supports generates more employment than one that provides limited, universal assistance. These findings are important in light of the reauthorization of TANF and the CCDF through the 2005 Deficit Reduction Act. This legislation introduces several punitive measures for welfare recipients and states, including greatly accelerated work participation rates, a narrowing of acceptable work activities, and the imposition of financial penalties on states that fail to comply with federal guidelines. The new work requirements are, furthermore, matched with small increases in funding for child care subsidies, a TANF block grant that is not adjusted for inflation, and an economic climate less favorable than the one throughout the late-1990s. The cumulative effects of these policy changes imply that the federal government endorses the "work first" over the "make work pay"

philosophy. However, results of my policy simulations suggest that the latter might actually be a more effective vehicle for increasing the employment of welfare recipients.

TABLE 3.1: Summary of Characteristics and Policy Changes Affecting Single Mothers, 1990-2004

Policy / Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Panel A: Employment and Earnings (March CPS)															
Employment (%)															
All Mothers	0.689	0.676	0.662	0.672	0.703	0.713	0.736	0.755	0.797	0.817	0.817	0.796	0.788	0.770	0.766
With High School/Less	0.624	0.597	0.568	0.588	0.612	0.625	0.652	0.681	0.727	0.768	0.767	0.729	0.725	0.709	0.695
With Children Ages 0-5	0.629	0.595	0.595	0.612	0.646	0.651	0.691	0.716	0.761	0.785	0.784	0.768	0.751	0.731	0.729
With 1 Child	0.763	0.754	0.742	0.782	0.793	0.773	0.778	0.792	0.827	0.847	0.846	0.821	0.820	0.794	0.794
With 2+ Children	0.637	0.623	0.602	0.593	0.642	0.671	0.706	0.727	0.776	0.794	0.795	0.776	0.763	0.753	0.746
Panel B: States' Child Care Characteristics															
CCDF Spending ($ in millions)	168	2154	2355	2912	3426	3740	3762	4601	6105	7124	7922	8479	9018	9720	9380
$ Per Child Ages 0-4	9	107	115	141	166	181	186	229	304	355	393	417	439	468	467
Private Child Care Earnings ($)	12195	12522	12828	12856	12976	13038	13158	13468	13824	14157	14350	14639	14976	15174	15249
Private Child Care Worker	7670	8146	8685	9404	10065	10611	10976	11481	12119	12638	13167	13695	13954	14004	14061
Panel C: Federal and Sate Tax Policies															
Bottom Income MTR	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.10	0.10	0.10
EITC (%, $)															
Phase-in Rate															
1 Child	0.14	0.167	0.176	0.185	0.236	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
2+ Children	0.14	0.173	0.184	0.195	0.30	0.36	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Maximum Credit															
1 Child	1377	1653	1783	1875	2595	2596	2591	2601	2632	2621	2581	2590	2631	2615	2604
2+ Children	1377	1713	1863	1975	3223	3855	4281	4303	4353	4327	4265	4275	4347	4316	4300
Income Tax Liability															
All Mothers	966	806	739	682	338	229	94	9	-299	-226	49	-16	-303	-758	-604
With 1 Child	1465	1175	1054	971	926	1229	1127	838	561	749	1011	1337	657	354	537
With 2+ Children	542	501	450	403	-149	-582	-694	-674	-947	-1018	-716	-1092	-1111	-1625	-1492
Panel D: States' AFDC/TANF Programs															
Maximum Benefit ($)	557	545	532	515	505	494	481	467	456	451	441	434	438	430	419
Welfare Reform															
Any Reform (%)	0	0	2.3	21.8	32.5	36.3	60.6	90.7	100	100	100	100	100	100	100
Time Limits (%)	0	0	0	0.1	0.5	1.5	24.7	67.9	95.8	96.2	96.4	96.1	95.8	95.8	96.0
Disregarded Earnings ($)	6254	6377	6323	6587	6807	7118	7440	8754	10254	10635	13153	13978	13420	12930	13129
Participation Rate (%)	0.511	0.546	0.578	0.575	0.549	0.500	0.439	0.371	0.273	0.209	0.185	0.168	0.160	0.157	0.152
Panel E: Economic Environment															
Unemployment	5.6	6.8	7.5	6.9	6.1	5.6	5.4	4.9	4.5	4.2	4.0	4.7	5.8	6.0	5.5

Notes: Dollars are adjusted for inflation to reflect 2004 prices. All means, except for the employment, welfare reform, and income tax liability variables, represent state-level averages. Welfare reform parameters indicate the proportion of single mothers in the CPS who are affected by a given reform. Time limits never reach full coverage because Michigan and Vermont do not have them. The labor supply, earnings, income tax liability, and earnings disregard variables are calculated only among those who are employed. These are calculated from the CPS sample for each year. The CCDF spending figures are from Besharov & Higney (2006).

TABLE 3.2:Variable Means for the CPS Sample of Single Mothers: 1992, 1995, 1998, 2001, 2004

CPS "Data" Year	**1992**	**1995**	**1998**	**2001**	**2004**
Number of Observations	N = 4,397	N = 3,849	N = 3,773	N = 6,764	N = 6,572
Age	32.56 (8.18)	33.09 (8.69)	33.44 (8.70)	33.76 (9.04)	33.86 (9.41)
Less than High School (%)	0.236 (0.424)	0.220 (0.414)	0.201 (0.400)	0.187 (0.390)	0.198 (0.399)
High School/GED (%)	0.399 (0.489)	0.360 (0.480)	0.354 (0.478)	0.361 (0.480)	0.336 (0.472)
Some College (%)	0.343 (0.474)	0.394 (0.488)	0.422 (0.493)	0.418 (0.493)	0.431 (0.495)
BA+ (%)	0.020 (0.140)	0.023 (0.151)	0.022 (0.147)	0.032 (0.177)	0.032 (0.177)
Widowed (%)	0.044 (0.205)	0.042 (0.202)	0.046 (0.210)	0.046 (0.210)	0.038 (0.191)
Separated (%)	0.186 (0.389)	0.189 (0.391)	0.154 (0.361)	0.138 (0.345)	0.136 (0.343)
Divorced (%)	0.359 (0.479)	0.343 (0.475)	0.330 (0.470)	0.322 (0.467)	0.317 (0.465)
Never Married (%)	0.409 (0.491)	0.423 (0.494)	0.468 (0.499)	0.492 (0.499)	0.507 (0.499)
Non-white (%)	0.368 (0.482)	0.370 (0.483)	0.359 (0.479)	0.354 (0.478)	0.356 (0.479)
Non-wage Income ($)	466.99 (761.58)	508.65 (936.66)	408.60 (718.44)	428.91 (815.10)	437.06 (833.53)
Child Ages 0-2 (%)	0.283 (0.450)	0.266 (0.442)	0.239 (0.426)	0.248 (0.432)	0.258 (0.437)
Child Ages 3-5 (%)	0.351 (0.477)	0.355 (0.478)	0.343 (0.474)	0.317 (0.465)	0.335 (0.472)
Child Ages 6-12 (%)	0.674 (0.468)	0.678 (0.466)	0.694 (0.460)	0.691 (0.461)	0.682 (0.465)
Child Ages 13-17 (%)	0.211 (0.408)	0.224 (0.417)	0.230 (0.421)	0.233 (0.423)	0.232 (0.422)
Youngest Child: 0-2 (%)	0.283 (0.450)	0.266 (0.442)	0.239 (0.426)	0.248 (0.432)	0.258 (0.437)
Youngest Child: 3-5 (%)	0.256 (0.436)	0.265 (0.441)	0.269 (0.443)	0.247 (0.431)	0.253 (0.434)
Youngest Child: 6-8 (%)	0.204 (0.403)	0.222 (0.415)	0.239 (0.426)	0.218 (0.413)	0.214 (0.410)
Youngest Child: 9-12 (%)	0.255 (0.436)	0.245 (0.430)	0.251 (0.434)	0.285 (0.451)	0.274 (0.446)
No. of Children Ages 0-2	0.328 (0.562)	0.299 (0.531)	0.265 (0.498)	0.275 (0.503)	0.289 (0.523)
No. of Children Ages 3-5	0.410 (0.606)	0.411 (0.598)	0.385 (0.569)	0.353 (0.552)	0.375 (0.564)
No. of Children Ages 6-12	0.916 (0.819)	0.936 (0.842)	0.963 (0.837)	0.946 (0.820)	0.924 (0.813)
No. of Children Ages 0-17	1.916 (1.088)	1.930 (1.083)	1.900 (1.035)	1.865 (0.991)	1.885 (1.007)
Urban Residence (%)	0.812 (0.390)	0.818 (0.385)	0.834 (0.371)	0.829 (0.376)	0.841 (0.364)
South (%)	0.368 (0.482)	0.378 (0.484)	0.364 (0.481)	0.371 (0.483)	0.391 (0.488)

Source: Author's calculations from the 1993, 1996, 1999, 2002, and 2005 March Current Population Survey (CPS).
Notes: Standard deviations are in parentheses. Data are weighed using the March Supplemental Person Weight. Dollars are adjusted for inflation to reflect 2004 prices.

TABLE 3.3: Simulated Maximum Likelihood Estimates of the Tri-variate Sample Selection and Child Care Expenditure Equations, SIPP 1990 (3)

Variable	Multivariate Probit Sample Selection Equations			OLS
	Participation	Use of Paid Care	Paying for Care	ln(child care expenditures per hour of work)
Age	0.072 (0.036)**	0.133 (0.031)***	0.106 (0.033)***	0.005 (0.010)
Age^2	-0.001 (0.000)**	-0.002 (0.000)***	-0.001 (0.000)***	--
High School/GED	0.448 (0.086)***	0.460 (0.084)***	0.446 (0.089)***	-0.235 (0.160)
Some College	0.578 (0.101)***	0.572 (0.103)***	0.469 (0.108)***	-0.095 (0.190)
BA+	1.287 (0.161)***	1.067 (0.126)***	1.027 (0.130)***	-0.521 (0.262)**
Widowed	0.458 (0.190)**	0.362 (0.193)*	0.279 (0.227)	--
Divorced	0.536 (0.094)***	0.326 (0.086)***	0.382 (0.092)***	--
Separated	0.328 (0.102)***	0.290 (0.094)***	0.390 (0.096)***	--
Non-white	-0.062 (0.079)	-0.092 (0.071)	-0.095 (0.076)	0.060 (0.095)
ln(non-wage income)	-0.109 (0.009)***	-0.073 (0.007)***	-0.051 (0.007)***	0.035 (0.017)**
Child Ages 0-2	-0.264 (0.106)**	0.119 (0.113)	0.185 (0.181)	--
Child Ages 3-5	0.031 (0.102)	0.208 (0.100)**	0.225 (0.146)	--
Child Ages 6-12	0.002 (0.121)	-0.220 (0.120)*	-0.196 (0.134)	--
Child Ages 13-17	0.313 (0.110)***	-0.101 (0.106)	0.216 (0.230)	--
No. of Children Ages 0-2	--	--	0.332 (0.207)*	0.296 (0.115)**
No. of Children Ages 3-5	--	--	0.383 (0.205)*	0.201 (0.097)**
No. of Children Ages 6-12	--	--	0.272 (0.188)	0.114 (0.068)*
No. of Children Ages 0-17	-0.187 (0.051)***	-0.116 (0.051)**	-0.401 (0.185)**	--
Unemployed Adult	--	-0.351 (0.298)	-3.197 (0.252)***	--
Urban Residence	-0.018 (0.087)	0.120 (0.082)	0.070 (0.084)	0.321 (0.101)***
South	0.115 (0.095)	0.072 (0.067)	0.063 (0.068)	-0.020 (0.085)
$Unemployment\ Rate_{t-1}$	-0.051 (0.025)**	--	--	--
$Maximum\ AFDC\ Benefit_{t-1}$	-0.000 (0.000)	--	--	--
Intercept	-0.224 (0.641)	-2.241 (0.563)***	-2.560 (0.599)***	0.784 (0.730)
$\rho_{1,2}$		0.982 (0.007)		--
$\rho_{1,3}$		0.968 (0.013)		--
$\rho_{2,3}$		0.967 (0.011)		--
$\lambda_{participation}$	--	--	--	0.955 (1.189)
$\lambda_{use\ of\ paid\ care}$	--	--	--	-0.444 (2.398)
$\lambda_{paying\ for\ care}$	--	--	--	-2.536 (2.166)
R^2	--	--	--	0.138
Log Pseudolikelihood		-1,886.420		--
Number of Observations		1,664		414

Source: Author's calculations from SIPP's 1990 Panel, Wave 3.

Notes: Marginal effects are presented. Robust standard errors are in parentheses. *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively. $\rho_{1,2}$, $\rho_{1,3}$, and $\rho_{2,3}$ is the correlation between the errors in models 1 and 2, 1 and 3, and 2 and 3, respectively.The lambdas are the sample selection parameters derived from the joint participation, use of paid care, and pay for care equations. Estimates from the other SIPP panels (waves) are available from the author upon request.

TABLE 3.4: Alternative Specifications of the OLS Child Care Expenditure Equation: All SIPP Panels (Waves)

Variable	1990 (3)	1991 (3)	1992 (6)/ 1993 (3)	1993 (9)	1996 (4)	1996 (10)	2001 (4)
Panel A: Tri-variate Sample Selection Model and the Inclusion of State-level Child Care Instruments							
Average Maximum Child-Staff Ratio	-0.050	-0.010	0.028	-0.023	0.009	-0.003	--
(centers)	(0.023)**	(0.030)	(0.020)	(0.034)	(0.025)	(0.031)	
Educational Requirement: All Staff	-0.016	-0.000	-0.015	0.024	--	--	--
(centers)	(0.009)*	(0.015)	(0.007)**	(0.015)*			
Educational Requirement: Director	--	--	--	--	-0.024	-0.099	--
(centers)					(0.011)**	(0.055)*	
ln(annual wages for private child care staff)	0.068	0.016	0.541	-0.073	0.715	0.156	-0.022
	(0.033)**	(0 .045)	(0.247)**	(0.045)*	(0.411)*	(0.084)*	(0.034)
No. of Private Child Care Establishments	0.078	-0.009	0.006	0.057	0.008	-0.003	0.038
(/ 1,000)	(0.043)*	(0 .040)	(0.028)	(0.030)*	(0.032)	(0.027)	(0.026)
$\lambda_{participation}$	0.539	-0.591	-1.777	5.171	5.652	-1.598	3.693
	(1.230)	(1.491)	(1.361)	(2.213)*	(2.066)***	(2.191)	(2.801)
$\lambda_{use\ of\ paid\ care}$	0.444	-0.576	0.012	-11.597	-2.203	2.933	5.440
	(2.422)	(3.061)	(2.549)	(3.634)***	(3.632)	(3.495)	(3.965)
$\lambda_{paying\ for\ care}$	-3.005	-1.693	-1.044	2.830	-1.298	-2.895	-5.958
	(2.163)	(2.478)	(2.067)	(2.767)	(2.850)	(2.828)	(2.863)**
Panel B: Bi-variate Sample Selection Model and the Inclusion of State-level Child Care Instruments							
Average Maximum Child-Staff Ratio	-0.051	-0.008	0.027	-0.016	0.007	-0.001	--
(centers)	(0.022)**	(0.030)	(0.022)	(0.031)	(0.025)	(0.031)	
Educational Requirement: All Staff	-0.017	-0.001	-0.015	0.026	--	--	--
(centers)	(0.009)*	(0.014)	(0.009)*	(0.014)*			
Educational Requirement: Director	--	--	--	--	-0.025	-0.097	--
(centers)					(0.011)**	(0.055)*	
ln (annual wages for private child care staff)	0.070	0.013	0.539	-0.073	0.696	0.153	-0.034
	(0.033)**	(0.045)	(0.270)**	(0.045)*	(0.411)*	(0.084)*	(0.033)
No. of Private Child Care Establishments	0.079	-0.009	0.006	0.064	0.007	-0.002	0.043
(/ 1,000)	(0.042)*	(0.040)	(0.027)	(0.033)*	(0.032)	(0.027)	(0.027)
$\lambda_{participation}$	0.565	-0.351	-1.365	1.711	4.993	-1.742	5.768
	(1.037)	(1.181)	(1.065)	(1.524)	(1.741)***	(1.832)	(2.306)**
$\lambda_{paying\ for\ care}$	-2.640	-1.717	-1.079	-3.414	-2.507	-0.330	-2.878
	(1.050)**	(1.186)	(0.798)	(1.385)**	(1.503)*	(1.933)	(1.483)*
Panel C: No Correction for Selection Bias and the Inclusion of State-level Child Care Instruments							
Average Maximum Child-Staff Ratio	-0.053	-0.008	0.028	-0.015	0.018	-0.000	--
(centers)	(0.022)**	(0 .030)	(0.020)	(0.035)	(0.025)	(0.031)	

Educational Requirement: All Staff (centers)	-0.017 (0.009)*	-0.001 (0.014)	-0.015 (0.007)**	0.024 (0.015)	--	--	--
Educational Requirement: Director (centers)	--	--	--	--	-0.024 (0.010)**	-0.101 (0.054)*	--
ln(annual wages for private child care staff)	0.067 (0.033)**	0.011 (0.044)	0.442 (0.237)*	-0.075 (0.044)*	0.791 (0.412)*	0.155 (0 .084)*	-0.017 (0.032)
No. of Private Child Care Establishments (/ 1,000)	0.084 (0.043)**	-0.007 (0.039)	0.004 (0.028)	0.077 (0.030)**	0.014 (0.032)	-0.007 (0.027)	0.037 (0.027)

Source: Author's calculations from SIPP's Core File and Child Care Topical Module in the 1990, 1991, 1992, 1993, 1996, and 2001 Panels.

Notes: Robust standard errors are in parentheses. *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively. The lambdas are the sample selection parameters derived from the joint participation, use of paid care, and pay for care equations. All models include controls for age, education, race, non-wage income, the number of children in various age groups, metropolitan residence, and region

TABLE 3.5: Estimates from the Heckman Selection-Corrected Wage Equation, 1991 CPS

Variable	Probit Participation Equation	OLS Net-of-Taxes Wage Equation
Youngest Child Ages 3-5	0.228	--
	(0.058)***	
Youngest Child Ages 6-8	0.331	--
	(0.065)***	
Youngest Child Ages 9-12	0.476	--
	(0.067)***	
No. of Children Ages 0-18	-0.080	--
	(0.021)***	
ln(non-wage income)	-0.098	--
	(0.005)***	
Age	0.027	0.050
	(0.016)	(0.009)***
Age-squared	-0.0004	-0.0005
	(0.0002)**	(0.0001)***
High School/GED	0.643	0.219
	(0.051)***	(0.035)***
Some College	1.006	0.315
	(0.065)***	(0.041)***
BA+	1.294	0.581
	(0.103)***	(0.050)***
Widowed	0.171	0.017
	(0.104)	(0.058)
Divorced	0.436	0.096
	(0.059)***	(0.030)***
Separated	0.078	0.027
	(0.062)	(0.033)
Non-white	-0.193	0.047
	(0.049)***	(0.026)*
Urban residence	-0.076	0.089
	(0.053)	(0.026)***
South	0.203	-0.094
	(0.049)***	(0.024)***
Unemployment rate	-0.040	-0.007
	(0.023)*	(0.011)
Intercept	-0.008	0.392
	(0.315)	(0.182)**
$\lambda_{participation}$	--	-0.006
		(0.054)
R^2	--	0.122
Number of Observations	4,352	2,959

Source: Author's calculations from the 1991 CPS.

Notes: Marginal effects are presented. Standard errors are in parentheses. *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively. Estimates from the other CPS years are available upon request from the author.

TABLE 3.6: Parameter Estimates from the Main Employment Probit

Variable	All Single Mothers				Single Mothers With A High School Degree or Less		Single Mothers With Children Under Age 6	
	(1a)	(1b)	(1c)	(1d)	(2a)	(2b)	(3a)	(3b)
ln(predicted hourly child care expenditure)	-0.191	-0.185	-0.058	-0.054	-0.075	-0.070	-0.073	-0.066
	(0.037)***	(0.033)***	(0.005)***	(0.005)***	(0.008)***	(0.007)***	(0.008)***	(0.007)***
ln(predicted net-of-taxes hourly wage)	0.392	0.401	0.081	0.070	0.110	0.097	0.082	0.067
	(0.072)***	(0.073)***	(0.025)***	(0.025)***	(0.038)***	(0.038)**	(0.039)**	(0.039)*
ln(monthly maximum welfare benefit)	-0.110	-0.086	-0.071	-0.073	-0.080	-0.083	-0.067	-0.069
	(0.027)***	(0.028)***	(0.026)***	(0.026)***	(0.038)**	(0.038)**	(0.040)*	(0.040)*
ln(predicted annual disregarded earnings)	--	--	0.016	0.014	0.020	0.019	0.026	0.024
			(0.004)***	(0.004)***	(0.006)***	(0.006)***	(0.006)***	(0.006)***
Any Statewide Welfare Reform	--	--	0.016	0.017	-0.005	-0.004	0.021	0.022
			(0.008)*	(0.008)**	(0.012)	(0.012)	(0.013)*	(0.013)*
Time Limit	--	--	0.050	0.046	0.067	0.062	0.059	0.054
			(0.017)***	(0.017)***	(0.024)***	(0.024)**	(0.025)**	(0.025)**
Time Limit x Age	--	--	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002
			(0.0003)***	(0.0003)***	(0.0005)***	(0.0005)***	(0.0005)***	(0.0005)***
AFDC/TANF Participation Rate	--	--	-0.147	-0.143	-0.190	-0.184	-0.186	-0.180
			(0.025)***	(0.025)***	(0.037)***	(0.037)***	(0.039)***	(0.039)***
Unemployment Rate	--	--	-0.007	-0.007	-0.009	-0.008	-0.008	-0.008
			(0.002)***	(0.002)***	(0.003)**	(0.003)**	(0.003)**	(0.003)**
ln(non-wage income)	-0.017	-0.017	-0.016	-0.016	-0.021	-0.021	-0.016	-0.016
	(0.002)***	(0.002)***	(0.0003)***	(0.0003)***	(0.0005)***	(0.0005)***	(0.0005)***	(0.0005)***
State Fixed-effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Linear Time Trend	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Month-in-sample Dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes
ε^{prices} (Elasticity)	-1.090	-1.288	-0.173	-0.174	-0.258	-0.265	-0.288	-0.286
ε^{wages} (Elasticity)	3.956	4.038	0.828	0.711	1.089	0.957	0.846	0.689
McFadden's R^2	0.154	0.155	0.160	0.160	0.154	0.154	0.151	0.151
Log-pseudolikelihood	-2,253.04	-2,250.46	-35,089.18	-35,092.46	-23,087.87	-23,089.52	-19,617.50	-19,621.68
Number of Observations	4,306	4,306	74,043	74,043	43,156	43,156	37,723	37,723

Source: Author's calculations from the 1991-2005 March Current Population Survey (CPS).

Notes: Marginal effects are shown, along with robust standard errors (in parentheses). *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively. All models include controls for age; age-squared; marital status; non-white; educational attainment; whether the youngest child in the family is ages 3-5, ages 6-8, and ages 9-12; the presence of a child ages 13-17; and the number of children ages 0-5. Estimates for these variables are available from the author upon request. The estimates in models (1a) and (1b) come from the 1995 March CPS, while those in (1c) and (1d) are derived from the full observation period. Both sets of models include all single mothers with at least one child ages 0-12. Models (2a) and (2b) include only single mothers with no more than a high school education, while models (3a) and (3b) reduce the sample to families with at least one child ages 0-5. The models in columns (a) and (b) differ only in the way the hourly child care expenditure variable is identified in the OLS prediction equation. The variable in column (a) uses the standard demographic instruments, while the variable in column (b) uses a richer set of state-level child care characteristics. See text for details.

TABLE 3.7: Tests of Robustness

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(predicted hourly child care expenditure)	-0.042	-0.013	-0.061	-0.009	-0.026	-0.054	-0.061
	(0.005)***	(0.007)*	(0.012)***	(0.006)	(0.005)***	(0.007)***	(0.005)***
ln(predicted net-of-taxes hourly wage)	0.070	0.025	0.282	0.258	0.097	0.045	0.087
	(0.025)***	(0.025)	(0.034)***	(0.021)***	(0.027)***	(0.031)	(0.027)***
ε^{prices} (Elasticity)	-0.115	-0.019	-0.539	-0.015	-0.065	-0.280	-0.203
ε^{wages} (Elasticity)	0.709	0.254	2.606	2.793	1.034	0.422	0.892
McFadden's R^2	0.159	0.158	0.196	0.116	0.137	0.182	0.160
Log-pseudolikelihood	-35,131.01	-35,156.22	-14,788.89	-20,162.90	-26,130.79	-22,772.63	-32,298.19
Number of Observations	74,043	74,043	29,484	44,559	56,557	47,441	67,172
Variable	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**
ln(predicted hourly child care expenditure)	-0.061	-0.071	-0.049	-0.044	-0.034	-0.070	-0.058
	(0.017)***	(0.008)***	(0.006)***	(0.005)***	(0.008)***	(0.006)***	(0.004)***
ln(predicted net-of-taxes hourly wage)	0.007	0.151	0.048	0.085	0.101	0.084	0.052
	(0.023)	(0.044)***	(0.029)*	(0.025)***	(0.035)***	(0.034)**	(0.022)**
ε^{prices} (Elasticity)	-0.203	-0.245	-0.147	-0.144	-0.089	-0.266	-0.187
ε^{wages} (Elasticity)	0.074	1.504	0.504	0.866	0.974	0.889	0.532
McFadden's R^2	0.158	0.146	0.173	0.162	0.130	0.171	0.178 (R^2)
Log-pseudolikelihood	-35,151.42	-16,909.72	-23,504.47	-35,003.9	-13,566.33	-21,405.86	--
Number of Observations	74,043	33,081	51,239	74,043	30,892	43,151	74,043

Source: Author's calculations from the 1991-2005 March Current Population Survey (CPS).

Notes: Marginal effects are shown, along with robust standard errors (in parentheses). *, **, *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively. All models include controls for age; age-squared; marital status; non-white; educational attainment; whether the youngest child in the family is ages 3-5, ages 6-8, and ages 9-12; the presence of a child ages 13-17; the number of children ages 0-5; and all policy variables listed in Table 3.7. Estimates for these variables are available from the author upon request. Each column represents a model in which the following change(s) are made: (1) child care expenditures are corrected for selectivity using a bi-variate sample selection procedure; (2) child care expenditures are not corrected for selectivity; (3) restricted to the period 1990-1996 (pre-PRWORA era); (4) restricted to the period 1997-2004 (post-PRWORA era); (5) deletion of the period 1990-1993; (6) deletion of the period 2001-2004; (7) deletion of the nine states that are not uniquely identified in the SIPP (Maine, Vermont, Iowa, North Dakota, South Dakota, Alaska, Idaho, Montana, and Wyoming); (8) substitutes states' weekly, private child care worker wages (/100) for predicted child care expenditures; (9) includes only never-married mothers (deleting divorced, separated, and widowed mothers); (10) includes families with at least one child ages 6-12; (11) includes a set of interactions between year dummy variables and the number of children ages 0-18; (12) includes only families with one child ages 0-18; (13) includes only families with two or more children ages 0-18; and (14) estimates the model using ordinary least squares (OLS) regression.

TABLE 3.8: Policy Simulations

Policy Scenario	Pr(employment)	Percentage Point Change
Baseline Predicted Probability	0.780	
Panel A: Child Care Subsidy Simulations		
25% Subsidy	0.795	1.5
50% Subsidy	0.815	3.5
75% Subsidy	0.846	6.6
Subsidy Reducing Child Care Costs to 15% of Net-of-Taxes Hourly Wages: All Mothers	0.818	3.8
Subsidy Reducing Child Care Costs to 10% of Net-of-Taxes Hourly Wages: All Mothers	0.836	5.6
Subsidy Reducing Child Care Costs to 5% of Net-of-Taxes Hourly Wages: All Mothers	0.864	8.4
Targeted Nonlinear Subsidy: All Mothers a) \$0 - \$5,000: 100% subsidy b) \$5,001 - \$10,000: 85% subsidy c) \$10,001 - \$15,000: 70% subsidy e) \$15,001 - \$20,000: 55% subsidy f) \$20,001 - \$25,000: 40% subsidy g) \$25,001 - \$30,000: 25% subsidy h) Eligibility ends for families above \$30,000	0.897	11.7
Panel B: Tax and EITC Simulations		
25% Increase in Net-of-Taxes Hourly Wages	0.796	1.6
50% Increase in Net-of-Taxes Hourly Wages	0.808	2.8
75% Increase in Net-of-Taxes Hourly Wages	0.818	3.8
Employment Change from a 50% Increase in Net-of-Taxes Hourly Wages by Predicted Wage Decile		
1st Decile	0.535 to 0.573	3.8
2nd Decile	0.629 to 0.665	3.6
3rd Decile	0.694 to 0.727	3.3
4th Decile	0.738 to 0.769	3.1
5th Decile	0.782 to 0.810	2.8
6th Decile	0.817 to 0.842	2.5
7th Decile	0.837 to 0.859	2.2
8th Decile	0.859 to 0.879	2.0
9th Decile	0.871 to 0.890	1.9
10th Decile	0.897 to 0.914	1.7
Employment Change from a 50% Increase in Net-of-Taxes Hourly Wages by the 2003 EITC Schedule		
Phase-in Region	0.747 to 0.777	3.0
Plateau Region	0.808 to 0.834	2.6
Phase-out Region	0.842 to 0.864	2.2
Above Phase-out Region	0.875 to 0.894	1.9

Notes: All simulations use estimates from the model in column (1d) in Table 3.7. The baseline predicted probability is the probability of employment based on the estimates from that model. With the exception of the predictions from the wage decile and EITC schedule exercises, percentage point change is in relation to the baseline probability of employment. Wage deciles and EITC regions are expressed in 2004 dollars.

FIGURE 3.1: Summary of Major Social Policy Legislation with Implications for Single Mothers, 1988-2005

Timeline	Policy Acronym	Policy's Full Name	Description
1988	FSA 1988	Family Support Act of 1988	Created JOBS program; required states to provide work supports and employment activities; increased earnings disregards for AFDC eligibility and child care benefits; required AFDC-UP parents to work 16 hours/week; expanded Medicaid coverage; tightened child support Created AFDC Child Care and Transitional Child Care; the former was an open-ended entitlement for AFDC recipients; the latter provided aid to former recipients for 1 year after exiting welfare
1990	OBRA 1990	Omnibus Budget Reconciliation Act of 1990	Mandated that the EITC was not to be counted as income in determining eligibility for means-tested programs; increased the phase-in rate for families with 1 child to 23% by 1994; created a separate rate schedule for families with 2+ children, increasing from 14% to 25% by 1994 Created At-Risk Child Care and the Child Care and Development Block Grant; the former subsidized costs for families at risk of using AFDC; the latter provided matching funds for quality-improvement and consumer education
	OBRA 1993	Omnibus Budget Reconciliation Act of 1993	Created a separate EITC schedule for childless workers; increased the one-child credit rate to 34% by 1995; raised the two-child credit rate to \$40%, for a maximum credit of \$3,370 by 1996
	N.A.	Welfare Waivers of 1992 -1996	Federal government granted 43 states a waiver to experiment with work requirements, time limits, family caps, and earnings disregards
1995	PRWORA 1996	Personal Responsibility and Work Opportunity Reconciliation Act of 1996	Ended the legal entitlement to aid; pays fixed, close-ended block grants to states; allows states to impose family caps; imposes work requirements after two years on welfare and a 60-month time limit on cash assistance; allows states to sanction families; provides incentives to reduce illegitimacy rate Created the Child Care and Development Fund; consolidated four child care programs; sets eligibility at 85% of SMI; directs states to use 70% of funds to help welfare families (30% go to the working poor); permits states to transfer 30% of TANF grant to the CCDF; grants states authority over subsidy issues
	TRA 1997	Taxpayer Relief Act of 1997	Created a child tax credit (non-refundable) of \$500, which was not indexed for inflation Improved compliance on EITC by denying benefits for 10 years those who fraudulently claim the credit and imposing due diligence on tax preparers
2000	EGTRRA 2001	The Economic Growth and Tax Relief Reconciliation Act of 2001	Created a 10% bracket; increased the child tax credit to \$1,000, made it refundable for those earning over \$10K, and phased it in at the same income level Created separate EITC flat and phase-out regions for married taxpayers who file jointly; the maximum credit applies to an additional \$1,000 of earnings and therefore extends the phase-out range by the same amount
	JGTRRA 2003	The Jobs and Growth Tax Relief Reconciliation Act of 2003	Increased the child tax credit to \$1,000 per child for 2003 and 2004; expanded the 10% tax bracket over the same years; granted tax breaks for married couples

2005	DRA05	The Deficit Reduction Act of 2005	Reauthorized the TANF program created in 1996; increased states' work participation rates to 50% of all TANF recipients and 90% of two-parent recipients; changed the baseline year for the "caseload reduction credit" to 2005 (from 1995); narrowed the definition of acceptable work activities; imposed penalties on states of up 5% of the TANF grant for failure to comply with federal guidelines; increased funding for child care subsidies by $1 billion over five years

FIGURE 3.2a: Differential Effect of Child Care Expenditures Across Families With One Child and Two Children

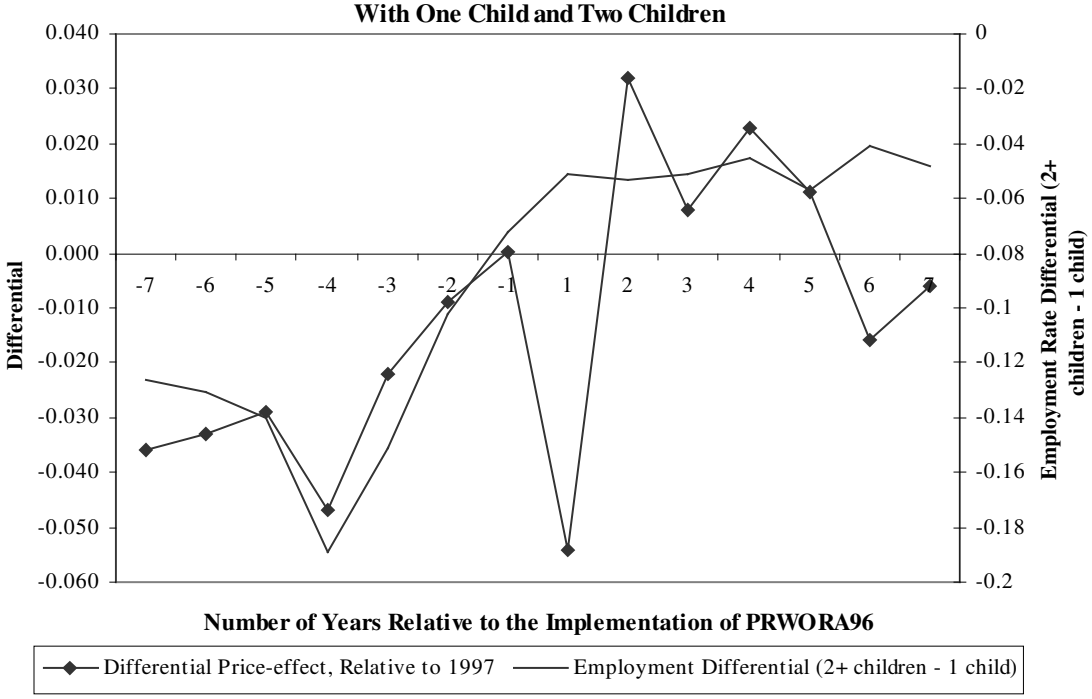
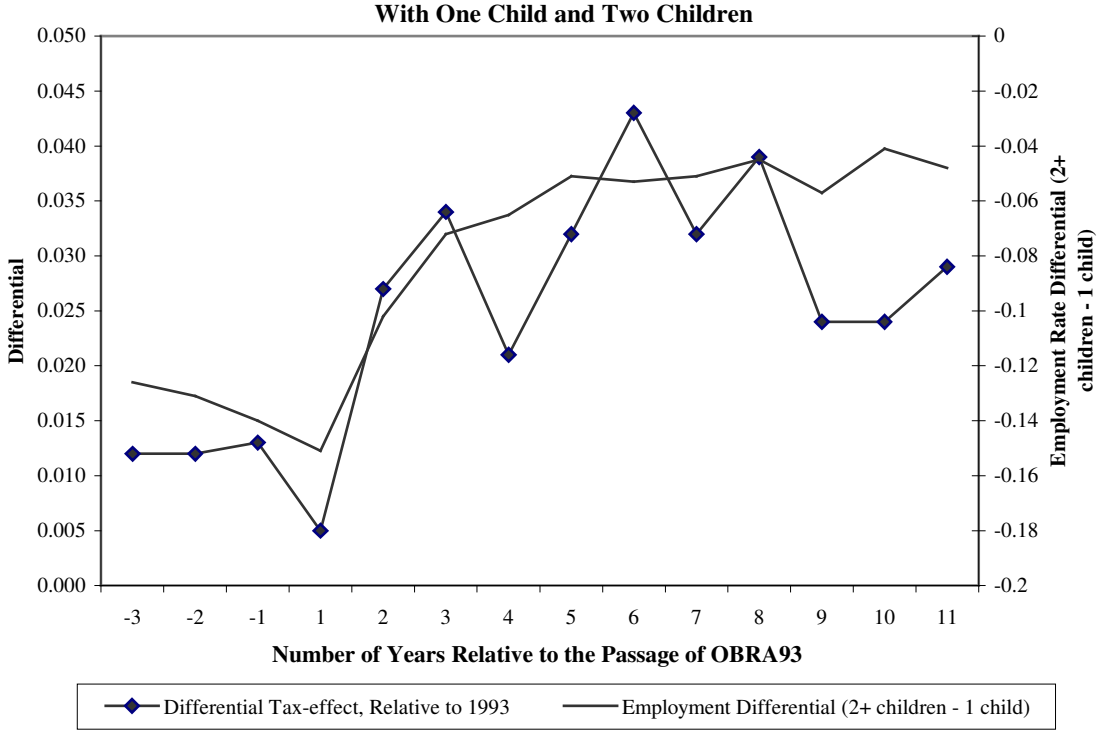


FIGURE 3.2b: Differential Effect of Taxes Across Families With One Child and Two Children



CHAPTER 4: CODEPENDENT OR INDEPENDENT? HETEROGENEOUS EFFECTS OF SOCIAL POLICY REFORMS ACROSS LABOR MARKET CONDITIONS

4.1 Introduction

Throughout the 1990s, U.S. social policy underwent fundamental changes that realigned work incentives for low-income single mothers. The 1996 welfare reform act replaced the 60-year-old Aid to Families with Dependent Children (AFDC) with the work-based Temporary Assistance for Needy Families (TANF) program. The new legislation imposes strict work requirements on welfare recipients, sanctions families that fail to comply with those requirements, and repeals the legal entitlement to cash aid by placing a 60-month lifetime time limit on benefit receipt. In addition, several other social policy reforms occurred contemporaneously with the onset of welfare reform. The 1990s witnessed phenomenal growth in federal and state Earned Income Tax Credits (EITC), which provide tax-based wage subsidies to low-income families. The federal government also increased funding for child care subsidy programs through creation of the Child Care and Development Fund (CCDF). Finally, significant expansions to the Medicaid program beginning in the late-1980s enabled most single mothers and their children to retain eligibility for health insurance after leaving welfare.

These policy developments, along with robust economic conditions throughout the 1990s, led to a steep rise in labor force participation among single mothers. Specifically, the share of employed single women with children under age 19 grew from 68.3 percent in 1992 to 82.7 percent in 2000, an increase of 21.1 percent.

An impressive empirical literature has attempted to dissect the relative contribution of social policy reforms and the economy in explaining the employment

growth among single mothers.[77] While there remains strong disagreement over the precise contribution of each factor, recent evidence suggests a coalescence around the EITC, the economy, and welfare reform, in that order, as the primary determinants of the observed employment changes throughout the 1990s.[78] Child care subsidies and welfare benefits consistently maintain a smaller role. Overall, these studies find that social policy reforms and the economy explain between 57 percent and 93 percent of the rise in single mothers' work participation.

A drawback associated with every study in this literature is that social policy reforms and the economy are viewed as *independent* or *competing* explanations, thereby neglecting the possibility that demand conditions *interact* with or *facilitate* policy reforms to influence welfare and employment outcomes. In other words, previous research focuses on estimating average "treatment" effects of social policy reforms, rather than investigating the possibility of heterogeneous policy effects across varying economic conditions.[79] This is precisely the issue considered in this chapter.

Although economic theory provides useful predictions for the role of specific social policy reforms and the economy separately, it is not clear *a priori* how the economy should influence the impact of social policy reforms. Ultimately, this is an empirical issue. However, one might reasonably assume that interactions between policy reforms and economic conditions take place through one of three channels. First, a

[77] For thorough reviews of the literature, see Blank (2002) and Grogger and Karoly (2005).

[78] There are, of course, departures from this general finding. Not surprisingly, studies that model multiple features of states' welfare reform efforts (as opposed to including a single waiver/reform dummy variable in an employment model) find a much larger role for welfare reform. In most cases, the overall effect of specific reforms rivals, and even exceeds, the EITC and economic effects.

[79] In his review of Grogger and Karoly's (2005) book on welfare reform, Gelbach (2006) argues that given the potential treatment effect heterogeneity, it is possible that "there is no such thing as "the" effect of welfare reform." While Gelbach limits his discussion of heterogeneous policy effects to common sub-groups defined by race and ages of children, a strong possibility exists that policy effects may also differ across economic conditions—not only for the average single mother but perhaps even more substantially for the sub-groups mentioned by Gelbach. In addition, one also needs to note the specific use of average and heterogeneous "treatment" effects in this chapter. Such phrasing is becoming more common in the welfare reform evaluation literature, but its use should not be confused with treatment effects obtained from randomized designs or the phrasing used in the propensity score literature. In this chapter, as in all others evaluating welfare reform, the treatment is defined as single mothers' exposure to a given policy reform, and the treatment effect is the estimated employment response to being exposed to that reform.

policy intervention like requiring work as a condition for welfare receipt could be more successful in tight labor markets because new jobs are created for welfare recipients to fill. In this formulation, the economy's influence on policy reforms is *reinforcing*. Alternatively, work requirements could be less successful during periods of strong economic growth because many recipients would leave welfare for work even in a world without those requirements. This formulation therefore implies that policy reforms and economic conditions are partially *offsetting*. Finally, certain policy reforms might be just as effective (or ineffective) at increasing employment under most economic conditions. In this scenario, social policy reforms are *invariant* to the local economy.

By matching detailed data on a large number of social policy reforms with Current Population Survey (CPS) samples over the period 1985-2004, I examine the plausibility of heterogeneous policy effects across varying economic conditions. In doing so, I pay particular attention to the aforementioned channels through which such a relationship could be revealed. My modeling strategy improves upon the simple state-level coding of policy reforms that characterize most studies in the literature by exploiting program rules on eligibility, the timing of policy effects, and the characteristics of families most likely affected. This leads to an identification strategy that takes advantage of policy variation not only across states and over time, but also across mothers within a given state and year. In addition, this study extends the literature by testing for heterogeneous policy effects across three work "margins:" any work participation; work and no welfare; and full-time, full-year work. Although neglected by previous studies, the latter two employment outcomes are important because increasing participation along these margins is an explicit goal of welfare and other social policy

reforms. Indeed, the fraction of single mothers working without welfare and working full-time (full-year) increased substantially throughout the 1990s. It may also be the case that the impact of the economy on policy reforms operates differently depending on the work margin.

Estimates from my preferred specification imply that the bundle of social policy reforms considered in this study explain 38.9 percent of the employment growth among single mothers between 1992 and 2000. Economic conditions, as measured by the state unemployment rate, account for another 13.2 percent of the employment growth. When the basic model is extended to account for policy heterogeneity across economic conditions, fully 54.4 percent of the observed increase is explained. Effects of policy reforms vary substantially across the particular policy itself, the work margin in question, and the economic conditions in which these policy reforms operate. Several interesting patterns emerge, however. Policy "carrots" like the EITC, child care subsidies, and earnings disregards reveal the greatest policy heterogeneity at low intensity work margins, while policy "sticks" like work requirements and welfare sanctions show considerably more heterogeneity at increasingly demanding work margins. Both sets of policies generate the greatest employment effects when economic conditions are favorable, implying that a strong economy *reinforces* the positive incentives created by social policy reforms.

These results have important policy implications. Social policy reforms do not create the same employment incentives across all economic conditions and work margins. Therefore, policy reforms should be carefully tailored to specific employment goals and take account of the economic environment in which they operate. If, for example, the

goal of a given policy reform is to move welfare recipients into work, policymakers can reliably draw from a broad menu of policy options to achieve their objectives. However, if the policy stipulates that recipients work full-time (as is the case with work requirements), favorable economic conditions must be present if policymakers are to ensure those requirements are met and recipients avoid benefit sanctions. These results also suggest that economic "triggers"—in which states stop the time limit clock or adjust downward work participation rates when the unemployment rate exceeds a certain level—is a useful mechanism to help welfare recipients and states avoid financial penalties.

The remainder of this chapter proceeds as follows. Section 4.2 provides intuition for the plausibility of heterogeneous policy effects across economic conditions. Section 4.3 describes the individual and state-level social policy data and empirical strategy used to test for these heterogeneous effects, while Section 4.4 presents and compares estimates for average policy effects (hereafter called ATE models) and heterogeneous policy effects (hereafter called HTE models). Section 4.5 concludes with a discussion of policy implications.

4.2 The Intuition for Heterogeneous Policy Effects

A sizeable empirical literature has attempted to dissect the relative contribution of social policy reforms and the economy to the employment growth of single mothers (Fang & Keane, 2005; Looney, 2005; Grogger, 2003; Kaushal & Kaestner, 2001; O'Neill & Hill, 2001; Schoeni & Blank, 2000; Meyer & Rosenbaum, 2001; Moffitt, 1999; Noonan, Smith, & Corcoran, 2005). Most studies parameterize separately specific components of welfare reform (e.g., work requirements and time limits) and include these

variables in an employment model along with controls for the EITC, child care subsidies, welfare benefits, and the unemployment rate. A few studies use the coefficients on the policy and economic variables to calculate the fraction of single mother's employment growth attributable to these competing factors. Table 4.1 presents a summary of these results. Overall, these studies explain between 57 percent and 93 percent of the rise in single mothers' work participation throughout the 1990s. There is, however, enormous variation in the precise amount attributable to each policy or economic factor. Some of these differences are due to measurement issues, especially in the case of the EITC. Meyer and Rosenbaum (2001), for example, capture EITC effects through the income taxes single mothers would pay if they worked, while Fang and Keane (2005) model the combined federal and state phase-in rate and maximum credit. Other measurement differences exist regarding welfare reform, with some studies simply controlling for "any statewide welfare reform" and others examining a large number of individual reforms. Nevertheless, the data assembled in Table 4.1 suggest that the EITC is responsible for approximately one-third of the employment growth, while the economy and welfare reform are each responsible for another 25 percent.

An implicit assumption in these studies, however, is that social policy reforms act independently of prevailing economic conditions to influence employment. As such, most of the academic and policy debate focuses on whether welfare reform or the economy played a larger role in lowering welfare use and increasing employment among single mothers.[80] Of course, social policy reforms and economic conditions are expected to have independent effects on welfare and work outcomes, but with a few exceptions,

[80] This was especially true in the years immediately following welfare reform. For a sampling of early studies see, CEA (1997; 1999), Figlio and Ziliak (1999), Wallace and Blank (1999), and Ziliak, Figlio, Davis and Connolly (2000).

the literature largely neglects the possibility that economic conditions also play a facilitative role in influencing these outcomes. To my knowledge, three studies explicitly allow the effects of welfare reform to vary with the economy (Bartik & Eberts, 1999; Figlio & Ziliak, 1999; Hofferth, Stanhope, & Harris, 2002). The first two studies interact a welfare waiver dummy variable with the unemployment rate, and the third interacts a work requirement dummy variable with the state median income. All three studies use as the dependent variable a measure of participation in or an exit from welfare, and find that welfare reform is more effective when economic conditions are favorable. However, a remaining issue in the literature is whether this general finding holds for a broad array of policy reforms and across several employment outcomes. This study is the first systematic attempt to fill this gap.

A central goal of this study is to clarify whether the strong economy throughout the 1990s interacted with welfare and other policy reforms to generate more favorable employment outcomes than if the policy reforms had been implemented in weaker economic conditions. This issue has gained considerable traction in recent years, given the 2001 recession and the slippage in single mothers' work participation. Thus, a reasonable question to raise is how welfare caseloads or employment rates might respond in the event of a deep recession. To make the question more concrete, one might posit whether employment levels among single mothers would have fallen more dramatically during the most recent recession had it not been for welfare or other policy reforms.

It is not clear *a priori* how economic conditions influence the effects of social policies, but a number of considerations guide this study's empirical strategy. First, the influence of the economy could conceivably vary depending on the specific policy

reform. Incentives created by policy "carrots," such as the EITC or child care subsidies, could operate differently in an economic downturn from policy "sticks," such as work requirements or welfare sanctions. Second, heterogeneous policy effects might operate differently depending on the employment goal associated with a specific policy reform. For example, the effects of a given reform might not be sensitive to prevailing economic conditions if the goal is to simply move single mothers from welfare to work. If, however, the employment goal is more ambitious—such as working and not receiving welfare or working full-time—one might expect substantially greater policy sensitivity across economic conditions. A final consideration is that heterogeneous policy effects could themselves be non-linear; that is, policy effects are expected to reveal different relationships, both qualitative and quantitative, depending on local labor market conditions.

In addition, interactions between policy reforms and economic conditions could take place through one of three channels. First, a policy intervention like work requirements could be more successful in tight labor markets because new jobs are created for welfare recipients to fill. In this formulation, the economy's influence on policy reforms is *reinforcing*. Alternatively, work requirements could be less successful during periods of strong economic growth because many recipients would leave welfare for work even in a world without those requirements. That welfare caseloads started declining in early-1994, over two years before the passage of national welfare reform and during a period of strengthening economic conditions, lends support to an independent, countercyclical relationship between the economy and welfare participation.[81] This

[81] Data presented in Crouse (1999) and discussed in Fang and Keane (2005) suggest that caseloads started falling before the implementation of AFDC waivers and TANF in at least 33 states.

formulation therefore implies that policy reforms and economic conditions are partially *offsetting*. Finally, certain policy reforms might be just as effective (or ineffective) at increasing employment under most economic conditions. In this scenario, social policy reforms are *invariant* to local labor market conditions.

4.3 Empirical Implementation

The forthcoming discussion introduces the individual-level labor market and demographic data from the CPS and describes the construction of social policy and economic variables used in the analysis. A key issue considered here is the identification of policy effects. I then discuss the two main modeling strategies. The first approach estimates the effects of policy reforms and the economy on the employment of single mothers over the period 1985 to 2004. Parameter estimates from this model are interpreted as average effects of social policies across all mothers and economic conditions (average treatment effects or ATE models). In the second approach, I allow the effects of policy reforms to vary across several discrete categorizations of economic conditions, and so the estimated coefficients are considered heterogeneous policy effects (heterogeneous treatment effects or HTE models). Both models are estimated using three discrete-choice employment outcomes: any work participation (AW); employed and not receiving welfare (WNW); and employed full-time, full-year (FTFY).

Labor Market and Demographic Data

Individual-level data on single mothers are drawn from the annual demographic supplement to the Current Population Survey (CPS). The CPS is a nationally representative survey of approximately 60,000 households, providing detailed data on

labor market behavior, income, and demographic characteristics for individuals ages 15 and over. March CPS surveys for the years 1986 to 2005 are used, yielding information on employment and income for the years 1985 to 2004. Included in the sample are single women (widowed, divorced, separated, and never married) ages 21 to 64, who have at least one child ages 18 and under. The sample is limited to children in this age range because it is the one most relevant to simultaneous eligibility for welfare, the EITC, and other means-tested programs. Single mothers from census-defined families comprise the unit of analysis. I include not only independent female-headed families (primary families), but also female heads of related sub-families and (unrelated) secondary families. Defining families in this manner provides the closest match to a tax-filing unit, which is crucial for determining eligibility for multiple means-tested programs. After applying a number of standard exclusions on the sample composition, the final analysis sample consists of 120,189 single mothers with at least one child ages 0 to 18.[82]

As shown in Table 4.2, three employment outcomes are explored in this chapter, reflecting work margins critical to the success of social policy reforms. I first construct a measure of annual employment, defined as whether a given single mother was employed at all in the previous year (AW). This measure reflects the dichotomous work decision, or employment at the extensive margin, that has been the focus of most previous research. Participation along the AW margin increased from 68.3 percent to 82.7 percent between 1992 and 2000. Two infra-marginal employment measures are also constructed: whether the mother was employed at all and did not receive welfare in the previous year (WNW) and whether the mother was employed full-time (35+ hours/week), full-year

[82] Exclusions to the sample include women in the armed services and women with negative earnings, negative non-labor income, positive earnings but zero hours of work, or positive hours of work but zero earnings. Also, approximately one-fourth of single mothers appear in the sample for two consecutive years, given the CPS rotating structure.

(48+ weeks) (FTFY). Although neglected by earlier work, participation along these two work margins increased substantially throughout the 1990s, as depicted in Figure 4.1. At the WNW margin, employment grew from 56.7 percent to 75.8 percent, while employment at the FTFY margin grew from 57.9 percent to 64.8 percent over the same period.

Table 4.3 presents summary statistics for the CPS sample of single mothers, organized around the three employment outcomes. It appears that the observable characteristics of these mothers are correlated with the intensity of work. Women participating at the FTFY margin are older, on average, than women at the AW margin. In addition, single mothers employed at the FTFY margin are more highly skilled, as measured by educational attainment, less likely to be never married and have younger children, and less likely to head families with greater numbers of young children. However, mothers across all three work margins are evenly distributed among urban-rural areas and geographic regions. These descriptive results are intuitively reasonable, given that participation at the FTFY margin is significantly more demanding, and therefore requires greater work experience and skills and fewer barriers.

Social Policy Variables

The following discussion describes the construction of key social policy variables examined in this study.[83] In particular, I document changes to federal and state EITCs,

[83] Several data sources were used to collect and corroborate these data. I am indebted to Hanming Fang and Michael Keane for sharing their extensive documentation of state and federal policy changes. Many of the variables I construct are different in important ways from their variable list, but these authors have substantially advanced the literature with the breadth and depth of their policy data. The Urban Institute's *Welfare Rules Databook* (various years) and the Welfare Rules Database were invaluable for coding many of the TANF variables. Crouse (1999), DHHS (1997), and U.S. GAO (1997) provided information on states' waiver programs. Federal and state EITC parameters were drawn from Fang and Keane and various publications from the Center on Budget and Policy Priorities. Data on CCDF spending (and its predecessor programs) were taken from the Green Book (various years). Finally, states' earnings disregard policies were coded using the Welfare Rules Database and *Characteristics of State Plans for Aid to Families with Dependent Children* (various years).

child care subsidies, welfare benefits and earnings disregards, several components of AFDC waivers and TANF policy, and Medicaid (see Table 4.2). This study also considers for the first time two increasingly popular options used by states to deter probable welfare recipients from seeking aid: mandatory job search at the time of application and cash diversion programs. I pay careful attention to creating potentially exogenous variation in each policy reform by exploiting not only cross-state and year-to-year variation, but also that across mothers within a given state and year. In doing so, I make two important assumptions. First, by conditioning the sample on women being single and having children, I take marriage and fertility decisions to be exogenous. Economic models provide clear predictions that welfare and tax policy should influence these decisions, but the empirical evidence is mixed.[84] Even if social policy reforms affect underlying preferences for marriage and fertility, this sample selection problem will produce a downward bias if marriageability and employment outcomes are positively correlated. The second and related assumption is that, by "turning on" policy variables only for those mothers who are potentially influenced by such reforms (as opposed to turning them on for all mothers), I assume a partial-information-decision-making process, such that reforms influence women's employment behavior only when they become single mothers. Again, however, this is a conservative assumption, leading me to understate the influence of policy reforms.

Federal and State Earned Income Tax Credits. Arguably the most important change to work incentives faced by single mothers comes from the EITC. Enacted in 1975, federal expenditures on the EITC increased dramatically throughout the 1990s. By

[84] For an excellent review of the fertility literature, see Moffitt (1997), who concludes that "A majority of the studies show that welfare has a … positive effect on fertility rather than none at all…Considerable uncertainty surrounds this consensus because a sizable minority of the studies find no effect at all…" Bilter, Gelbach, Hoynes, and Zavodny (2004) review the evidence on marriage, and provide some of their own, which in both cases leads to mixed results.

2004, foregone revenue totaled $39.3 billion, up from $2.1 billion in 1985. Claimant families also grew steadily over this period, from 7.4 million to 21.4 million. Single-parent families comprise 48 percent of all claimants, and 75 percent of EITC dollars are paid to these families (Liebman, 1999; Green Book, 2004). In addition, state EITCs are increasingly widespread. In 1985, two states (Rhode Island and Wisconsin) operated their own EITC, increasing to 16 states by 2004. These credits simply "piggyback" onto the federal credit by using its eligibility rules and credit rates. To capture EITC effects, I combine the federal and state maximum credits that apply to families of a given size. Identification of this variable comes from year-to-year changes in the federal credit (especially after the 1986, 1990, and 1993 expansions), cross-state variation in maximum credits, and the differential treatment of families with different numbers of children. Table 4.4 displays the large and differential growth in the EITC maximum credit between 1985 and 2004. By 2004, eligible families with two or more children could receive a credit of $4,536, compared to $2,738 among one-child families.

Child Care Subsidies. Child care subsidies help low-income families defray child care costs, thereby reducing fixed work costs and increasing the likelihood of employment. The federal and state governments increased significantly child care funding over the past two decades by consolidating four preexisting programs and raising overall spending. By 2004, approximately $9.4 billion was spent through the CCDF, serving 1.7 million children per month. I parameterize changes to child care subsidy policy by summing federal and state expenditures through the CCDF (and its predecessor programs) and dividing by the number of children ages 0-12 in a given state and year. Several sources of variation identify this variable: year-to-year changes in CCDF

spending (which prior to 1991 was zero), cross-state variation in funding generosity, and program rules governing the age-eligibility of children who can receive subsidies. In particular, mothers whose youngest child is over age 12 are ineligible for child care assistance, making such families a potential comparison group. As shown in Table 4.4, CCDF spending per child rose from zero in 1985 to $135 by 2004.

Welfare Benefits and Earnings Disregards. Welfare benefits paid to non-working women increase the utility of remaining in that state, thereby providing an unambiguous disincentive to work. Over the past two decades, states took a number of steps to mitigate this disincentive. First, the real value of maximum welfare benefits declined substantially, as shown in Table 4.4, with some states experiencing declines as large as 25 percent in the period following welfare reform. Second, states altered policies governing earnings disregards when computing benefits for employed welfare recipients. Specifically, states increased the initial disregard and lowered the benefit phase-out rat. I control for the generosity of states' welfare benefits through the maximum AFDC/TANF benefit (for a three-person family) paid to non-working recipients. Changes to earnings disregards are captured by assigning to each single mother a predicted amount of annual disregarded earnings, based on mothers' own earnings and states' disregard policies in a given year.[85] Identifying variation for both variables comes from the large geographic and temporal variation in benefits and disregards.[86] Moreover, disregards vary across mothers, depending on exogenous, individual determinants of earnings. Between 1985 and 2004, maximum welfare benefits declined from $592 to $420, on average, while the

[85] This is a new approach to controlling for earnings disregard policies. Previous research simply incorporates such parameters as the benefit reduction rate. For a detailed description of how my procedure is accomplished, see Herbst (2006).
[86] An additional source of variation for these and all other welfare-related variables is that welfare benefits are paid until the youngest child reaches age 17. Since my sample includes families whose youngest is age 18, these families provide a potential comparison group.

phase-out rate declined from 67 percent to 46 percent, leading to a large increase in the amount of disregarded earnings over this period, as shown in Table 4.4.

Mandatory Job Search and Cash Diversion Programs. Many states have recently begun experimenting with policies that deter potential welfare recipients from receiving aid. Currently, 20 states mandate job search activities at the time of application. Specifically, these policies require applicants to search for a job either prior to applying for welfare or while the application is being vetted. Applicants must then prove that they have indeed searched for a job. Second, 30 states operate formal cash diversion programs, in which eligible applicants forgo welfare receipt in order to obtain temporary cash payments. States vary greatly in the amount provided to families, with some states providing a one-time lump sum transfer and others calculating the diversion payment as a percentage of the normal benefit. In addition, states limit the number of times an eligible family can receive payments, and many deny eligibility for some period following the transfer. I code both policies as state-level dummy variables, since they likely influence the behavior of a larger group of single mothers. Therefore, identification is achieved mainly through the differential timing of "turning on" these policies.[87] By 2004, over 46 percent of single mothers lived in states that implemented job search requirements, while 64 percent were potentially influenced by formal diversion programs.

Work Requirements and Sanctions. In 1993, Iowa became the first state to implement work requirements as a condition for receiving welfare. With the passage of welfare reform in 1996, all states now require recipients to participate in an acceptable

[87] Again, another source of identifying variation comes from the fact that these policies affect only those families whose youngest child is ages 0-17, leaving families with children age 18 as a potential comparison group.

work activity within 24 months of obtaining benefits, although 42 states require work immediately. States vary greatly in the type of work deemed acceptable and the number of hours per week one must participate in these activities, but most states require a minimum of 30 hours of weekly participation. Prior to the Family Support Act (FSA) of 1988, recipients with children under age six were exempt from work requirements. Over time states lowered this age exemption, thereby exposing more mothers to work requirements. Most states currently exempt only those families with children under 12 months old. In cases where the recipient is not exempt from work requirements and not complying with them, states have the option to sanction these families by reducing or eliminating all or part of their welfare benefits. As of 2004, 18 states had an initial, full-family sanction for failing to comply, and 42 states had an ultimate, full-family sanction. I create two dummy variables that capture the effects of work requirements and sanctions, as shown in Table 4.2. First, I use states' work requirement time limits combined with age exemption policies and the age structure of CPS families to code single mothers as potentially exposed to a work requirement. Second, I use the policy variation noted above in conjunction with state-specific sanction policies to code mothers as potentially affected by an initial full-family sanction.[88] Identification of these variables comes from multiple sources. States vary dramatically in terms of when both policies were first implemented, and given additional variation in the work requirement time limit, when individuals could be subjected to them. For example, as shown in Table 4.4, a small number of single mothers were potentially bound to work requirements beginning in

[88] Specifically, I use the age of the youngest child in a given family in concert with state-specific exemption policies to determine whether, in principle, a family could be exempt, even if the state's work requirement time limit exhausted. Most studies focus on whether a given state implements an ultimate full-family sanction. However, this is misspecified because it is difficult to determine when that sanction will be used and therefore may not be as influential. As a result, I model the initial sanction because it is the one that has the most proximate influence.

1994, increasing to 90 percent by 2004. A second source of variation comes from changes to states' age exemption polices: fully 42 percent of mothers were exempt from work requirements in 1985, while only seven percent were exempt in 2004. Thus, women who are shielded from work requirements because their children fall within the age exemption range helps to identify this effect and that of sanctions.

Time Limits. Time limits represent the greatest departure from previous policy. The origins of time-limited welfare receipt are found in the AFDC waiver period, during which 16 states retracted the entitlement status of welfare. With the implementation of PRWORA in 1996, all states have to abide by the federally mandated 60-month time limit.[89] Two types of time limit policies are implemented: lifetime and intermittent. The former deems ineligible for future benefits those families that have received welfare for 60 months, consecutively or nonconsecutively. The latter allows families to receive welfare for a certain number of months in a given period and then requires a "benefit waiting period" before regaining eligibility. By 2004, 43 states implemented a lifetime time limit, 16 states implemented an intermittent time limit, and five states (District of Columbia, Maine, Michigan, New York, and Vermont) do no have either. Time limits have both mechanical and behavioral effects on employment.[90] Mechanical effects arise from the fact that individuals must work after hitting the state-defined limit, assuming it is enforced. The behavioral effect incorporates the assumption that forward-looking women will save their stock of welfare benefits until they experience an employment shock. Therefore, the hypothesized positive effects of time limits will be greater when

[89] A critical point is that states have enormous flexibility on how to implement their time limit policies. On the one hand, states can set stricter limits than 60 month time limit, but on the other hand, states can and do continue to pay benefits after the time limit as long as they do so with their own funds.
[90] For detailed reviews of both effects, see Fang and Keane (2005) and Grogger (2003).

women are in their early working years and will decrease as they age.[91] I create three dummy variables to account for these mechanical and behavioral effects. The first two are state-level measures designed to capture whether a state has a lifetime or intermittent time limit. These variables are then interacted with the age of the mother to account for the age-dependence of time limit effects. The third variable uses information on when states' implemented their time limits, the amount of time allotted for welfare receipt, and the age of a mother's oldest child to determine whether a time limit could be binding. The intuition for this variable is that mothers cannot receive welfare any longer than the age of the oldest child. Therefore, it is impossible for time limits to bind for a mother whose oldest child is "younger" than the time limit.[92] As shown in Table 4.4, time limits bound for the first wave of single mothers as early as 1997; by 2004, two-thirds of mothers were potentially bound.

Medicaid. Enacted in 1965, the Medicaid program provides medical insurance to low-income families. Prior to the mid-1980s, participation in Medicaid was linked to participation in AFDC, but a number of recent changes have allowed single mothers and their children to maintain eligibility after leaving welfare. Arguably the most important change came through OBRA 1990, which required states to phase in coverage for children born after September 1983, until all poor children ages 18 and under were insured. As shown in Table 4.4, this benchmark was met in 2002. To capture changes in Medicaid generosity, I create a dummy variable to reflect whether all children in a working family are potentially insured. I exploit not only year-to-year variation in

[91] The precise relationship between time limits and employment depends on the age of the mother's youngest child. Beginning with the observation that AFDC/TANF eligibility ends when the youngest child reaches age 18, a five-year time limit does not influence work decisions when the youngest child is between ages 13 and 17. However, the younger the youngest child is below age 13, the stronger is the incentive to "bank" welfare benefits for future use. Another critical point is that time limits generate negative work incentives for some mothers and positive incentives for others, both of which depend on the age of the youngest child.

[92] This is very similar to the measure used by Fang and Keane (2005).

eligibility rules, but also variation across mothers within a state and year because eligibility depends in part on the age structure of children.

Estimating the Employment Models

As previously stated, two basic employment models are estimated in this study: an ATE and HTE model. Within each model, three employment outcomes are investigated: AW (any work), WNW (work and no welfare), and FTFY (full-time, full-year work). Given the discrete characterization of the employment outcomes, the decision to participate in each work state arises from the underlying utility generated by single mothers' work choices. This underlying propensity to work at a given margin is not observed, however, and so I express the ATE model in the following manner:

$$[4.1] \quad \Pr[emp_{ist} = 1 \mid \mathbf{x}] = \Phi\{\alpha + \mathbf{P}_{ist}'\beta + \phi E_{ist} + \mathbf{X}_{ist}'\theta + \mu_s + \nu_t + (\text{trend} \times \nu_t) + \varepsilon_{ist}\},$$

for $i = 1, \ldots, N_{is}$; $s = 1, \ldots, S$; $t = 1, \ldots, N$, where $\varepsilon \sim$ i.i.d. $N(0,1)$. Given the normality assumption on ε, I estimate this model using probit regression. The dependent variable, emp_{ist}, is one of three employment outcomes for the i^{th} single mother in state s at time t. The $\mathbf{P}_{ist}$ represents a vector of social policy reforms, and E_{ist} is the average, annual state unemployment rate.[93] I also include controls for observable characteristics that are correlated with policy reforms and local economic conditions, and which also shift preferences for employment. The $\mathbf{X}_{ist}$ is a vector of demographic and human capital variables, such as age, race, marital status, educational attainment, number and ages of children, metropolitan status, and non-wage income. The parameters μ_s and ν_t denote

[93] I experimented with several other measures of economic conditions, with varying degrees of success. First, I tested a measure of the volatility of states' economic environment by creating the mean deviation of county-level unemployment rates from the overall state average, weighted by the size of the labor force. In addition, I experimented with state-level measures of total UI covered employment and wages as well as employment and wages in the retail and service sectors. Employment and wage growth rates were also tested. Many of these measures were statistically significant in the ATE employment models, although at times the coefficients were incorrectly signed. In the end, I decided to focus on state unemployment rates in order to simplify the analysis.

state and year fixed effects, while (trend × ν_t) indicates state-specific time trends. The parameters of interest are β and ϕ, which measure the impact of social policy reforms and the economy, respectively, on the employment of single mothers. Specifically, these parameters measure the average effect of policy and economic variables across all mothers and economic conditions.

To test for heterogeneous policy effects (HTE model), I estimate permutations of the following stylized model:

[4.2] $\Pr[emp_{ist} = 1 \mid \mathbf{x}] = \Phi\{\alpha + \beta_1(P_{ist} \times E_{\text{UR<26th}}) + \beta_2(P_{ist} \times E_{\text{UR26th–50th}}) + \beta_3(P_{ist} \times E_{\text{UR51st–75th}}) + \beta_4(P_{ist} \times E_{\text{UR>75th}}) + \mathbf{E}_{ist}'\phi\,\mathbf{X}_{ist}'\theta + \mu_s + \nu_t + (\text{trend} \times \nu_t) + \varepsilon_{ist}\}$,

where emp_{ist} denotes the binary work outcomes described above. The key variables in this model are interactions between each social policy reform (P_{ist}) and dummy variables for quartiles of the state unemployment rate (E). The quartile dummies are created in the following manner. I first average in two-year increments (over the period 1985-2004) the unemployment rate and then create a dummy variable at each quartile break in the distribution. This leads to following four unemployment rate dummy variables:

$E_{\text{UR<26th}}$: (UR is less than the 26th percentile) = 1; 0 = otherwise
$E_{\text{UR26th–50th}}$: (UR is between the 26th and 50th percentiles) = 1; 0 = otherwise
$E_{\text{UR51st–75th}}$: (UR is between the 51st and 75th percentiles) = 1; 0 = otherwise
$E_{\text{UR>75th}}$: (UR is greater than the 75th percentile) = 1; 0 = otherwise.[94]

Creating quartile distribution breaks in two-year increments ensures a large number of observations in each cell and accounts for cyclical movements in economic conditions. There is also considerable variation across the distribution breaks, as shown in Table 4.4. Another advantage of this approach is that it allows the effects of policy reforms to vary

[94] Two-year incremental averages and quartile breaks are admittedly *ad hoc*. However, I experimented with alternative break points (e.g., three and five distribution breaks) and with one-year and three-year incremental averages. The results are qualitatively similar to the procedure described in the text.

across fairly heterogeneous economic conditions, but also provides information on how each reform operates within a very specific environment.[95] I suppress from the model the "main effect" associated with each policy reform, so that the coefficient on the interaction (β) is interpreted as the impact of a given policy reform at the specified unemployment quartile.[96] This parameterization allows for a general test of heterogeneous policy effects.

4.4 Estimation Results

This section presents estimation results for the probit ATE and HTE models. The ATE results are depicted in Table 4.5, and HTE results are depicted in Table 4.6. In addition, I estimate the HTE model on two sub-groups: single mothers with a high school degree or less (Table 4.7) and non-white single mothers (Table 4.8).[97] Table 4.9 contains results from specification tests of the equality of policy coefficients across quartiles of the unemployment rate.

Results from the ATE Models

Table 4.5 presents marginal effects associated with social policy reforms and the economy across all three work margins. Coefficients are for the most part statistically significant at conventional levels and correctly signed. Marginal effects associated with the EITC and child care subsidies suggest that both policies are strongly and positively related to employment at the AW and WNW (only subsidies) margins but negatively

[95] Still another advantage of the dummy variable approach is that is mitigates the collinearity problem that arises when interacting each policy reform with the continuously measured unemployment rate.
[96] Multicollinearity was somewhat of a concern when estimating [2]. Therefore, I estimate a separate probit model for each set of policy-unemployment rate interactions, for a total of 12 regressions for each employment outcome (or 36 different regressions).
[97] I estimate the HTE model on several other sub-groups, including mothers with young children and never married mothers. Results are qualitatively similar to those reported in the text, although given the smaller sample sizes associated with the above sub-groups, standard errors were often much higher.

related to employment at the FTFY margin. Although support for the latter result is somewhat less common in the empirical literature, it does in fact accord with economic theory. Women at this margin are more likely to be within the phase-out range of the EITC and experience greater subsidy co-payment rates, both of which act as implicit taxes on earnings and therefore create an incentive to lower work intensity.

The negative job search coefficients may at first appear to be counterintuitive, but recall that states only require a job search as a condition for applying for welfare. No requirement exists that applicants must find employment as well. Therefore, it could be the case that welfare applicants simply look for a job (or at least indicate that they have) to fulfill the requirement, and then remain unemployed while receiving welfare. Additional research is needed to verify this assertion. Formal diversion programs, on the other hand, are positively associated with employment at the AW and WNW margins, but this effect disappears at the FTFY margin. Such a pattern of results is reasonable given that families must be income-eligible for TANF in order to receive a diversion grant, and so one would not expect the relationship to hold at the FTFY margin.

Work requirements, benefit sanctions, and time limits are, as expected, positively related to employment across virtually all work margins. Time limits display the age-dependence predicted by economic theory, that is, this policy leads to smaller increases in employment as the mother ages. Not surprisingly, binding time limits (mechanical effect) are associated with larger employment effects than the parameterization of lifetime and intermittent time limits, which capture behavioral effects. An interesting pattern emerges for these policy "sticks": the magnitude of the employment effects consistently increases with the intensity of work. These results, especially for work

requirements and sanctions, conform to the structure of states' TANF programs, in that most states require full-time participation in a work activity or risk benefit sanctions. Therefore, one might expect greater behavioral effects at the WNW and FTFY margins.

Finally, economic conditions, as measured by the state unemployment rate, are strongly related to employment at the AW margin, but the effect attenuates across the WNW and FTFY margins (and is statistically insignificant at WNW). Such results imply that tenuous workers are more sensitive to demand conditions—perhaps because they are younger and less-skilled—but that economic conditions matter less once workers become firmly rooted in the labor force.

In sum, marginal effects in Table 4.5 imply a pattern of results that split policy "carrots" and "sticks." The former set of policies—including the EITC, child care subsidies, and Medicaid—appear to have its largest positive effects at the AW margin and then decline (or become negative) with increasing work intensity. Policy "sticks," on the other hand, exhibit greater positive effects as work intensity increases. That work requirements and sanctions create stronger work incentives at the FTFY margin is reasonable given the structure of states' TANF policies. Economic conditions appear to be influential at work margins where tenuous workers are most likely located (AW), declining somewhat as work intensity becomes increasingly demanding.

Results from the HTE Models

Table 4.6 presents marginal effects from the probit HTE models estimated on all single mothers, and Tables 4.7 and 4.8 investigate sub-samples of low-skilled and non-white mothers, respectively. To ease interpretation of results, I suppress in Tables 4.7 and 4.8 the coefficients associated with the middle two policy-unemployment

interactions.[98] Given the large number of results, I focus the discussion on a few policy reforms.

Marginal effects associated with the EITC and child care subsidies are positively associated with employment at the AW margin, and this finding holds across all quartiles of the unemployment rate. Both policies, once again, become negative as the intensity of work increases. However, whereas the EITC effects are relatively stable across all economic conditions, spending on child care subsidies is quite sensitive to the economic environment. Specifically, the magnitude of positive *and* negative effects is greatest when relative economic conditions are favorable. At the AW margin, the magnitude of the positive incentive introduced by CCDF spending increases threefold moving from the least to the most favorable economic environment, while the magnitude of the disincentive roughly doubles at the FTFY margin. One possible explanation for this pattern is that CCDF spending is negatively correlated with the unemployment rate (ρ = -0.26), suggesting that single mothers' employment decisions become more responsive to economic incentives as funding levels for subsidies increase.

The pattern of results for job search and diversion programs is striking. States' mandatory job search policies lead to lower employment rates at the AW and WNW margins, but become positive at the FTFY margin. In fact, the only positive and statistically significant result for job search policies is found at the FTFY margin, and when economic conditions are favorable. Diversion programs, on the other hand, are consistently positively associated with employment, but the magnitude and significance of the effect increases as work intensity increases in favorable economic conditions. Together these results imply that soft policy "sticks" require a strong economy in order to

[98] Results for all missing coefficients are available from the author upon request.

produce employment gains, especially if the goal of such policies is to increase full-time employment.

Turning to such hard policy "sticks" as work requirements, welfare sanctions, and time limits one finds a similar pattern of results. The case of work requirements provides an interesting example. This policy does not produce consistent evidence of a positive employment effect across the AW and WNW margins, but there appears to be strong evidence of such an effect at the FTFY margin. These results largely confirm those found in Table 4.5. In addition, the magnitude of marginal effects is remarkably uniform across quartiles of the unemployment rate at the AW and WNW margins but displays greater heterogeneity at the FTFY margin, with larger positive effects in robust economic conditions. In fact, moving from the least to the most favorable labor market conditions increases the effects of work requirements by 31 percent at the FTFY margin. Welfare sanctions create stronger work incentives across increasingly demanding work margins, but the effects do not reveal much heterogeneity across economic environments. Finally, the pattern of results for time limits, especially binding and intermittent time limits, follow a pattern similar to that of work requirements: one finds the largest magnitude of effects at the FTFY margin and when the economy is strong. Moving from the least to the most favorable labor market conditions increases the employment effect by 54 percent and 37 percent for intermittent and binding time limits, respectively.

With a few exceptions, the results in Table 4.6 imply some interesting patterns. Policy "carrots"—especially child care subsidies, disregarded earnings, and Medicaid generosity—create their greatest employment incentives when the economy is strong and when the work intensity is low. Soft policy "sticks" like mandatory job search and

diversion grants actually require strong economic conditions to produce positive employment effects, while hard policy "sticks" like work requirements and time limits produce larger effects in strong conditions. In addition, patterns for all policy "sticks" are more pronounced across increasingly intense wok margins.

A similar pattern emerges, and in many cases is more dramatic, for sub-samples of low-skilled (i.e., those with a high school degree or less) and non-white single mothers. Tables 4.7 and 4.8 present results for these sub-groups. Across both types of mothers, the EITC leads to uniform employment effects across both economic conditions and work margins. Federal and state spending on child care subsidies is associated with greater employment rates in favorable economic conditions, and this general pattern holds for the magnitude of negative effects. States' job search and diversion programs are predicted to increase employment more as the intensity of work increases, especially in the presence of strong labor market conditions. While the magnitude of work requirement effects is fairly uniform at the AW margin, there is considerable heterogeneity at the FTFY margin. In fact, moving from the least to the most favorable economic conditions raises the likelihood of employment by 53 percent and 235 percent for low-skilled and non-white single mothers, respectively. Welfare sanctions also reveal the greatest heterogeneity at the FTFY margin, and the only statistically significant result is found for this employment outcome in favorable labor market conditions. Similar patterns are revealed for the time limit policies.

Specification Tests

Table 4.9 presents results from an explicit test of policy heterogeneity across varying economic conditions. Specifically, I report p-values from a series of χ^2 tests that

examine two hypotheses. First, I test the hypothesis that all social policy-unemployment interactions have the same coefficient, and second, I test whether the interactions at the least and most favorable economic conditions are the same. Bolded p-values imply that the null hypothesis of equality of coefficients is rejected at the 20 percent level or better. The impetus for extending the rejection region is that, in some cases, very small differences in coefficients nearly miss statistical significance at conventional levels (10 percent or better), but are significant at levels just above that threshold. However, most bolded p-values reveal a rejection of the null at levels of at least 10 percent.

Specification tests in Table 4.9 largely confirm the pattern of results described in the previous section. Generally speaking, there is a great deal of policy heterogeneity across economic conditions. Much of this heterogeneity is unevenly distributed across the three work margins, with policy-unemployment interactions revealing the greatest variation at the FTFY margin. Interestingly, the specification tests show very little policy heterogeneity at the WNW margin, and slightly more at the AW margin. Thus, it appears that most of the behavioral "action" with respect to differential policy effects is concentrated at the outermost work margins. These results also confirm that policy "carrots" are more likely to reveal heterogeneous effects at lower intensity work margins, while policy "sticks" are more likely to show variation at more demanding work margins. In addition, it is important to note that many of these results are more pronounced for low-skilled and non-white mothers. Behavioral responses to job search and cash diversion programs, in particular, as well as work requirements and sanctions are more varied across economic conditions for these mothers.

Decomposition of Single Mothers' Employment Growth: 1992-2000

To summarize the results from previous sections, I use the parameter estimates reported in Tables 4.5 and 4.6 to decompose the contribution of social policy reforms and the economy to the employment growth of single mothers between 1992 and 2000. As shown in 4.10, employment rates increased 14.4 percentage points at the AW margin, 19.1 percentage points at the WNW margin, and 6.9 percentage points at the FTFY margin. All decompositions are conducted separately for ATE and HTE models.

Estimates from my preferred specification imply that the bundle of social policies examined in this chapter explain 38.9 percent of the AW employment growth among single mothers. The EITC is the single largest contributor, explaining approximately 13 percent of the observed increase. Child care subsidies (9.6 percent) and work requirements (7.4 percent) are also important factors. Economic conditions, as measured by the state unemployment rate, account for another 13.2 percent of the employment growth. Overall, my model is able to explain over half (52.1 percent) the increase in annual employment between 1992 and 2000. These estimates match closely recent work by Fang and Keane (2005) and Looney (2005), but differ in important ways from other authors. Specifically, the fraction of employment growth attributed to the EITC is on the low end of previous estimates, diverging considerably from Grogger (2003) and Meyer and Rosenbaum (2001). However, the model in this chapter incorporates many more policy reforms than Grogger's analysis, which may have reduced the EITC effect, and this chapter conducts the decomposition using a different time period from the one in Meyer and Rosenbaum's work.

When the basic model is extended to account for policy heterogeneity across economic conditions, fully 54.4 percent of the observed increase in annual employment is explained by the social policy reforms. This represents a 40 percent improvement in explanatory power over the model estimating only average "treatment" effects (ATE model). Changes to the EITC account for a similar fraction of the increase in annual employment (13.1 percent). The contribution of child care subsidies increases 21 percent in the heterogeneous model, and the effects of declining maximum welfare benefits rise substantially, by 75 percent. In addition, heterogeneous effects of diversion grants and Medicaid appear to exceed their average effects, with the former increasing 92 percent and the latter increasing 48 percent.

Turning to the WNW work margin, I find that social policy reforms explain 23.6 percent of the 1992-2000 employment increase among single mothers, significantly less than at the AW margin. Improved economic conditions contribute very little to employment growth at this margin, explaining an additional two percentage points. Whereas the EITC was a primary factor at the AW margin, it explains almost nothing (0.13 percent) at this work level. All other policy reforms appear to explain a similar fraction of the employment growth. When the model is extended to include heterogeneous policy effects, its explanatory power increases to account for 30.5 percent of the growth. This represents a 29 percent increase over the ATE model. Most of this additional explanatory power comes from heterogeneous effects in child care subsidies, welfare benefits, and Medicaid.

4.5 Conclusion and Policy Implications

This chapter began with the observation that, although a substantial literature investigates the contribution of social policy reforms and the economy to the employment growth of single mothers, every study assumes that both factors act independently to influence welfare and employment outcomes. Such an assumption leads researchers to estimate average "treatment" effects that hold across all mothers and economic conditions. In this chapter, however, I relax this assumption by investigating the presence of heterogeneous policy effects across varying economic conditions. Specifically, using data over the period 1985 to 2004, I explore the effects of a broad menu of social policy reforms across discrete categorizations of the unemployment rate. This study also extends the literature by testing for heterogeneous policy effects across three work "margins:" any work participation; work and no welfare; and full-time, full-year work.

Estimates from my preferred specification imply that the bundle of social policy reforms considered in this study explain 38.9 percent of the annual employment growth among single mothers between 1992 and 2000. Economic conditions account for another 13.2 percent of the increase. When the basic model is extended to account for policy heterogeneity across economic conditions, fully 54.4 percent of the observed increase is explained, representing a 40 percent improvement in explanatory power.

As summarized in Table 4.11, a number of interesting patterns emerge from the data. First, it is interesting to note that many policy reforms do not show significant heterogeneity across economic conditions or work margins. Among those that reveal varying effects, policy "carrots" create their greatest employment incentives when the

economy is strong and the work intensity is low. Soft policy "sticks" like mandatory job search and diversion grants require strong economic conditions to produce positive employment effects, while hard policy "sticks" like work requirements and time limits produce larger effects in such environments. Patterns for all policy "sticks" are more pronounced across increasingly intense work margins. Both sets of policies generate the greatest employment effects when economic conditions are favorable, implying that a strong economy *reinforces* the positive incentives created by social policy reforms.

This research raises several important policy implications. First, social policy reforms do not create the same employment incentives across all economic conditions and work margins. Therefore, policy reforms should be carefully tailored to specific employment goals and take account of the economic environment in which they operate. If, for example, the goal of a given policy reform is to move welfare recipients into work, policymakers can reliably draw from a broad menu of policy options to achieve their objectives. Based on the results of this study, use of an EITC or work requirements, for example, can achieve similar employment results across most economic conditions. However, if the policy stipulates that recipients work full-time (as is the case with work requirements), favorable economic conditions must be present if policymakers are to ensure those requirements are met and recipients avoid benefit sanctions.

These results also suggest that economic "triggers"—in which states stop the time limit clock or adjust downward work participation rates when the unemployment rate exceeds a certain level—is a useful mechanism to help welfare recipients and states avoid financial penalties. Another option for states operating in a weak economy is to broaden the number of "acceptable" work activities or shift welfare recipients into activities that

are less sensitive to the economy (e.g., subsidized employment, community service, and education/job training programs). Each of these strategies is increasingly important in light of the 2005 TANF reauthorization, which raises work participation rates for all welfare recipients, narrows the definition of acceptable work activities, and imposes financial penalties on non-complaint states.

An open question for future research is how policy-economy interactions influence measures of well-being, such as earnings and poverty. Specifically, it is important to determine whether the increased employment incentives associated with work requirements and welfare sanctions, for example, are matched with gains in economic well-being. This issue is particularly crucial for policy reforms operating in poor economic conditions because welfare recipients could be forced to accept lower paying jobs just to avoid violation of work requirements and hence risk benefit sanctions.

TABLE 4.1:The Contribution of Social Policy Reforms and the Economy to the Employment Growth of Single Mothers

			Percent of Employment Growth Attributable to:				
Study Author(s) / (Year)	**Data Source**	**Observation Period**	**EITC**	**CCDF**	**Welfare Benefits**	**Welfare Reform**	**Economy**
O'Neill and Hill (2001)	March CPS	1992 - 1996	--	--	--	22.0	35.0
		1996 - 1999	--	--	--	61.7	17.4
Meyer and Rosenbaum (2001)	March CPS	1984 - 1996	61.4	5.9	13.6	14.8[1]	12.2
		1992 - 1996	35.1	1.5	7.6	19.8[1]	--
Grogger (2003)	March CPS	1993 - 1999	33.5	--	6.9	13.0[2]	20.5
Fang and Keane (2004)	March CPS	1993 - 1999	16.8	9.20	--	20.9[3]	45.6
Looney (2005)	SIPP	1993 - 1999[4]	21.5	0.0[5]	11.0	18.4[6]	12.8

Notes: Several measures of economic conditions are often used. However, to maintain consistency, this table considers only the contribution of the state (or metropolitan) unemployment rate. [1] Waivers for work requirement/benefit reduction time limits and sanctions. [2] Implementation of any statewide welfare reform and time limits, both of which are interacted with the age of the youngest child. [3] Time limits and work requirements. [4] Estimates are based on models explaining monthly employment, whereas the remaining studies use annual employment as the dependent variable. [5] Included in the employment model is the number of months transitional child care is available for women leaving welfare. This variable non-significant in the employment regressions, and it does not explain any of the employment growth [6] Welfare benefit reduction rates, age-of-child exemptions from work requirements, benefit sanctions, implementation of AFDC waivers (plus leads and lags), and the implementation of welfare reform (plus leads and lags).

TABLE 4.2: Variable Description and Identification Strategy

Variable Name	Description	Identifying Variation			
		State	Year	Rules	Kids
Panel A: Employment Outcomes					
Work	= 1 if the mother was employed in the previous year; 0 = otherwise	--	--	--	--
Work and No Welfare	= 1 if the mother was employed and did not receive welfare in the previous year; 0 = otherwise	--	--	--	--
Full-time, Full-year Work	= 1 if the mother was employed full-time (35+ hours), full-year (48+ weeks), conditional on being employed; 0 = otherwise	--	--	--	--
Panel B: Social Policy Reforms					
EITC Maximum Credit	Combined federal and state EITC maximum credit for families with 1, 2, or 3+ children	√	√		√
CCDF Spending	Federal and state spending through the CCDF (and its predecessor programs) per child ages 0-12	√	√	√	
Welfare Maximum Benefit	AFDC/TANF maximum benefit for a 3-person family, assuming the mother is not employed	√	√	√	
Disregarded Earnings	Predicted amount of disregarded earnings when calculating welfare benefits for employed recipients, based on states' earnings disregard policies (initial disregard and benefit reduction rate)	√	√	√	
Job Search	= 1 if a state mandates job search activities at the time of welfare application; 0 = otherwise	√	√	√	
Diversion Program	= 1 if a state operates a formal welfare diversion program; 0 = otherwise	√	√	√	
Work Requirement	= 1 if the mother could be subjected to a work requirement, based on states' age-of-child work exemption and work requirement time limit; 0 = otherwise	√	√	√	√
Welfare Sanction	= 1 if the mother could be subjected to an initial full-family sanction for not meeting work requirements, based on states' sanction policies, length of work requirement time limit, and whether the mother could be subjected to a work requirement; 0 = otherwise	√	√	√	√
Lifetime Time Limit	= 1 if a state has a lifetime time limit, followed by a full-family benefit reduction; 0 = otherwise	√	√	√	
Intermittent Time Limit	= 1 if a state has an intermittent time limit; 0 = otherwise	√	√	√	
Time Limit is Binding	= 1 if a state's lifetime time limit could be binding, based on states' time limit policy and the age of the mother's oldest child; 0 = otherwise	√	√	√	√
Medicaid Coverage	= 1 if all children in a working family are potentially covered by Medicaid, based on states' eligibility age limit policies and the age of mother's oldest child; 0 = otherwise	√	√		√
Panel C: Indicators of Macro-economic Conditions					
Unemployment Rate	State unemployment rate, annual average	√	√		

TABLE 4.3: Summary Statistics for Single Mothers, 1985-2004

Variable	Outcome 1: Work	Outcome 2: Work and No Welfare	Outcome 3: Full-time, Full-year Work	All Single Mothers
Age	34.98	35.58	36.57	34.62
	(8.94)	(8.81)	(8.33)	(9.44)
Less than High School	0.159	0.138	0.115	0.231
	(0.365)	(0.344)	(0.319)	(0.421)
High School/GED	0.390	0.386	0.386	0.379
	(0.487)	(0.487)	(0.486)	(0.485)
Some College	0.319	0.329	0.338	0.283
	(0.466)	(0.470)	(0.473)	(0.450)
BA+	0.130	0.145	0.160	0.104
	(0.336)	(0.352)	(0.366)	(0.306)
Widowed	0.050	0.054	0.047	0.059
	(0.219)	(0.226)	(0.212)	(0.236)
Separated	0.160	0.157	0.153	0.166
	(0.366)	(0.364)	(0.360)	(0.372)
Divorced	0.439	0.463	0.501	0.388
	(0.496)	(0.498)	(0.500)	(0.487)
Never Married	0.349	0.324	0.297	0.384
	(0.476)	(0.468)	(0.456)	(0.486)
Non-white	0.337	0.319	0.328	0.365
	(0.472)	(0.466)	(0.469)	(0.481)
Youngest Child: 0-2	0.189	0.165	0.124	0.228
	(0.391)	(0.371)	(0.329)	(0.420)
Youngest Child: 3-5	0.190	0.182	0.177	0.194
	(0.392)	(0.386)	(0.381)	(0.396)
Youngest Child: 6-8	0.169	0.171	0.173	0.161
	(0.375)	(0.376)	(0.379)	(0.367)
Youngest Child: 9-12	0.197	0.206	0.219	0.182
	(0.398)	(0.404)	(0.414)	(0.386)
Youngest Child: 13-17	0.219	0.237	0.263	0.201
	(0.413)	(0.425)	(0.440)	(0.401)
Number of Children: 0-5	0.466	0.414	0.351	0.552
	(0.669)	(0.625)	(0.582)	(0.747)
Urban Residence	0.813	0.816	0.827	0.813
	(0.389)	(0.386)	(0.377)	(0.389)
South	0.391	0.401	0.399	0.381
	(0.488)	(0.490)	(0.489)	(0.485)
Non-wage Income	391.79	380.27	340.29	463.67
(monthly)	(757.56)	(793.87)	(703.50)	(799.91)

Source: Author's calculations from the 1986-2005 March CPS.
Notes: Standard deviations are in parentheses. Data are weighted using the March Supplemental Person Weight. Dollars are adjusted to reflect to 2004 prices. Number of observations for Outcome 1: 90,024. Number of observations for Outcome 2: 79,000. Number of observations for outcome 3: 55,045. Number of observations for all single mothers: 120,183.

TABLE 4.4: Social Policy and Economic Factors Influencing Single Mothers' Work Decisions, 1985-2004

Variable/Year	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004
Panel A: Employment Outcomes										
Work	0.673	0.702	0.705	0.683	0.719	0.754	0.798	0.827	0.803	0.777
Work and No Welfare	0.567	0.588	0.586	0.567	0.587	0.637	0.697	0.758	0.752	0.730
Full-time, Full-year Work	0.569	0.594	0.573	0.579	0.579	0.590	0.618	0.648	0.649	0.642
Panel B: Social Policy Reforms										
EITC Maximum Credit:										
1 Child ($1000s)	0.949	1.407	1.393	1.801	2.640	2.666	2.703	2.688	2.762	2.738
2+ Children ($1000s)	0.949	1.408	1.392	1.893	3.295	4.423	4.495	4.446	4.564	4.536
Implementation of a State EITC (%)	0.003	0.024	0.048	0.067	0.139	0.144	0.180	0.257	0.284	0.271
CCDF Spending ($1000s)	0	0	0	0.026	0.037	0.058	0.095	0.118	0.093	0.135
Welfare Maximum Benefit ($1000s)	0.610	0.604	0.570	0.526	0.497	0.469	0.444	0.431	0.432	0.420
Disregarded Earnings ($1000s)	4.459	4.390	4.450	4.505	4.822	5.154	7.578	9.873	10.085	9.792
Job Search (%)	0	0	0	0	0	0.162	0.187	0.242	0.250	0.464
Diversion Program (%)	0	0	0	0	0	0.053	0.295	0.620	0.642	0.641
Age-of-Child Work Exemption (%)	0.423	0.439	0.254	0.252	0.226	0.177	0.092	0.089	0.066	0.074
Work Requirement (%)	0	0	0	0	0.010	0.566	0.787	0.853	0.898	0.889
Welfare Sanction (%)	0	0	0	0	0	0	0.225	0.231	0.242	0.336
Lifetime Time Limit (%)	0	0	0	0	0	0.016	0.654	0.748	0.773	0.805
Intermittent Time Limit (%)	0	0	0	0	0	0.214	0.408	0.399	0.376	0.373
Time Limit is Binding (%)	0	0	0	0	0	0	0.172	0.273	0.556	0.648
Medicaid Coverage (%)	0	0.044	0.325	0.423	0.634	0.758	0.971	0.882	1.0	1.0
Panel C: Indicators of Macro-economic Conditions										
Unemployment Rate	7.12	5.64	5.67	7.54	6.22	5.46	4.58	4.08	5.82	5.56
Quartiles of the Unemployment Rate										
(UR < 26th)	4.93	3.94	4.32	5.46	5.02	4.19	3.63	3.16	4.01	4.44
(UR 26th – 50th)	6.40	5.20	5.25	6.71	6.28	5.10	4.45	4.02	4.84	5.27
(UR 51st – 75th)	7.66	6.30	5.83	7.63	6.89	5.86	5.19	4.51	5.54	6.02
(UR > 75th)	9.68	8.13	6.74	8.85	8.50	7.12	5.95	5.09	6.42	6.79

Notes: Dollars are adjusted for inflation to reflect 2004 prices. Data are weighted by March CPS Supplemental Person weight. Full-time, full-year work is calculated among those who worked in the previous year. All percentages reflect the fraction of single mothers with at least one child under age 19 who live in a state with a given reform. See text for additional information on how these variables were constructed.

TABLE 4.5: Marginal Effects from the ATE Employment Models

Variable	Outcome 1: Work	Outcome 2: Work and No Welfare	Outcome 3: Full-time, Full-year Work
EITC Maximum Credit	0.0105	-0.0001	-0.0114
($1000s)	(0.0023)***	(0.0028)	(0.0030)***
CCDF Spending	0.1565	0.1728	-0.1210
($1000s)	(0.0337)***	(0.0404)***	(0.0450)***
ln(welfare maximum benefit)	-0.0900	-0.1156	-0.0460
	(0.0260)***	(0.0308)***	(0.0352)
ln(disregarded earnings)	0.0524	0.0941	0.1116
	(0.0052)***	(0.0061)***	(0.0070)***
Job Search	-0.0211	-0.0164	0.0077
	(0.0077)***	(0.0090)*	(0.0100)
Diversion Program	0.0137	0.0241	-0.0012
	(0.0069)*	(0.0082)***	(0.0092)
Work Requirement	0.0124	0.0138	0.0390
	(0.0059)**	(0.0071)*	(0.0081)***
Welfare Sanction	0.0120	0.0234	0.0294
	(0.0083)	(0.0098)**	(0.0108)***
Lifetime Time Limit	0.0412	0.0576	-0.0160
	(0.0138)***	(0.0167)***	(0.0200)
Lifetime Time Limit × Age	-0.0017	-0.0026	-0.0008
	(0.0003)***	(0.0004)***	(0.0005)*
Intermittent Time Limit	0.0282	0.0526	0.0693
	(0.0147)*	(0.0176)***	(0.0200)***
Intermittent Time Limit × Age	-0.0010	-0.0015	-0.0015
	(0.0003)***	(0.0004)***	(0.0005)***
Time Limit is Binding	0.0541	0.1100	0.0986
	(0.0152)***	(0.0180)***	(0.0212)***
Time Limit is Binding × Age	-0.0016	-0.0029	-0.0026
	(0.0004)***	(0.0005)***	(0.0006)***
Medicaid Coverage	0.0133	0.0048	-0.0041
	(0.0044)***	(0.0052)	(0.0062)
Unemployment Rate	-0.0055	-0.0011	-0.0041
	(0.0017)***	(0.0020)	(0.0025)*
Mean of Dependent Variable	0.744	0.647	0.606
Demographic Controls	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
State-specific Time Trends	Yes	Yes	Yes
Number of Observations	120,189	120,189	90,028
Log-likelihood	-54,994.642	-57,200.037	-53,541.574

Source: Author's calculation from the 1986-2005 March CPS

Notes: Marginal effects are shown, along with robust standard errors (in parentheses). *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All models include controls for age; age-squared; whether the youngest child is ages 3-5, ages 6-8, ages 9-12, and ages 13-17; number of children ages 0-5; educational attainment; marital status; non-white; metropolitan residence; and non-wage income.

TABLE 4.6: Effects of Social Policy Reforms Across Quartiles of the Unemployment Rate: HTE Model

Variable	Outcome 1: Work	Outcome 2: Work and No Welfare	Outcome 3: Full-time, Full-year Work
EITC Maximum Credit			
× (UR < 26th)	0.0096	0.0001	-0.0126
	(0.0035)***	(0.0040)	(0.0043)***
× (UR 26th – 50th)	0.0109	-0.0001	-0.0133
	(0.0030)***	(0.0036)	(0.0039)***
× (UR 51st – 75th)	0.0116	0.0024	-0.0102
	(0.0030)***	(0.0036)	(0.0040)**
× (UR > 75th)	0.0102	-0.0025	-0.0090
	(0.0031)***	(0.0038)	(0.0043)**
CCDF Spending			
× (UR < 26th)	0.2658	0.2557	-0.1868
	(0.0540)***	(0.0637)***	(0.0665)***
× (UR 26th – 50th)	0.2140	0.2359	-0.1326
	(0.0492)***	(0.0587)***	(0.0637)**
× (UR 51st – 75th)	0.1527	0.1696	-0.1451
	(0.0476)***	(0.0577)***	(0.0641)**
× (UR > 75th)	0.0808	0.0905	-0.0703
	(0.0434)*	(0.0523)*	(0.0597)
ln(welfare maximum benefit)			
× (UR < 26th)	-0.0847	-0.1205	-0.0543
	(0.0299)***	(0.0353)***	(0.0400)
× (UR 26th – 50th)	-0.0954	-0.1157	-0.0569
	(0.0269)***	(0.0319)***	(0.0364)
× (UR 51st – 75th)	-0.1003	-0.1215	-0.0534
	(0.0260)***	(0.0308)***	(0.0353)
× (UR > 75th)	-0.0942	-0.1216	-0.0496
	(0.0275)***	(0.0326)***	(0.0373)
ln(disregarded earnings)			
× (UR < 26th)	0.0445	0.0910	0.1213
	(0.0061)***	(0.0072)***	(0.0081)***
× (UR 26th – 50th)	0.0520	0.0928	0.1084
	(0.0058)***	(0.0068)***	(0.0079)***
× (UR 51st – 75th)	0.0567	0.0956	0.1112
	(0.0056)***	(0.0067)***	(0.0077)***
× (UR > 75th)	0.0588	0.0997	0.1072
	(0.0061)***	(0.0074)***	(0.0086)***
Job Search			
× (UR < 26th)	-0.0211	-0.0079	0.0363
	(0.0129)*	(0.0145)	(0.0146)**
× (UR 26th – 50th)	-0.0284	-0.0234	0.0017
	(0.0117)**	(0.0135)*	(0.0140)
× (UR 51st – 75th)	-0.0194	-0.0233	0.0079
	(0.0107)*	(0.0128)*	(0.0133)
× (UR > 75th)	-0.0211	-0.0108	-0.0148
	(0.0121)*	(0.0141)	(0.0163)
Diversion Program			
× (UR < 26th)	0.0166	0.0385	0.0260
	(0.0104)	(0.0118)***	(0.0129)**
× (UR 26th – 50th)	0.0173	0.0323	-0.0018
	(0.0096)*	(0.0114)***	(0.0128)
× (UR 51st – 75th)	0.0127	0.0113	-0.0144
	(0.0085)	(0.0102)	(0.0116)
× (UR > 75th)	0.0121	0.0191	-0.0131
	(0.0090)	(0.0108)*	(0.0124)

Work Requirement			
× (UR < 26th)	0.0067	0.0168	0.0510
	(0.0084)	(0.0097)*	(0.0105)***
× (UR 26th – 50th)	0.0138	0.0122	0.0346
	(0.0076)*	(0.0092)	(0.0102)***
× (UR 51st – 75th)	0.0153	0.0109	0.0308
	(0.0075)**	(0.0092)	(0.0104)***
× (UR > 75th)	0.0146	0.0156	0.0389
	(0.0076)*	(0.0093)*	(0.0108)***
Welfare Sanction			
× (UR < 26th)	-0.0058	0.0107	0.0326
	(0.0116)	(0.0132)	(0.0138)**
× (UR 26th – 50th)	0.0193	0.0340	0.0298
	(0.0109)*	(0.0130)**	(0.0142)**
× (UR 51st – 75th)	0.0252	0.0267	0.0176
	(0.0110)**	(0.0136)*	(0.0150)
× (UR > 75th)	0.0039	0.0273	0.0415
	(0.0166)	(0.0193)	(0.0210)*
Lifetime Time Limit			
× (UR < 26th)	0.0315	0.0552	0.0057
	(0.0144)**	(0.0171)***	(0.0210)
× (UR 26th – 50th)	0.0441	0.0621	-0.0211
	(0.0136)***	(0.0167)***	(0.0213)
× (UR 51st – 75th)	0.0429	0.0513	-0.0435
	(0.0139)***	(0.0174)***	(0.0221)
× (UR > 75th)	0.0391	0.0569	-0.0230
	(0.0141)***	(0.0173)***	(0.0222)**
Intermittent Time Limit			
× (UR < 26th)	0.0323	0.0612	0.0820
	(0.0154)**	(0.0182)***	(0.0205)***
× (UR 26th – 50th)	0.0222	0.0445	0.0581
	(0.0158)	(0.0188)**	(0.0213)***
× (UR 51st – 75th)	0.0328	0.0501	0.0646
	(0.0156)**	(0.0190)**	(0.0217)***
× (UR > 75th)	0.0148	0.0469	0.0533
	(0.0187)	(0.0219)**	(0.0250)**
Time Limit is Binding			
× (UR < 26th)	0.0399	0.0971	0.1108
	(0.0163)**	(0.0184)***	(0.0213)***
× (UR 26th – 50th)	0.0592	0.1165	0.1043
	(0.0149)***	(0.0173)***	(0.0211)***
× (UR 51st – 75th)	0.0572	0.1054	0.0831
	(0.0152)***	(0.0180)***	(0.0221)***
× (UR > 75th)	0.0521	0.1067	0.0808
	(0.0158)***	(0.0183)***	(0.0229)***
Medicaid Coverage			
× (UR < 26th)	0.0176	0.0179	0.0040
	(0.0071)**	(0.0083)**	(0.0096)
× (UR 26th – 50th)	0.0258	0.0144	-0.0050
	(0.0062)***	(0.0076)*	(0.0091)
× (UR 51st – 75th)	0.0082	0.0013	-0.0095
	(0.0062)	(0.0076)	(0.0093)
× (UR > 75th)	0.0008	-0.0145	-0.0050
	(0.0070)	(0.0087)*	(0.0106)

Source: Author's calculation from the 1986-2005 March CPS

Notes: Marginal effects are shown, along with robust standard errors (in parentheses). *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Each set of policy-unemployment interaction coefficients is derived from a separate regression of each employment outcome on all policy variables listed in Table 4.5, as well as controls for age; age-squared; whether the youngest child is ages 3-5, ages 6-8, ages 9-12, and ages 13-17; number of children ages 0-5; educational attainment; marital status; non-white; metropolitan residence; non-wage income; and the set of unemployment rate quartile dummies. The omitted category is above the 75th percentile of the distribution. Also included are state fixed effects, year dummies, and state-specific time trends. Withheld from the models are the main

TABLE: 4.7: Effects of Social Policy Reforms Across Quartiles of the Unemployment Rate (HTE Model): Single Mothers with a High School Degree or Less

Variable	Outcome 1: Work		Outcome 2: Work and No Welfare		Outcome 3: Full-time, Full-year Work	
	Marginal Effect	Standard Error	Marginal Effect	Standard Error	Marginal Effect	Standard Error
EITC Maximum Credit						
× (UR < 26th)	0.0196	0.0053***	0.0102	0.0059*	-0.0037	0.0062
× (UR > 75th)	0.0167	0.0047***	0.0042	0.0054	-0.0095	0.0061
CCDF Spending						
× (UR < 26th)	0.3542	0.0823***	0.2756	0.0928***	-0.1816	0.0972*
× (UR > 75th)	0.1292	0.0652**	0.1086	0.0750	-0.0963	0.0855
ln(welfare maximum benefit)						
× (UR < 26th)	-0.0527	0.0436	-0.0455	0.0495	-0.0239	0.0562
× (UR > 75th)	-0.0659	0.0402*	-0.0586	0.0461	-0.0069	0.0525
ln(disregarded earnings)						
× (UR < 26th)	0.0701	0.0091***	0.1153	0.0103***	0.1388	0.0117***
× (UR > 75th)	0.0773	0.0091***	0.1114	0.0105***	0.1053	0.0123***
Job Search						
× (UR < 26th)	-0.0105	0.0189	0.0051	0.0208	0.0421	0.0211**
× (UR > 75th)	-0.0262	0.0174	-0.0157	0.0198	-0.0081	0.0227
Diversion Program						
× (UR < 26th)	0.0187	0.0157	0.0484	0.0175***	0.0310	0.0186*
× (UR > 75th)	0.0166	0.0135	0.0283	0.0157*	-0.0239	0.0177
Work Requirement						
× (UR < 26th)	0.0218	0.0122*	0.0358	0.0139**	0.0681	0.0149***
× (UR > 75th)	0.0290	0.0111**	0.0366	0.0132***	0.0446	0.0152***
Welfare Sanction						
× (UR < 26th)	-0.0102	0.0176	0.0194	0.0193	0.0494	0.0200**
× (UR > 75th)	0.0053	0.0253	0.0280	0.0288	0.0332	0.0308
Lifetime Time Limit						
× (UR < 26th)	0.0203	0.0221	0.0370	0.0255	-0.0040	0.0290
× (UR > 75th)	0.0236	0.0222	0.0375	0.0259	-0.0452	0.0306
Intermittent Time Limit						
× (UR < 26th)	0.0302	0.0235	0.0332	0.0275	0.0840	0.0292***
× (UR > 75th)	-0.0065	0.0288	0.0074	0.0331	0.0366	0.0357
Time Limit is Binding						
× (UR < 26th)	0.0690	0.0238***	0.1339	0.0274***	0.1254	0.0303***
× (UR > 75th)	0.0820	0.0234***	0.1442	0.0276***	0.0690	0.0333**
Medicaid Coverage						
× (UR < 26th)	0.0254	0.0104**	0.0113	0.0118	-0.0043	0.0134
× (UR > 75th)	0.0017	0.0101	-0.0156	0.0119	-0.0171	0.0146

Source: Author's calculation from the 1986-2005 March CPS

Notes: Marginal effects are shown, along with robust standard errors (in parentheses). *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Number of observations for Outcome 1: 72,730. Number of observations for Outcome 2: 72,730. Number of Observations for Outcome 3: 49,001. Each set of policy-unemployment interaction coefficients is derived from a separate regression of each employment outcome on all policy variables listed in Table 4.5, as well as controls for age; age-squared; whether the youngest child is ages 3-5, ages 6-8, ages 9-12, and ages 13-17; number of children ages 0-5; educational attainment; marital status; non-white; metropolitan residence; non-wage income; and the set of unemployment rate quartile dummies. The omitted category is above the 75th percentile of the distribution. The policy-unemployment interactions for the two middle quartiles are included in the models but excluded from the table, for ease of presentation and interpretation. Also included are state fixed effects, year dummies, and state-specific time trends. Withheld from the models are the main effects associated with each policy-unemployment interaction.

TABLE: 4.8: Effects of Social Policy Reforms Across Quartiles of the Unemployment Rate (HTE Model): Non-white Single Mothers

Variable	Outcome 1: Work		Outcome 2: Work and No Welfare		Outcome 3: Full-time, Full-year Work	
	Marginal Effect	Standard Error	Marginal Effect	Standard Error	Marginal Effect	Standard Error
EITC Maximum Credit						
× (UR < 26th)	0.0164	0.0072**	-0.0009	0.0084	-0.0049	0.0087
× (UR > 75th)	0.0086	0.0060	-0.0105	0.0072	-0.0268	0.0078***
CCDF Spending						
× (UR < 26th)	0.4000	0.1159***	0.3348	0.1353***	-0.0112	0.1362
× (UR > 75th)	0.0274	0.0694	0.0266	0.0832	-0.1261	0.0939
ln(welfare maximum benefit)						
× (UR < 26th)	-0.1487	0.0579**	-0.1573	0.0683**	-0.1757	0.0738**
× (UR > 75th)	-0.1676	0.0528***	-0.1846	0.0628***	-0.1869	0.0675***
ln(disregarded earnings)						
× (UR < 26th)	0.0545	0.0118***	0.1082	0.0141***	0.1019	0.0157***
× (UR > 75th)	0.0621	0.0115***	0.1178	0.0139***	0.0976	0.0156***
Job Search						
× (UR < 26th)	-0.0221	0.0245	-0.0097	0.0278	0.0603	0.0266**
× (UR > 75th)	-0.0460	0.0245*	0.0107	0.0276	-0.0563	0.0303*
Diversion Program						
× (UR < 26th)	0.0040	0.0212	0.0089	0.0245	0.0396	0.0240
× (UR > 75th)	0.0024	0.0185	-0.0050	0.0222	-0.0272	0.0239
Work Requirement						
× (UR < 26th)	0.0198	0.0167	0.0100	0.0204	0.0664	0.0203***
× (UR > 75th)	0.0288	0.0146*	0.0213	0.0181	0.0198	0.0201
Welfare Sanction						
× (UR < 26th)	-0.0079	0.0225	0.0034	0.0257	0.0403	0.0259
× (UR > 75th)	-0.0095	0.0296	0.0134	0.0346	-0.0151	0.0368
Lifetime Time Limit						
× (UR < 26th)	0.0313	0.0289	0.0088	0.0362	-0.0284	0.0402
× (UR > 75th)	0.0403	0.0280	0.0249	0.0356	-0.0856	0.0416**
Intermittent Time Limit						
× (UR < 26th)	0.0857	0.0274***	0.1196	0.0346***	0.1156	0.0367***
× (UR > 75th)	0.0799	0.0309**	0.1609	0.0365***	0.0603	0.0448
Time Limit is Binding						
× (UR < 26th)	0.0695	0.0293**	0.1508	0.0340***	0.1374	0.0363***
× (UR > 75th)	0.0555	0.0306*	0.1448	0.0349***	0.0684	0.0411
Medicaid Coverage						
× (UR < 26th)	0.0229	0.0144	0.0236	0.0169	-0.0072	0.0194
× (UR > 75th)	0.0088	0.0131	-0.0090	0.0161	-0.0345	0.0190*

Source: Author's calculation from the 1986-2005 March CPS

Notes: Marginal effects are shown, along with robust standard errors (in parentheses). *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Number of observations for Outcome 1: 38,300. Number of observations for Outcome 2: 38,300. Number of Observations for Outcome 3: 26,479. Each set of policy-unemployment interaction coefficients is derived from a separate regression of each employment outcome on all policy variables listed in Table 4.5, as well as controls for age; age-squared; whether the youngest child is ages 3-5, ages 6-8, ages 9-12, and ages 13-17; number of children ages 0-5; educational attainment; marital status; non-white; metropolitan residence; non-wage income; and the set of unemployment rate quartile dummies. The omitted category is above the 75th percentile of the distribution. The policy-unemployment interactions for the two middle quartiles are included in the models but excluded from the table, for ease of presentation and interpretation. Also included are state fixed effects, year dummies, and state-specific time trends. Withheld from the models are the main effects associated with each policy-unemployment interaction.

TABLE 4.9: Specification Tests of the Equality of Policy Coefficients Across Quartiles of the Unemployment Rate (p-values)

Variable	Outcome 1: Work	Outcome 2: Work and No Welfare	Outcome 3: Full-time, Full-year Work
Panel A: All Single Mothers			
EITC Maximum Credit	0.938 / 0.888	0.616 / 0.578	0.807 / 0.504
CCDF Spending	**0.015 / 0.002**	**0.082 / 0.021**	0.479 / **0.129**
ln(welfare maximum benefit)	0.744 / 0.564	0.962 / 0.952	0.971 / 0.832
ln(disregarded earnings)	**0.026 / 0.006**	0.553 / **0.176**	**0.135 / 0.054**
Job Search	0.872 / 0.999	0.701 / 0.877	**0.039 / 0.009**
Diversion Program	0.949 / 0.700	**0.144 / 0.165**	**0.024 / 0.010**
Work Requirement	0.782 / 0.412	0.924 / 0.919	0.305 / 0.332
Welfare Sanction	**0.102** / 0.583	0.463 / 0.421	0.710 / 0.683
Lifetime Time Limit	0.490 / 0.441	0.701 / 0.883	**0.002 / 0.039**
Intermittent Time Limit	0.400 / 0.239	0.604 / 0.419	0.290 / **0.134**
Time Limit is Binding	**0.175** / 0.252	0.293 / 0.409	**0.054 / 0.031**
Medicaid Coverage	**0.021 / 0.073**	**0.016 / 0.003**	0.718 / 0.496
Panel B: Single Mothers With a High School Degree or Less			
EITC Maximum Credit	0.950 / 0.641	0.798 / 0.376	0.607 / 0.440
CCDF Spending	**0.069 / 0.014**	0.271 / **0.111**	0.873 / 0.445
ln(welfare maximum benefit)	0.465 / 0.578	0.929 / 0.627	0.879 / 0.580
ln(disregarded earnings)	0.390 / 0.393	**0.117** / 0.691	**0.011 / 0.003**
Job Search	0.688 / 0.511	0.367 / 0.434	**0.193 / 0.071**
Diversion Program	0.772 / 0.907	**0.040** / 0.326	**0.042 / 0.012**
Work Requirement	0.780 / 0.610	0.291 / 0.956	0.363 / **0.190**
Welfare Sanction	0.271 / 0.567	0.920 / 0.777	0.765 / 0.610
Lifetime Time Limit	0.947 / 0.834	0.382 / 0.975	**0.005 / 0.039**
Intermittent Time Limit	**0.114 / 0.112**	0.713 / 0.338	0.289 / **0.087**
Time Limit is Binding	0.868 / 0.421	0.684 / 0.577	**0.035 / 0.007**
Medicaid Coverage	**0.057 / 0.083**	0.218 / **0.086**	0.362 / 0.486
Panel C: Non-white Single Mothers			
EITC Maximum Credit	**0.143** / 0.345	0.256 / 0.318	**0.138 / 0.033**
CCDF Spending	**0.021 / 0.002**	**0.150 / 0.028**	0.301 / 0.425
ln(welfare maximum benefit)	0.867 / 0.530	0.864 / 0.437	0.354 / 0.769
ln(disregarded earnings)	0.469 / 0.474	0.570 / 0.460	0.927 / 0.759
Job Search	0.645 / 0.434	0.884 / 0.553	**0.010 / 0.000**
Diversion Program	0.875 / 0.949	0.393 / 0.622	**0.062 / 0.020**
Work Requirement	0.735 / 0.635	0.752 / 0.624	**0.173 / 0.053**
Welfare Sanction	0.576 / 0.961	0.673 / 0.791	0.218 / **0.152**
Lifetime Time Limit	0.977 / 0.657	0.521 / 0.518	**0.021 / 0.032**
Intermittent Time Limit	0.703 / 0.823	0.415 / **0.166**	0.393 / **0.093**
Time Limit is Binding	0.428 / 0.503	0.389 / 0.809	**0.044 / 0.007**
Medicaid Coverage	**0.062** / 0.444	0.337 / **0.138**	0.360 / 0.282

Notes: The specification tests check the equality of the policy-unemployment coefficients reported in Tables 4.6, 4.7, and 4.8. Two null hypotheses are tested: (1) that all policy-unemployment coefficients are the same and (2) that the lowest and highest policy-unemployment-quartile coefficients are the same. P-values from these tests are shown, and only those implying a rejection of the null hypothesis at the 20% level (or below) are bolded.

TABLE 4.10: Decomposition of Factors Explaining the Employment Growth Among Single Mothers: 1992-2000

Variable	Outcome 1: Work		Outcome 2: Work and No Welfare		Outcome 3: Full-time, Full-year Work	
Change: 1992-2000	14.4		19.1		6.9	
Percent of Total 1992-2000 Employment Change Attributable to:						
	ATE Model	HTE Model	ATE Model	HTE Model	ATE Model	HTE Model
EITC	13.2	13.1	0.13	-0.15	-29.9	-32.5
CCDF	9.6	11.6	7.9	9.2	-15.6	-17.6
Welfare Benefits	11.9	20.8	11.5	15.6	12.0	3.8
Job Search	-3.5	-4.3	-2.1	-2.4	2.7	3.9
Diversion Program	5.9	11.3	7.8	8.5	-1.1	0.93
Work Requirements	7.4	7.1	6.2	6.3	49.4	50.8
Welfare Sanction	1.9	0.93	2.8	2.6	10.3	11.1
Time Limits	-11.7	-12.3	-11.8	-12.4	-35.6	-34.3
Medicaid	4.2	6.2	1.2	3.2	-2.9	-0.88
Unemployment Rate	13.2	--	2.0	--	20.3	--

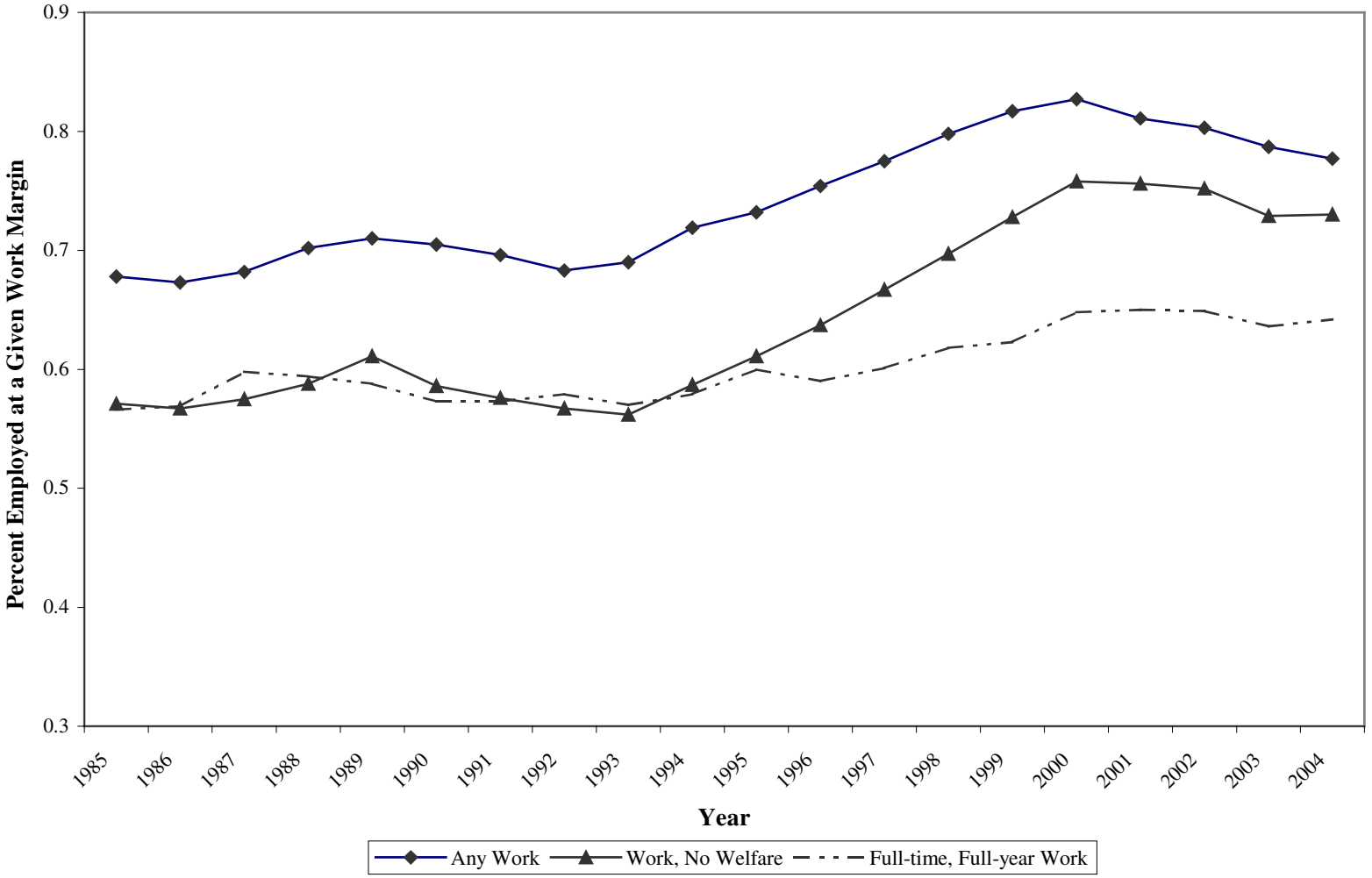
Source: Author's calculation from the 1986-2005 March CPS.
Notes: ATE = average treatment effects; HTE = heterogeneous treatment effects. All decompositions are based on models estimated in Tables 4.5 and 4.6. Percentages are interpreted as the fraction annual employment growth attributed to each social policy reform and the economy. Decompositions are calculated in the following manner: the mean change in each policy reform (between 1992 and 2000) is multiplied by the associated coefficient, and then divided by the percentage point change in employment.

TABLE 4.11: Summary of Heterogeneous Employment Effects Across Economic Conditions

Social Policy Reform	Outcome 1: Work	Outcome 2: Work and No Welfare	Outcome 3: Full-time, Full-year Work
Moving from the least to the most favorable economic environment, the effect of the policy reform:			
Panel A: All Single Mothers			
EITC Maximum Credit	=	=	=
CCDF Spending	+	+	+
Welfare Maximum Benefit	=	=	=
Disregarded Earnings	-	=	+
Job Search	=	=	+
Diversion Program	=	+	+
Work Requirement	=	=	=
Welfare Sanction	-	=	=
Lifetime Time Limit	=	=	+
Intermittent Time Limit	=	=	+
Time Limit is Binding	-	=	+
Medicaid Coverage	+	+	=
Panel B: Single Mothers With a High School Degree or Less			
EITC Maximum Credit	=	=	=
CCDF Spending	+	+	=
Welfare Maximum Benefit	=	=	=
Disregarded Earnings	=	+	+
Job Search	=	=	+
Diversion Program	=	+	+
Work Requirement	=	=	+
Welfare Sanction	=	=	=
Lifetime Time Limit	=	=	-
Intermittent Time Limit	+	=	+
Time Limit is Binding	=	=	+
Medicaid Coverage	+	+	=
Panel C: Non-white Single Mothers			
EITC Maximum Credit	+	=	-
CCDF Spending	+	+	=
Welfare Maximum Benefit	=	=	=
Disregarded Earnings	=	=	=
Job Search	=	=	+
Diversion Program	=	=	+
Work Requirement	=	=	+
Welfare Sanction	=	=	+
Lifetime Time Limit	=	=	-
Intermittent Time Limit	=	-	+
Time Limit is Binding	=	=	+
Medicaid Coverage	+	+	=

Notes: The "=" symbol denotes that the effect of a given policy reform does not vary across quartiles of the unemployment rate. The "+" symbol denotes that the magnitude of a policy reform increases as one moves from the least to the most favorable economic environment. The "-" symbol denotes that the effect of a policy reform decreases in magnitude as one moves from the least to the most favorable economic environment.

Figure 4.1: Employment Trends for Single Mothers, 1985-2004



CHAPTER 5: CONCLUSION AND POLICY IMPLICATIONS

The preceding chapters were intended to shed light on several critical issues regarding the flurry of recent social policy reforms—particularly child care subsidies and the EITC—and their interactions with local labor market conditions. In this final chapter, I summarize key results, discuss relevant policy implications, and offer suggestions for future research.

Chapter 2 began with the observation that, despite the dramatic growth in funding for child care subsidies, participation among eligibles (take-up) remains comparatively low. Indeed, early studies determined that 12 percent to 15 percent of eligible children receive subsidies, while 80 percent to 86 percent of eligible taxpayers receive the EITC. Therefore, the goal of Chapter 2 was to provide updated estimates on eligibility and take-up rates for CCDF child care subsidies, and to explore factors related to why many eligible households do not receive such assistance. I find that although 28 percent of households with children under age 13 are eligible for child care subsidies, take-up is just 14 percent. There is, however, substantial variation across households. For example, fully 52 percent female-headed households are eligible for subsidies, with a take-up rate of 23 percent. I also find important differences in the distribution of demographic, economic, and child care characteristics between eligible recipient and non-recipient households. Eligible recipient households are more likely to be headed by young, single females with fewer relatives but greater numbers of young children in the household. Interestingly, eligible recipients are simultaneously more likely to be engaged in a work activity and have an attachment to another means-tested program, such as TANF or food

stamps. Furthermore, a higher proportion of these households use paid sources of child care, are more likely to pay for child care, but when they do, pay less than their eligible non-recipient counterparts. Finally, there is evidence to support the claim that states substitute some generosity in eligibility for additional generosity in benefits, and that financially constrained states are rationing subsidies in a way that targets specific household characteristics.

Chapter 3 began with the observation that, although there is a large empirical literature examining the labor supply effects of child care costs and taxes, to date these literatures have evolved independently of each other. That is, no study has developed a modeling strategy that accounts for prices and taxes simultaneously. Given that previous research demonstrates the importance of both factors for single mothers, excluding one of these from an employment model might lead to an omitted variables problem. The goal of Chapter 3, therefore, was to join together empirical techniques from previous child care and EITC studies to simultaneously estimate the effects of prices and taxes on the labor supply of single mothers.

Estimates from the main employment model suggest that a one percent increase in costs and net-wages are associated with a 5.4 percentage point decrease and a seven percentage point increase in employment, respectively. These translate to an elasticity of employment with respect to child care expenditures of -0.174 and an elasticity of employment with respect to net-of-taxes wages of 0.711. One of the central implications of this finding is that child care price-effects are considerably smaller than what is commonly found in the literature, whereas the tax-effects are solidly within the range of previous estimates. In addition, I find low-skilled single mothers and those with young

children are moderately more responsive to child care prices and net-wages. These main results are corroborated by my alternative modeling strategy: single mothers with multiple children became comparatively less sensitive to child care prices and more sensitive to net-wages over the study period, especially after expansions to child care subsidies and the EITC were enacted. Finally, policy simulations imply that a system of generous, targeted work supports generate more employment than one that provides limited, universal assistance.

Chapter 4 argued that all previous studies evaluating the employment effects of recent social policy reforms suffers from a common drawback: the assumption that policy reforms and economic conditions are independent explanations of single mothers' phenomenal employment growth throughout the 1990s. The goal of this chapter, therefore, was to investigate the possibility of heterogeneous policy effects across varying economic conditions. Although it is not immediately clear a priori how the economy should influence the impact of social policy reforms, the analysis was guided by several considerations. Specifically, I focused on heterogeneity across policy reforms, work margins, and sub-groups of single mothers.

Estimates from my preferred specification imply that the bundle of social policy reforms considered in this study explain 38.9 percent of the employment growth among single mothers between 1992 and 2000. Economic conditions, as measured by the state unemployment rate, account for another 13.2 percent of the employment growth. When the basic model is extended to account for policy heterogeneity across economic conditions, fully 54.4 percent of the observed increase is explained. Several interesting patterns emerge from the data. Policy "carrots" like the EITC, child care subsidies, and

earnings disregards reveal the greatest policy heterogeneity at low intensity work margins, while policy "sticks" like work requirements and welfare sanctions show considerably more heterogeneity at increasingly demanding work margins. Both sets of policies generate the greatest employment effects when economic conditions are favorable, implying that a strong economy reinforces the positive incentives created by social policy reforms.

Findings in this dissertation are important in light of the reauthorization of TANF and the CCDF through the 2005 Deficit Reduction Act. This legislation introduces several punitive measures for welfare recipients and states, including greatly accelerated work participation rates, a narrowing of acceptable work activities, and the imposition of financial penalties on states that fail to comply with federal guidelines. The new work requirements are, furthermore, matched with small increases in funding for child care subsidies, a TANF block grant that is not adjusted for inflation, and an economic climate less favorable than the one throughout the late-1990s.

These policy developments are projected to simultaneously increase the demand for child care services and subsidies, raise the pecuniary cost of purchasing care, and decrease the government's ability to further defray such costs. Results from this dissertation suggest that take-up rates for subsidies could decline for certain households. In order to control costs, states may begin to lower eligibility ceilings, curtail subsidy benefits, and more aggressively ration benefits according to specific household attributes. Single mothers, in particular, may become more responsive to the effective increase in child care prices, especially in the event of a deep economic recession. With fewer subsidy dollars available to offset price increases, there is some concern that single

mothers will not be able to meet the new work requirements, and hence risk welfare benefit sanctions. One way to mitigate the deleterious effects of an economic downturn (especially in a policy environment with heightened work requirements) is to build economic "triggers" into states' TANF plans. These triggers would essentially turn off time limits and work requirements when the unemployment rate meets or exceeds a certain level. Results in this dissertation also suggest that it might be prudent to reestablish even a limited countercyclical funding mechanism into TANF.

Based on the results from this dissertation, future research on social policy reforms should consider the following extensions. First, the employment model estimated in Chapter 3 can be expanded to include other work margins. Specifically, such infra-marginal employment outcomes as hours-of-work; work and no welfare; and full-time, full-year work are important markers of the success of recent policy reforms. However, very few studies have concentrated on these employment outcomes. Another avenue for future research, based findings in Chapter 3, is to explore the extent to which single mothers became more or less sensitive to child care prices and taxes throughout the 1990s. As previously stated, funding for subsidies and the EITC increased substantially during the decade, and so one might expect single mothers to becomes less sensitive to prices and more sensitive to net-wages in the period following policy expansions, relative to before. Evaluating employment effects in this way represents a departure methodologically from previous work, and thus would be prove valuable in either confirming or disputing such research. Third, future research should concentrate on mandatory job search and cash diversion policies, two increasingly popular options used by states to deter probable welfare recipients from seeking aid. As Chapter 4 notes, by

2004, over 46 percent of single mothers lived in states that implemented job search requirements, while 64 percent were potentially influenced by formal diversion programs. Yet very few studies have devoted serious attention to these policy reforms. Finally, future studies should focus on indicators of economic well-being as outcomes. Considerably less attention has been paid to the effects of social policy reforms on earnings, income, and poverty. In addition, it would be interesting to examine policy-economy interactions in this context in order to determine whether the gains in employment are matched with gains in financial well-being.

APPENDICES

APPENDIX 2.1: ESTIMATED MARGINAL EFFECTS FROM THE SUBSIDY ELIGIBLITY EQUATION, INCLUDING CONTROLS FOR THE TYPE OF CHILD CARE ARRANGEMENT

	Children Ages 0-4	Children Age 5	Children Ages 6-12
Variable	**∂Pr(Eligible)/∂x (Robust Standard Error)**		
Center-based	-0.100	0.017	--
	(0.018)***	(0.039)	
Family-based	-0.113	-0.002	-0.031
	(0.020)***	(0.053)	(0.024)
Nanny/Babysitter	-0.067	-0.064	-0.034
	(0.035)*	(0.064)	(0.031)
Relative	-0.048	-0.001	-0.055
	(0.019)**	(0.050)	(0.016)***
Before-/After-school Program	--	-0.160	-0.083
		(0.028)***	(0.016)***
Self-care	--	--	-0.023
			(0.025)
Log-Likelihood	-3,011.031	-602.804	-3,906.838
Number of Observations	7,426	1,592	9,767
McFadden's R^2	0.332	0.362	0.310
Percent Correctly Predicted	0.805	0.797	0.806

Source: Author's calculations from the 2002 NSAF.

Notes: These models are based on sub-samples of households (with an employed householder and/or spouse, if present) with at least one child in the designated age range who is using one of the listed child care arrangements. Child care arrangements are mutually exclusive within an age group, since it is the arrangement that the child spent the greatest number of hours in while a given household member was involved in a work activity. All models include the full set of controls displayed in the last column of Table 2.6. Coefficients from these variables are omitted here to save space. Parent care is the omitted category. All models are estimated with region dummies.

APPENDIX 2.2: ESTIMATED MARGINAL EFFECTS FROM THE SUBSIDY RECEIPT EQUATION, INCLUDING CONTROLS FOR THETYPE OF CHILD CARE ARRANGEMENT

	Children Ages 0-4	Children Age 5	Children Ages 6-12
Variable	**∂Pr(Receive)/∂x (Robust Standard Error)**		
Center-based	0.129	0.081	--
	(0.021)***	(0.024)***	
Family-based	0.143	0.068	0.103
	(0.034)***	(0.046)**	(0.024)***
Nanny/Babysitter	0.052	0.045	0.075
	(0.033)*	(0.046)	(0.025)***
Relative	0.076	0.038	0.049
	(0.021)***	(0.030)*	(0.012)***
Before-/After-school Program	--	0.088	0.153
		(0.050)***	(0.020)***
Self-care	--	--	0.020
			(0.014)*
Log-Likelihood	-1,705.191	-315.779	-1,690.094
Number of Observations	7,421	1,591	9,762
McFadden's R^2	0.221	0.334	0.267
Percent Correctly Predicted	0.913	0.914	0.942

Source: Author's calculations from the 2002 NSAF.

Notes: These models are based on sub-samples of households (with an employed householder and/or spouse, if present) with at least one child in the designated age range who is using one of the listed child care arrangements. Child care arrangements are mutually exclusive within an age group, since it is the arrangement that the child spent the greatest number of hours in while a given household member was involved in a work activity. All models include the full set of controls displayed in the second column of Table 2.7. Coefficients from these variables are omitted here to save space. Parent care is the omitted category. All models are estimated with region dummies.

APPENDIX 2.3: ESTIMATED MARGINAL EFFECTS FROM THE SUBSIDY TAKE-UP EQUATION, INCLUDING CONTROLS FOR THE TYPE OF CHILD CARE ARRANGEMENT

	Children Ages 0-4	Children Age 5	Children Ages 6-12
Variable	**∂Pr(Take-up)/∂x (Robust Standard Error)**		
Center-based	0.268	0.196	--
	(0.048)***	(0.063)***	
Family-based	0.310	0.315	0.233
	(0.070)***	(0.175)**	(0.059)***
Nanny/Babysitter	0.138	0.243	0.239
	(0.091)*	(0.168)*	(0.079)***
Relative	0.154	0.236	0.119
	(0.041)***	(0.111)***	(0.036)***
Before-/After-school Program	--	0.344	0.333
		(0.238)*	(0.051)***
Self-care	--	--	0.099
			(0.055)**
Log-Likelihood	-879.442	-163.127	-882.662
Number of Observations	2,417	512	2,878
McFadden's R^2	0.201	0.347	0.230
Percent Correctly Predicted	0.838	0.837	0.873

Source: Author's calculations from the 2002 NSAF.

Notes: These models are based on sub-samples of households (with an employed householder and/or spouse, if present) with at least one child in the designated age range who is using one of the listed child care arrangements. Child care arrangements are mutually exclusive within an age group, since it is the arrangement that the child spent the greatest number of hours in while a given household member was involved in a work activity. All models include the full set of controls displayed in the fourth column of Table 2.7. Coefficients from these variables are omitted here to save space. Parent care is the omitted category. All models are estimated with region dummies.

APPENDIX 2.4: DATA SOURCES

This appendix provides additional information about the data sources used to simulate eligibility for child care subsidies. Information is given in tabular form, highlighting where a given piece of information comes from and its internet URL, if applicable. The table also provides the year to which the data apply.

Information	Data Source and Location	Applicable Year
Demographic	2002 National Survey of America's Families (NSAF), The Urban Institute	2002
Employment, income, and program participation	2002 NSAF	2001
Child care mode	2002 NSAF	2002
Subsidy receipt	2002 NSAF	2001/2002
Acceptable work activities	The Children's Defense Fund: *A Fragile Foundation: State Child Care Assistance Policies* http://www.childrensdefense.org/earlychildhood/childcare/fragile_foundation_intro.pdf	2000
Characteristics of states' child care subsidy regimes	The Child Care Bureau: *Child Care and Development Fund: Report of State Plans, FY2002-2003* http://www.nccic.org/pubs/stateplan2002-03/plan.pdf	2001
State-specific income and earnings deductions	The Children's Defense Fund: *State Developments in Child Care, Early Education, and School-Age Care* http://www.childrensdefense.org/earlychildhood/statedevelopments01.pdf	2000
State-specific income exclusions	The Child Care Bureau: *Child Care and Development Fund: Report of State Plans, FY2002-2003* http://www.nccic.org/pubs/stateplan2002-03/plan.pdf	2001
Income eligibility limits, by state and family size	The Child Care Bureau: Unpublished data	2001
State median income, by family size	Bureau of the Census: 2000 Decennial Census, SF4 http://www.census.gov/Press-Release/www/2003/SF4.html	1999

As the table shows, survey data provided by the NSAF come from multiple years, with demographic and other household attributes collected for 2002 and employment/earnings data collected for 2001. Therefore, the goal was to simulate subsidy eligibility using state rules for 2001. This was possible for most components of the simulation. The largest temporal mismatch comes from the State Median Income data (2000 Census), which is based on 1999 earnings. More recent state-level data are not available. These figures are expressed in real 2001 dollars, however.

APPENDIX 2.5: VARIABLE CONSTRUCTION

Indicator for Child Care Subsidy Receipt

For the 2002 NSAF, questions on child care use and sources of help paying child care costs are embedded in a larger survey on a set of "focal children." Families with children under age 13 are asked detailed questions about child care arrangements, including center- and family-based services, Head Start, and relative care. Child care information is ascertained for up to two randomly selected focal children, one of whom is between the ages of 0 and 5 and the other between ages 6 and 12. Regular, primary non-parental arrangements—defined as the one used at least once a week over the previous month and for the greatest number of hours—are asked of all parents, regardless of their employment status. However, if a given child care arrangement is reported as being used while the respondent works, looks for work, or is in school, a set of questions is then asked about the family's total child care expenses. Follow-up questions are also asked about sources of help in paying child care costs. Specifically, the sequence of questions proceeds as follows:

1) *Now think about all the child care arrangements and programs you use regularly for [Focal Child 1/Focal Child 2/All your children under age 13] while you worked, were in school or looked for work. How much did you pay for all child care arrangements and programs used in the last month?* The figure reported here is the total amount paid for all sources of child care, for all children under age 13, and for the purpose of allowing the respondent to work.

2) If no child care expenses are reported in the previous question, respondents are then asked: *What person or agencies paid for or provided child care for [Focal Child 1/Focal Child 2/All your children under age 13] so that you didn't have to pay for it?* The answers include "welfare or social services agency," "employer," "nonresident parent," and "relative friend." Follow-up questions were then asked on whether these sources provided and paid for child care or did one or the other.

3) If child care costs are reported, the following is asked: *Sometimes the amount of money that a parent is charged for a child care arrangement or program depends on how much the family earns. This is sometimes called a sliding scale fee. Was the amount you were charged for the child care of [Child] determined by how much money you earn?*

4) There is an additional question on whether the government provides help paying child care costs, located in the Family Respondent portion of the survey and specifically a section covering families' participation in welfare and other cash transfer programs. The question is: *In the past 12 months, did you receive government assistance in paying for child care? Do not include the Dependent Care Tax Credit.*

Using the questions above, this chapter codes a household as receiving a child care subsidy if one or more of the following conditions are met:

1) the household (or at least one of the families within the household, if applicable) reports receiving government assistance in paying for child care; or

2) the household (or at lest one of the families within the household, if applicable) reports paying child care costs according to a sliding scale fee; or

3) the household is using only paid sources of child care for all focal children, does not report any child care expenses, and does not report receiving help from a nonresident parent, relative, or friend.

Several points regarding this nomenclature are noteworthy. First, this measure builds on and extends recent work by Giannarelli, Adelman, and Schmidt (2003), who use the 1999 NSAF. Apparently, earlier rounds of the NSAF did not ask whether a nonresident parent, relative, or friend paid for child care expenses, and so the authors had to infer this was not the case in constructing their indicator of subsidy receipt. Another difference is due to the authors' consideration of help from organizations such as the YMCA, whereas this chapter is concerned with sources of government help. A final difference between the classifications arises from the paid child care modes included in

third condition. Giannarelli, Adelman, and Schmidt (2003) incorporate only center-based, Head Start, and before- and after-school programs, while this study focuses on the use of these *and* family-based and babysitter/nanny care.

Second, there is likely to be some measurement error in the question on sliding scale fees, since the government is not the only entity that uses such a benefit schedule. Therefore, non-profit organizations that charge a co-payment are misclassified in this coding scheme. Another source of measurement error arises because other individuals or organizations (non-governmental entities) could pay child care expenses, but the household simply did not report these sources and are therefore classified as receiving help from a government agency. Finally, although respondents were asked to omit help from the Dependent Care Tax Credit, several high-income families still report receiving government assistance in paying for child care (question 4).

Third, since the unit of analysis in this chapter is the household, subsidy receipt is also measured at the household level. This means that if two or more separate families (or sub-families) reside in the same household and just one of those families receives a child care subsidy, the entire household is coded as receiving a subsidy. Similarly, if child care in both families is subsidized, the household is coded as being a subsidized household.

Classification of Acceptable Work Activities

In most states, families must be involved in an acceptable work activity in order to be eligible for child care subsidies. However, these activities differ across the states and by a family's involvement with the welfare system. Although 16 states apparently provide a legal entitlement to subsidies among TANF families, eligibility still hinges on

the fulfillment of work requirements, participation in job training programs, or formal job search activities. Families with no formal attachment to the welfare system still must meet the requirements for an acceptable work activity, which often differs from the requirements for TANF families, in addition to meeting income eligibility limits. Therefore, this chapter simulates separately the work requirements of families receiving welfare and other, low-income families.

The following are acceptable work activities for TANF families:

1) 51 states consider formal employment an acceptable work activity, and 17 states require TANF families to be working for a certain number of hours per week.

2) 51 states permit TANF families to look for work.

3) 45 states consider post-secondary (college course-taking) an acceptable work activity, and nine of those states impose a work requirement as well in order to remain eligible.

4) 51 states deem participation in a job training program an acceptable work activity.

Below are the acceptable work activities for non-TANF families:

1) 51 states consider formal employment an acceptable work activity, and 18 states require non-TANF families to be working for a certain number of hours per week.

2) 16 states permit these families to engage in job search activities.

3) 46 states consider post-secondary (college course-taking) an acceptable work activity, and 13 of those states impose a work requirement as well in order to remain eligible.

4) 48 states deem participation in a job training program an acceptable work activity, and seven of those states impose a work requirement.

Fortunately, the NSAF enables one to examine participation in all four work activities by TANF status, through the following questions:

1) Job searching is assessed by two questions: *During the last 4 weeks, have you been actively looking for paid work?* And: *During 2001, did you take classes or workshops to help you look for work, like job search assistance, jobs clubs, or world-of-work orientations?*

2) Participation in post-secondary education is assessed by the following: *During 2001, did you take college courses or programs for credit toward a college degree, such as an AA, BA, or advanced degree?*

3) Enrollment in a job training program is assessed by the following: *During 2001, did you take courses or apprentice programs that trained you for a specific job, trade, or occupation (excluding AA or BA degree programs, GED classes, or on-the-job training)?*

It is important to note that as with subsidy receipt, participation in work activities is measured at the household level and only as it applies to the householder. This introduces some measurement error because several states require both parents, if present, to be engaged in work activities. Work participation requirements also apply differentially to families with young children and those with older children, but this nomenclature simulates work rules identically for all families. Furthermore, this study does not apply state-specific hours' requirements for participation in work activities; it just simulates whether a state deems a given work activity is acceptable or required and applies that rule to all TANF or non-TANF families.

APPENDIX 3.1 VARIABLE MEANS FOR THE SIPP SAMPLE OF SINGLE MOTHERS: 1990-1993 PANELS

SIPP Panel (Wave)	**1990 (3)**	**1991 (3)**	**1992 (6), 1993 (3)**	**1993 (9)**
Dates of Data Collection	9/90 – 12/90	9/91 – 12/91	9/93 – 12/93	9/95 – 12/95
CPS "Data" Year(s)	1990	1991, 1992	1993, 1994	1995, 1996
Number of Observations	N = 1,664	N = 875	N = 2,677	N = 1,201
Demographics				
Age	32.23 (7.48)	32.48 (7.65)	32.29 (7.63)	32.95 (7.78)
Less than High School (%)	0.272 (0.445)	0.278 (0.448)	0.249 (0.432)	0.253 (0.434)
High School/GED (%)	0.439 (0.496)	0.410 (0.492)	0.424 (0.494)	0.419 (0.493)
Some College (%)	0.205 (0.403)	0.226 (0.418)	0.244 (0.429)	0.234 (0.423)
BA+ (%)	0.082 (0.274)	0.084 (0.278)	0.082 (0.274)	0.093 (0.290)
Widowed (%)	0.045 (0.209)	0.055 (0.228)	0.037 (0.189)	0.039 (0.194)
Separated (%)	0.202 (0.402)	0.180 (0.385)	0.191 (0.393)	0.174 (0.379)
Divorced (%)	0.378 (0.485)	0.389 (0.487)	0.367 (0.482)	0.373 (0.483)
Never Married (%)	0.372 (0.483)	0.374 (0.484)	0.403 (0.490)	0.412 (0.4920
Non-white (%)	0.394 (0.488)	0.363 (0.481)	0.383 (0.486)	0.377 (0.485)
Non-wage Income ($)	512.87 (669.81)	539.25 (700.39)	521.05 (634.66)	500.99 (809.44)
Child Ages 0-2 (%)	0.292 (0.455)	0.278 (0.448)	0.282 (0.450)	0.240 (0.427)
Child Ages 3-5 (%)	0.330 (0.470)	0.339 (0.473)	0.357 (0.479)	0.372 (0.483)
Child Ages 6-12 (%)	0.665 (0.472)	0.698 (0.459)	0.656 (0.475)	0.688 (0.463)
Child Ages 13-17 (%)	0.196 (0.397)	0.195 (0.397)	0.214 (0.410)	0.232 (0.422)
No. of Children Ages 0-2	0.343 (0.587)	0.316 (0.545)	0.318 (0.542)	0.259 (0.480)
No. of Children Ages 3-5	0.378 (0.580)	0.378 (0.563)	0.414 (0.602)	0.421 (0.589)
No. of Children Ages 6-12	0.899 (0.811)	0.995 (0.869)	0.914 (0.851)	0.991 (0.882)
No. of Children Ages 0-17	1.86 (1.01)	1.93 (1.07)	1.92 (1.05)	1.95 (1.02)
Unemployed Adult (%)	0.010 (0.100)	0.010 (0.101)	0.008 (0.093)	0.009 (0.099)
Urban Residence (%)	0.757 (0.428)	0.720 (0.449)	0.772 (0.419)	0.780 (0.413)
South (%)	0.385 (0.486)	0.355 (0.478)	0.356 (0.479)	0.347 (0.476)
Employment/Child Care				
Labor Force Participation (%)	0.641 (0.479)	0.643 (0.479)	0.637 (0.480)	0.662 (0.473)
Uses Paid Child Care (%)	0.675 (0.468)	0.621 (0.485)	0.651 (0.476)	0.735 (0.441)
Pays for Child Care (%)	0.612 (0.487)	0.604 (0.489)	0.570 (.495)	0.568 (0.495)
Weekly Child Care Costs ($)	78.87 (53.47)	77.50 (47.08)	75.21 (51.75)	79.34 (76.49)
Cost per Hour of Work ($)	2.08 (1.51)	2.01 (1.35)	2.06 (1.66)	2.07 (2.02)
Share of Income Paid (%)	0.159 (0.240)	0.168 (0.167)	0.193 (0.378)	0.165 (0.201)

Source: Author's calculations from the SIPP Core File and Child Care Topical Module.
Notes: Standard deviations are in parentheses. All means are weighted using the final person weight from the fourth month of a given wave of data collection. Dollars are adjusted for inflation to reflect 2005 prices.

APPENDIX 3.1 (CONTINUTED) VARIABLE MEANS FOR THE SIPP SAMPLE OF SINGLE MOTHERS: 1996 AND 2001 PANEL

SIPP Panel (Wave)	**1996 (4)**	**1996 (10)**	**2001 (4)**
Dates of Data Collection	3/97 – 6/97	3/99 – 6/99	1/02 – 4/02
CPS "Data" Years	1997, 1998	1999, 2000, 2001	2002, 2003, 2004
Number of Observations	N = 2,605	N = 2,015	N = 1,985
Demographics			
Age	33.16 (8.22)	33.20 (8.33)	33.25 (8.12)
Less than High School (%)	0.216 (0.411)	0.192 (0.394)	0.196 (0.397)
High School/GED (%)	0.360 (0.480)	0.384 (0.486)	0.328 (0.469)
Some College (%)	0.339 (0.473)	0.328 (0.469)	0.364 (0.481)
BA+ (%)	0.083 (0.277)	0.094 (0.292)	0.110 (0.313)
Widowed (%)	0.042 (0.202)	0.035 (0.185)	0.034 (0.183)
Separated (%)	0.171 (0.377)	0.144 (0.351)	0.147 (0.354)
Divorced (%)	0.340 (0.473)	0.344 (0.475)	0.337 (0.472)
Never Married (%)	0.444 (0.497)	0.476 (0.499)	0.480 (0.499)
Non-white (%)	0.388 (0.487)	0.403 (0.490)	0.370 (0.483)
Non-wage Income ($)	448.73 (612.09)	407.85 (617.21)	406.19 (607.70)
Child Ages 0-2 (%)	0.244 (0.429)	0.230 (0.421)	0.259 (0.438)
Child Ages 3-5 (%)	0.356 (0.479)	0.335 (0.472)	0.329 (0.4700
Child Ages 6-12 (%)	0.680 (0.466)	0.692 (0.461)	0.685 (0.464)
Child Ages 13-17 (%)	0.217 (0.412)	0.208 (0.406)	0.205 (0.404)
No. of Children Ages 0-2	0.266 (0.492)	0.252 (0.484)	0.286 (0.509)
No. of Children Ages 3-5	0.406 (0.588)	0.373 (0.555)	0.368 (0.559)
No. of Children Ages 6-12	0.941 (0.841)	0.973 (0.865)	0.953 (0.827)
No. of Children Ages 0-17	1.88 (1.06)	1.86 (1.04)	1.87 (1.00)
Unemployed Adult (%)	0.013 (0.116)	0.013 (0.117)	0.008 (0.093)
Urban Residence (%)	0.810 (0.391)	0.848 (0.358)	0.771 (0.419)
South (%)	0.385 (0.486)	0.384 (0.486)	0.372 (0.483)
Employment/Child Care			
Labor Force Participation (%)	0.743 (0.436)	0.778 (0.415)	0.777 (0.416)
Uses Paid Child Care (%)	0.762 (0.425)	0.775 (0.417)	0.756 (0.429)
Pays for Child Care (%)	0.573 (0.494)	0.534 (0.499)	0.541 (0.498)
Weekly Child Care Costs ($)	81.33 (71.43)	81.90 (73.43)	85.86 (80.07)
Cost per Hour of Work ($)	2.29 (3.28)	2.22 (2.77)	2.32 (2.99)
Share of Income Paid (%)	0.171 (0.232)	0.207 (0.547)	0.156 (0.187)

Source: Author's calculations from the SIPP Core File and Child Care Topical Module.
Notes: Standard deviations are in parentheses. All means are weighted using the final person weight from the fourth month of a given wave of data collection. Dollars are adjusted for inflation to reflect 2005 prices.

APPENDIX 3.2: CONSTRUCTION OF OTHER KEY POLICY VARIABLES AND THEORETICAL EFFECTS

The following describes the construction of other key policy variables that appear in the employment models, and discusses the theoretical effect of each on the work decision of single mothers.

First, to capture the effect of states' *earnings disregard policies*, I assigned to each single mother a predicted amount of annual disregarded earnings. This is accomplished by coding both the initial (fixed) component and the variable component of each state's disregard policy over the study period and then applying these rules to the earnings of employed single mothers. The fixed component refers to the first $30 of earnings, for example, while the variable component is 33% of the remainder. I code only the initial earnings disregard, omitting both the work expense and child care expense components. This process assumes that women are in the first four months of welfare receipt. After four consecutive months, states continued only the initial $30 disregard; after one year on welfare, individuals faced a 100 percent implicit tax on earnings. To predict disregarded earnings for non-working mothers, I estimated for each CPS survey a simple OLS regression of annual disregarded earnings on several exogenous demographic and human capital characteristics plus a vector of state fixed effects. Insertion of fixed effects controls for variation in states' disregard policies, especially in the period after welfare reform. Second, I capture the effect of *states' welfare reform efforts* through two dummy variables: enactment of any *statewide welfare reform* and *time limits*. The former is defined as the first reform policy a state passed under its waiver authority, including expanded earnings disregards, family caps, and work requirement sanctions. If a state did not implement any changes under a waiver, I take

the implementation of its TANF program to be the first welfare policy considered. Both variables equal one starting in the year after the policies are executed, and they equal zero in the years prior to their implementation. In the year of implementation, I follow the standard practice of coding both variables as the faction of the year during which these policies were in effect. Finally, the *AFDC/TANF participation rate* was constructed by dividing each state's (adult) female caseload by the total number of female-headed households (with children under age 18).

Economic models suggest that every hour of work by women with children requires the use of substitute child care. *Child care expenditures* are viewed as a fixed cost of employment, such that each hour of care purchased in the market reduces the returns to work. A testable hypothesis is that an increase in hourly child care expenditures reduces the incentive to work. This is particularly applicable in the case of single mothers because child care costs often represent a significant fraction of their earnings. The theoretical effect of introducing an *EITC* is unambiguously positive. Eligibility for the program is confined to those with positive earnings, and EITC recipients experience an expanded budget set that makes work look more attractive at every wage level. In other words, the increased net-of-taxes wage rate for recipients previously not working leads to only a positive substitution effect. States' *maximum AFDC/TANF benefit* is predicted to decrease the incentive to work because the income effect from guaranteed benefits to those not working reduces the attractiveness of entering the labor force. This is particularly relevant for low-skilled workers in high benefit states, whose reservation wages are below the maximum welfare benefit. However, increasing the initial *earnings disregard* and lowering the *welfare phase-out*

rate encourages the combination of welfare and work over pure welfare receipt (among those previously not working). This is because employed recipients can keep more of their earnings until they reach the break-even point. The theoretical effect of states' bundled *welfare reform efforts* is ambiguous, since states often implemented several policies are the same time. However, most of the individual policies—such as work requirements and benefit sanctions—are expected to increase the incentive to work. Finally, *time limits* are hypothesized to increase employment through two channels. One is purely the mechanical effect experienced by those who hit a state's time limit. The other is behavioral, and incorporates the assumption that forward-looking women will save their welfare benefits until they experience an employment shock.

BIBLIOGRAPHY

Alm, J. & Whittington, L. (1995). Does the income tax affect marital decisions? *National Tax Journal, 48,* 565-572.

Anderson, P., & Levine, P. (2000). Child care and mothers' employment decisions. In Rebecca M. Blank & David Card (Eds.), *Finding Jobs: Work and Welfare Reform*. New York, NY: Russell Sage Foundation.

Averett, S., Peters, E., & Waldman, D. (1997). Tax credits, labor supply, and child care. *Review of Economics and Statistics, 79,* 125-135.

Barnett, S. (1992). Benefits of compensatory preschool education. *Journal of Human Resources, 27*, 279-312.

Barnett, S. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. *The Future of Children, 5,* 25-50.

Bartik, T. & Eberts, R. (1999). Examining the effect of industry trends and structure on welfare caseloads. In S. H. Danziger (Ed.) *Economic Conditions and Welfare Reform*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Baum II, C. (2002). A dynamic analysis of the effect of child care costs on the work decisions of low-income mothers with infants. *Demography*, *39*, 139-164.

Berger, M., & Black, D. (1992). Child care subsidies, quality of care, and the labor supply of low-income, single mothers. *The Review of Economics and Statistics*, *74*, 635-642.

Bergmann, B. (1996). *Saving Our Children from Poverty: What the United States Can Learn from France.* New York: Russell Sage Foundation.

Besharov, D. & Higney, C. (2006). *Federal and state child care expenditures (1997-2003): Rapid growth followed by steady spending*. Report prepared for Administration on Children, Youth, and Families; Administration for Children and Families; U.S. Department of Health and Human Services. College Park, MD: Welfare Reform Academy, University of Maryland School of Public Policy.

Besharov, D., Morrow, J., & Shi, A. (2006). *Child care data in the Survey of Income and Program Participation: Inaccuracies and corrections*. College Park, MD: Welfare Reform Academy, University of Maryland School of Public Policy.

Bitler, M., Gelbach, J., Hoynes, H., & Zavodny, M. (2004). The impact of welfare reform on marriage and divorce. *Demography, 41,* 213-236.

Blank, R. (2002). Evaluating welfare reform in the United States. *Journal of Economic Literature, 40,* 1105-1166.

Blau, D. (1993). The supply of child care labor. *Journal of Labor Economics, 11,* 324-347.

Blau, D. (2000). Child care subsidy programs. Working Paper 7806. Cambridge, MA: National Bureau of Economic Research.

Blau, D. (2001). *The Child Care Problem: An Economic Analysis*. New York, NY: The Russell Sage Foundation.

Blau, D. (2002). The effect of input regulations in input use, price, and quality: The case of child care. Working Paper. Department of Economics. Chapel Hill, NC: University of North Carolina.

Blau, D. (2003). Do child care regulations affect the child care and labor markets? *Journal of Policy Analysis and Management, 22,* 443-465.

Blau, D., & Hagy, A. (1998). *The demand for quality in child care.* Journal of *Political Economy*, *106*, 104-146.

Blau, D., & Robins, P. (1988). Child care costs and family labor supply. *Review of Economics and Statistics*, *70*, 374-381.

Blau, D., & Robins, P. (1991). *Child care and the labor supply of young* mothers over time. *Demography*, *28*, 333-351.

Blau, D., & Tekin, E. (2001, forthcoming). *The determinants and consequences of child care subsidies for single mothers.* Journal of Population Economics.

Bowen, W., & Finegan, A. (1969). *The economics of labour force participation*. Princeton, NJ: Princeton University Press.

Browning, E. (1995). Effects of the Earned Income Tax Credit on income and welfare. *National Tax Journal*, *48,* 23-43.

Burman, L. & Wheaton, L. (2005). *Who gets the Child Tax Credit?* Policy Brief. Washington, DC: Urban Institute-Brookings Tax Policy Center.

Burtless, G. & Hausman, J. (1978). The effect of taxation on labor supply: Evaluating the Gary negative income tax experiment. *Journal of Political Economy, 86,* 1103-1130.

Campbell, F. & Ramey, C. (1994). Effects of early intervention on intellectual and academic achievement: A follow-up study of children from low-income families. *Child Development, 65,* 684-689.

Cancian, M. & Levinson, A. (2006). Labor supply effects of the Earned Income Tax Credit: Evidence from Wisconsin's supplemental for families with three children. Working Paper. Washington, DC: Department of Economics, Georgetown University.

Cappellari, L. & Jenkins, S. (2003). Multivariate probit regression using simulated maximum likelihood. *The Stata Journal, 3,* 278-294.

Cleveland, G. & Hyatt, D. (2003). Child care subsidies, welfare reform, and lone mothers. *Industrial Relations, 42,* 251-269.

Connelly, R. (1992). The effect of child care costs on married women's labor force Participation. *Review of Economics and Statistics*, *74*, 83-90.

Connelly, R. & Kimmel, J. (2001). The effect of child care costs on the labor force participation and welfare recipiency of single mothers: Implications for welfare reform. Working Paper 01-69. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Connelly, R. & Kimmel, J. (2002). The effect of child care costs on the employment and welfare recipiency of single mothers. *Southern Economic Journal, 69,* 498-519.

Connelly, R. & Kimmel, J. (2003). Marital status and full-time/part-time work status in child care choices. *Applied Economics, 35,* 761-777.

Council of Economic Advisors (CEA) (1997). *Explaining the decline in welfare receipt, 1993-1996.* Washington, DC: May.

Council of Economic Advisors (CEA) (1999). *The effects of welfare policy and the economic expansions on welfare caseloads: An update.* Washington, DC: August.

Crouse, G. (1999). *State implementation of major changes to welfare policies 1992-1998.* Available at http://aspe.hhs.gov/HSP/Waiver-Policies99/policy_CEA.htm.

Dickert-Conlin, S. & Houser, S. (1998). Taxes and transfers: A new look at the marriage penalty. *National Tax Journal, 51,* 175-217.

Dickert-Conlin, S. & Houser, S., & Scholz, J. (1995). The Earned Income Tax Credit and transfer programs: A study of labor market and program participation. In James Poterba (Ed.), *Tax Policy and the Economy: Volume 9.* Cambridge, MA: MIT Press.

Eissa, N. & Hoynes, H. (1998). The Earned Income Tax Credit and the labor supply of married couples. Working Paper 6856. Cambridge, MA: National Bureau of Economic Research.

Eissa, N. & Hoynes, H. (2004). Taxes and labor market participation of married couples: The earned income tax credit. *Journal of Public Economics, 88,* 1931-1958.

Eissa, N., Kleven, H., & Kreimer, C. (2004). Evaluation of four tax reforms in the United States: Labor supply and welfare effects for single mothers. Georgetown Public Policy Institute Working Paper. Washington, DC: Georgetown University.

Eissa, N. & Liebman, J. (1996). Labor supply response to the Earned Income Tax Credit. *Quarterly Journal of Economics, 111,* 605-637.

Ellwood, D. (2000). The impact of the Earned Income Tax Credit and social policy reforms on work, marriage, and living arrangements. *National Tax Journal, 53,* 1063-1105.

Ewan, D., Blank, H., Hart, K., & Schulman, K. (2001). *State developments in child care, early education, and school-age care 2001.* Washington, DC: The Children's Defense Fund.

Fang, H. & Keane, M. (2004). Assessing the impact of welfare reform on single mothers. *Brookings Papers on Economic Activity, 2004,* 1-116.

Feenberg, D. & Rosen, H. (1995). Recent developments in the marriage tax. *National Tax Journal, 48,* 91-101.

Figlio, D. & Ziliak, J. (1999). Welfare reform, the business cycle, and the decline in AFDC caseloads. In S. H. Danziger (Ed.) *Economic Conditions and Welfare Reform.* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Fong, M. & Lokshin, M. (2000). Child care and women's labor force participation in Romania. World Bank Working Paper. Washington, DC: The World Bank.

Giannarelli, L., Adelman, S., & Schmidt, S. (2003). *Getting help with child care expenses.* Occasional Paper No. 62. Washington, DC: The Urban Institute.

Gelbach, J. (2002). Public schooling for young children and labor supply. *American Economic Review, 92*, 307-322.

Gelbach, J. (2006). Review of *Welfare Reform: Effects of A Decade of Change*, by Jeffrey Grogger and Lynn A. Karoly. *Journal of Economic Literature, 44,* 1056-1062.

Greene, W. (2003). *Econometric Analysis: 5th Edition*. Upper Saddle River, NJ: Prentice Hall.

Greenberg, M., Lombardi, J., & Schumacher, R. (2000). *The Child Care and Development Block Grant: An overview*. Washington, DC: The Center for Law and Social Policy.

Grogger, J. (2003). The effects of time limits, the EITC, and other policy changes on welfare use, work, and income among female-headed families. *Review of Economics and Statistics, 85,* 394-408.

Grogger, J. (2004). Welfare transitions in the 1990s: The economy, welfare, and the EITC. Journal of Policy Analysis and Management, 23, 671-695.

Grogger, J. & Karoly, L. (2005). *Welfare Reform: Effects of A Decade of Change.* Cambridge, MA: Harvard University Press.

Grogger, J. & Michalopoulos, C. (2003). Welfare dynamics under time limits. *Journal of Political Economy, 111,* 530-554.

Han, W., & Waldfogel, J. (2001). Child care and women's employment. A comparison of single and married mothers with pre-school age children. *Social Science Quarterly, 82*, 552-568.

Hausman, J. (1980). The effects of wages, taxes, and fixed costs on women's labor force participation. *Journal of Public Economics, 14,* 161-194.

Hausman, J. (1985). Taxes and labor supply. In Alan Auerbach & Martin Feldstein (Eds.), *Handbook of Public Economics: Volume 1.* Amsterdam: Elsevier.

Hausman, J., Kinnucan, M., & McFadden, D. (1979). A two-level electricity demand model: Evaluation of the Connecticut time-of-day pricing test. *Journal of Econometrics, 10,* 263-289.

Heckman, J. (1974). Effects of child-care programs on women's work effort. *Journal of Political Economy*, *82*, 136-163.

Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica, 47,* 153-161.

Heckman, J. (1993). What has been learned about labor supply in the past twenty years? *American Economic Review Papers and Proceedings*, 116-121.

Heckman, J. (1996). Comment on Nada Eissa. In Martin Feldstein & James Poterba (Eds.), *Empirical Foundations of Household Taxation*. National Bureau of Economic Research. Chicago, IL: University of Chicago Press.

Heckman, J. & MaCurdy, T. (1981). New methods for estimating labor supply functions: A survey. Working Paper No. 858. Cambridge, MA: National Bureau of Economic Research.

Heeb, R. & Kilburn, R. (2004). The effects of state regulations on childcare prices and choices. Working Paper. Labor and Population Program. Santa Monica, CA: RAND.

Helburn, S. (1995). Cost, quality, and child outcomes in child care centers: Technical Report. Denver, CO: Department of Economics, University of Colorado.

Herbst, C. (2006). The effects of child care costs and taxes on the employment of single mothers: Evidence from a SIPP-CPS matching procedure. Unpublished Doctoral Dissertation. College Park, MD: University of Maryland School of Public Policy.

Hofferth, S., Stanhope, S., & Harris, K. (2002). Exiting welfare in the 1990s: Did public policy influence recipients' behavior? *Population Research and Policy Review, 21,* 433-472.

Hoffman, S., & Seidman, L. (1990). *The Earned Income Tax Credit: Antipoverty Effectiveness and Labor Market Effects.* Kalamazoo, MI: Upjohn Institute for Employment Research.

Holtzblatt, J. & Rebelein, R. (1999). Measuring the effect of the EITC on marriage penalties and bonuses. Working Paper. Washington, DC: U.S. Department of the Treasury.

Hotz, J. & Kilburn, R. (1995). Regulating child care: The effects of state regulations on child care demand and its cost. Working Paper No. 93-03. Labor and Population Program. Santa Monica, CA: RAND.

Hotz, J., Mullin, C., & Scholz, J. (2003, 2005). The earned income tax credit and labor market participation of families on welfare. Working Paper. Joint Center for Poverty Research. Evanston, IL: Northwestern University.

Hotz, J. & Scholz, J. (2001). The earned income tax credit. Working Paper No. 8078. Cambridge, MA: National Bureau of Economic Research.

Hotz, J. & Xiao, M. (2005). The impact of minimum quality standards on firm entry, exit, and product quality: The case of the child care market. Working Paper No. 11873. Cambridge, MA: National Bureau of Economic Research.

Karoly, L., Greenwood, P., Everingham, J., Hoube, J., Kilburn, R., Rydell, P., Sanders, M., & Chiesa, J. (1998). *Investing in our children: What we know and don't Know about the costs and benefits of early childhood interventions.* Report MR-898-TCWF. Santa Monica, CA: RAND.

Kaushal, N. & Kaestner, R. (2001). From welfare to work: Has welfare reform worked? *Journal of Policy Analysis and Management, 20,* 699-719.

Keane, M. (1994). A computationally practical simulation estimator for panel data. *Econometrica, 62,* 95-116.

Keane, M. (1995). A new idea for welfare reform. *Federal Reserve Bank of Minneapolis Quarterly Review, 19,* 2-28.

Keane, M. & Moffit, R. (1998). A structural model of multiple welfare program participation and labor supply. *International Economic Review, 39,* 553-589.

Killingsworth, M. & Heckman, J. (1986). Female labor supply: A survey. In Orley Ashenfelter & Richard Layard (Eds.), *Handbook of Labor Economics: Volume 1*. Amsterdam: Elsevier.

Kimmel, J. (1995). The effectiveness of child-care subsidies in encouraging the welfare-to-work transition of low-income single mothers. *American Economic Review*, 85, 271-275.

Kimmel, J. (1998). Child care costs as a barrier to employment for single and married mothers. *Review of Economics and Statistics, 80,* 287-299.

Liebman, J. (1998). The impact of the Earned Income Tax Credit on incentives and income distribution. In Jim Poterba (Ed.), *Tax Policy and the Economy 12*. Cambridge, MA: MIT Press.

Liebman, J. (1999*a*). Who are the ineligible EITC recipients? Working Paper. J.F.K. School of Government. Cambridge, MA: Harvard University.

Liebman, J. (1999*b*). The optimal design of the Earned Income Tax Credit. Working Paper. J.F.K. School of Government. Cambridge, MA: Harvard University.

Liebowitz, A., Klerman, J., & Waite, L. (1992). Employment of new mothers and child care choice: Differences by children's age. *Journal of Human Resources*, *27*, 112-133.

Long, S. & Clark, S. (1997). *The new child care block grant: State funding choices and their implications.* Policy Brief Series A, No. A-12. Washington, DC: The Urban Institute.

Looney, A. (2005). The effects of welfare reform and related policies on single mothers' welfare use and employment in the 1990s. Finance and Economics Discussion Series, Division of Research, Statistics, and Monetary Affairs. Federal Reserve Board: Washington, DC.

Loprest, P. (1999). *Families who left welfare: Who are they and how are they doing?* Occasional Paper No. 99-02. Washington, DC: The Urban Institute.

MaCurdy, T. (1992). Work disincentive effects of taxes: A reexamination of some evidence. *American Economic Review, 82,* 243-249.

MaCurdy, T., Green, D., & Paarsch, H. (1990). Assessing empirical approaches for analyzing taxes and labor supply. *Journal of Human Resources, 25,* 415-490.

Michalopoulos, C. & Robins, P. (1999). Employment and child-care choices in Canada and the United States. Working Paper. New York, NY: Manpower Demonstration Research Corporation.

Michalopoulos, C., Robins, R., & Garfinkel, I. (1991). A structural model of labor supply and child care demand. *Journal of Human Resources*, *27*, 166-203.

Meyer, B. & Rosenbaum, D. (1999). Welfare, the earned income tax credit, and the labor supply of single mothers. Working Paper No. 7363. Cambridge, MA: National Bureau of Economic Research.

Meyer, B. & Rosenbaum, D. (2000). Making single mothers work: recent tax and welfare policy and its effects. *National Tax Journal, 53,* 1027-1061.

Meyer, B. & Rosenbaum, D. (2001). Welfare, the Earned Income Tax Credit, and the labor supply of single mothers. *Quarterly Journal of Economics, 116*, 1063-1114.

Meyers, M., Heintz, T., & Wolf, D. (2002). Child care subsidies and the employment of welfare recipients. *Demography*, *39*, 165-179.

Moffitt, R. (1983). An economic model of welfare stigma. *American Economic Review, 75,* 1023-1035.

Moffitt, R. (1984). The estimation of a joint wage-hours labor supply model. *Journal of Labor Economics, 2,* 550-566.

Moffitt, R. (1986). The econometrics of piecewise-linear budget constraints: A Survey and exposition of the maximum likelihood method. *Journal of Business and Economic Statistics, 4,* 317-328.

Moffitt, R. (1990). The econometrics of kinked budget constraints. *Journal of Economic Perspectives, 4,* 119-139.

Moffitt, R. (1997). The effect of welfare on marriage and fertility: What do we know and what do we need to know? Discussion Paper No. 1153-97. Institute for Research on Poverty.

Moffitt, R. (1999). The effect of pre-PRWORA waivers on AFDC caseloads and female earnings, income, and labor force behavior. In S. H. Danziger (Ed.) *Economic Conditions and Welfare Reform*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Nagle, A. & Johnson, N. (2006). A hand up: How state Earned Income Tax Credits help working families escape poverty in 2006. Washington, DC: Center on Budget and Policy Priorities.

Nash, M. (1997). Special report: Fertile minds. *Time*. February 3, 1997.

Neumark, D. & Wascher, W. (2000). Using the EITC to help poor families: New evidence and a comparison with the minimum wage. Working Paper No. 7599. Cambridge, MA: National Bureau of Economic Research.

Noonan, M., Smith, S., & Corcoran, M. (2005). Examining the impact of welfare reform, labor market conditions, and the Earned Income Tax Credit on the employment of black and white single mothers. Working Paper No. 123-05. Institute of Industrial Relations: University of California, Berkeley.

Oliver, H., Phillips, K., Giannarelli, L., & Chen, A. L. (2002). *Eligibility for CCDF-funded subsidies under the October 1999 program rules: Results from the TRIM3 microsimulation model*. Urban Institute Working Paper. Retrieved October 2005, from: http://aspe.hhs.gov/hsp/05/elig-ccsub//.

O'Neil, J. & Hill, A. (2001). *Gaining ground? Measuring the impact of welfare reform on Welfare and Work*. Civic Report No. 17. New York, NY: Manhattan Institute for Policy Research.

Parrott, S., Park, E., & Greenstein, R. (2005). *Assessing the effects of the budget conference agreement on low-income families and individuals*. Washington, DC: The Center on Budget and Policy Priorities. Retrieved January 2006, from http://www.cbpp.org/12-20-05bud.htm.

Powell, L. (1997). The impact of child care costs on the labour supply of married mothers: Evidence from Canada. *Canadian Journal of Economics, 30,* 577-594.

Powell, L. (1998). Part-time versus full-time work and child care costs: Evidence for married mothers. *Applied Economics, 30,* 503-511.

Ribar, D. (1992). Child care and the labor supply of married women: Reduced form evidence. *The Journal of Human Resources*, 27, 134-165.

Ribar, D. (1995). A structural model of child care and the labor supply of women. *Journal of Labor Economics, 13*, 558-597.

Robins, P. (1985). A comparison of the labor supply findings from the four negative income tax experiments. *Journal of Human Resources, 20,* 567-582.

Rowe, G. & Versteeg, J. (2005). *Welfare rules databook: State TANF policies as of July 2003.* Washington DC: The Urban Institute.

Saez, E. (2002). Do taxpayers bunch at kink points? Working Paper No. 7366. Cambridge, MA: National Bureau of Economic Research.

Schoeni, R. & Blank, R. (2001). What has welfare reform accomplished? Impacts on welfare participation, employment, income, poverty, and family structure. Working Paper No. 7627. Cambridge, MA: National Bureau of Economic Research.

Scholz, J. (1994). The Earned Income Tax Credit: Participation, compliance, and anti-poverty effectiveness. *National Tax Journal, 47,* 63-87.

Scholz, J. & Levine, K. (2000). The evolution of income support policy in recent decades. Working Paper. Department of Economics. Madison, WI: University of Wisconsin.

Schulman, K., Blank, H., & Ewan, D. (2001). *A fragile foundation: State child care assistance policies.* Washington, DC: The Children's Defense Fund.

Schulman, K. & Blank, H. (2005). *Child care assistance policies 2005: States fail to make up lost ground, families continue to lack critical supports*. Issue Brief. Washington, DC: National Women's Law Center. Retrieved September 2005, from: http://www.nwlc.org/pdf/ChildCareSubsidyReport_September2005.pdf.

Schumacher, R. & Greenberg, M. (1999). *Child care after leaving welfare: Early evidence from state studies.* Washington, DC: The Center for Law and Social Policy.

Sonenstein, F., Gates, G., Schmidt, S., & Bolshun, N. (2002). *Primary child care arrangements of employed parents: Findings from the 1999 National Survey of America's Families.* Occasional Paper No. 59. Washington, DC: The Urban Institute.

Stern, S. (1997). Simulation-based estimation. *Journal of Economic Literature, 35,* 2006-2039.

Tekin, E. (2004). Single Mothers Working at Night: Standard Work, Child Care Subsidies, and Implications for Welfare Reform. Working Paper No. 10274. Cambridge, MA: National Bureau of Economic Research.

Tekin, E. (2005). Child care subsidy receipt, employment, and child care choices of single mothers. *Economics Letters, 89,* 1-6.

Triest, R. (1990). The effect of income taxation on labor supply in the United States. *Journal of Human Resources, 25,* 491-516.

U.S. Department of Health and Human Serivces (DHHS) (Various Years). *Characteristics of state plans for Aid to Families with Dependent Children.* Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families.

U.S. Department of Health and Human Services, Administration for Children and Families, Child Care Bureau (Child Care Bureau). (1995). *Federal child care program in FY 1995.* Retrieved July 10, 2006 from: http://www.acf.hhs.gov/programs/ccb/research/1995.htm.

U.S. Department of Health and Human Serivces (DHHS) (1997). *Setting the Baseline: A Report on State Welfare Waivers.* Available at http://aspe.hhs.gov/HSP/isp/waiver2/title.htm.

U.S. Department of Health and Human Services, Administration for Children and Families. (1999). *Access to child care for low-income working families*. Retrieved September 2003, from: www.acf.dhhs.gov/programs/ccb/research/ccreport/ccreport.

U.S. Department of Health and Human Services, Administration for Children and Families, Child Care Bureau. (2002). *Child Care and Development Fund: Report of state plans FY2002-2003.* Retrieved September 2005, from: http://nccic.org/pubs/stateplan/stateplan-intro.html.

U.S. Department of Health and Human Services, Administration for Children and Families. (2005). *Child Care and Development Fund: Report of state plans, FY2004-2005.* Retrieved January 2005, from: http://www.nccic.org/pubs/stateplan/.

U.S. General Accounting Office. (1993). *Earned Income Tax Credit: Design and administration could be improved.* Report No. HEHS-93-145. Washington, DC: U.S. General Accounting Office.

U.S. General Accounting Office. (1994). *Child care: Child care subsidies increase likelihood that low-income mothers will work*. Report No. HEHS-95-20. Washington, DC: U.S. General Accounting Office.

U.S. General Accounting Office. (1997). *Welfare Reform: States' Early Experiences with Benefit Termination.* Report No. HEHS-97-74. Washington, DC: U.S. General Accounting Office.

U.S. General Accounting Office. (1999). *Education and care: Early childhood programs and services for low-income families.* Report No. HEHS-00-11. Washington, DC: U.S. General Accounting Office.

U.S. General Accounting Office. (2003). *Child care: Recent state policy changes affect the availability of assistance for low-income families.* Report No. GAO-03-588. Washington, DC: U.S. General Accounting Office.

U.S. House of Representatives, Committee on Ways and Means. (Various Years). *Green Book, Background on Material and Data on Programs within the Jurisdiction of the Committee on Ways and Means.* Washington, DC: Government Printing Office.

Vandell, D. & Wolfe, B. (2000). *Child care quality: Does it matter and does it need to be improved?* Madison: Institute for Research on Poverty, University of Wisconsin. Available at: www.aspe.hhs.gov/hsp/ccquality00/ccqual.htm.

Wallace, G. & Blank, R. (1999). What goes up must come down? In S. H. Danziger (Ed.) *Economic Conditions and Welfare Reform*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Zedlewski, S. (2004). *Recent trends in food stamp participation among poor families with children.* Discussion Paper No. 04-03. Washington, DC: The Urban Institute.

Ziliak, J., Figlio, D., Davis, E., & Connolly, L. (2000). Accounting for the decline in AFDC caseloads: Welfare reform or the economy? *Journal of Human Resources, 35,* 570-