To the Faculty of Washington State University:

The members of the Committee appointed to examine the dissertation of DANIEL W. AXELSEN find it satisfactory and recommend that it be accepted.

________________________________________________  
Chair

________________________________________________
I would first like to thank my chair Robby Rosenman for the effort that he has exerted on this project. Robby, you have helped me over the course of the last two years and I greatly appreciate it. I have learned a lot from you. I would also like to thank Rod Fort and Ray Huffaker for serving on my committee. I also want to thank Greg Weeks of the Employment Security Department for his support in this project, specifically giving me access to these data. I would also like to thank Tomas, Bill, and Hal for their friendships while at Washington State University. I would also like to give extra special thanks to Maggie Ketwig. Maggie, you have been a great friend to me during my time at WSU, so thank you.

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I have yet to mention my family and my friends, and I have done so because I wanted to save them for last as we typically save the best, or the most important people for last.

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and wish he were here to see me graduate. My grandma played a similar role. Grandpa
and grandma, thank you.
Chair: Robby Rosenman

Welfare has forever been a source of social discontent. Federal and State governments have administered several variations of welfare policies since welfare’s inception in 1935. The most current policy, TANF, has adopted strong work requirements and time limited welfare as its major reforms. Our paper analyzes the work decision of current, potential, and former welfare recipients. We determine which factors reduce welfare dependency through work incentive. Theoretically, we model welfare recipient work choice as a utility maximization problem. Given the optimal choice of work hours we then derive several government policy corollaries and firm labor corollaries. The decision to work depends on non-wage versus in-kind benefit level, labor market conditions, and pecuniary income.

Empirically, our analysis has discovered two expenditure categories, policy variables, which increase work effort. Childcare and the EITC are significantly, and positively correlated with hours worked. If governments are to spend additional money and have to decide which categories to allocate its budget to, these two categories seem logical.
Employer provided insurance creates work incentive, and may imply that individuals become less welfare dependent given an insurance alternative to Medicaid. Why? Because they no longer fear losing their health insurance benefits for themselves and their children. Given this information, the government may want to pass legislation requiring firms to offer health insurance. Even if the State or Federal government subsidizes part of the bill, overall the cost of the subsidy may be less then the cost of keeping those individuals on welfare for long periods of time.

Welfare recipients, like most individuals in society, suffer most in recessionary times and are much better off economically in expansionary times. In the past, the government as well as previous literature has not acknowledged the business cycle. Our results suggest that they both should do just that.
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Dedication

This dissertation is dedicated to my mother, father, grandmother,

Patty, Jessica, and Austin.

In memory of my grandpa and my best friend - this one’s for you grandpa!
CHAPTER 1

I. Introduction

Income support programs for individuals and households, commonly known as welfare, have often been a focus of social discontent. Many believe welfare discourages work, perpetuates dependence, and undermines the family. In partial response to these criticisms, in 1996 welfare was revised once again through the Personal Responsibility and Work Reconciliation Act (PRWORA). This legislation changed the nature of previous welfare policy, placing more emphasis on work requirements with temporary transition, and less on human capital accumulation. Programs are now designed around immediate labor force participation, whereas the preceding program placed much more emphasis on long-term human capital accumulation. Temporary Assistance for Needy Families (TANF) was the program designed to meet these objectives. Yet, little has been done to explain how the system actually functions in moving welfare recipients’ off of the welfare rolls. More specifically, little research has explained how the different institutions involved interact in the decision process that moves welfare recipients from welfare to work. There are three players: government, firms and the welfare recipient. Government sets the policy, firms hire low skilled individuals who are typical of welfare recipients, and welfare recipients themselves must decide to take assistance or employment. The purpose of this research is to provide a comprehensive analysis of how the choices of each of these participants affect the work decision.

1 The term government refers to the state government only. This is consistent throughout the manuscript. When we refer to the Federal government we will explicitly say “Federal government”.

1
There are three important variables in the decisions of each current welfare participant: income (wages and the welfare guarantee, i.e., cash transfer), in-kind benefits, and non-wage benefits. Government sets a monthly income guarantee and in-kind benefit levels. Government provided in-kind benefits include at least health insurance, Food Stamps and child-care; referred to hereafter as the “in-kind benefit package”. Firms offer wages and possibly non-wage benefits. If a firm offers non-wage benefits, such benefits typically include at least health insurance, but may also include a retirement plan and other fringe benefits. These benefits are known hereafter as the “non-wage benefit package”.

Individuals choose to work or not depending on what is offered by the private sector on the one hand and the government on the other.

Several issues arise when considering each of these players. Firms offer a mix of wages and non-wage benefits such that the sum is equal to the marginal revenue product of the worker hired\(^2\). If non-wage benefits are offered, firms will pay lower wages, all else equal. Individuals prefer leisure to labor and are concerned about income with which to purchase goods, in-kind benefits, and non-wage benefits\(^3\). Individuals select a mix of goods and leisure based on tastes and preferences, given in-kind and non-wage benefit levels. Goods and leisure are imperfect substitutes.

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\(^2\) We assume that individuals work in only those industries classified as perfectly competitive. Therefore, firms hire the optimal level of labor according to that point where the marginal revenue product of labor is exactly equal to the market wage rate, \(W_L = MRP_L\). Welfare recipients are not worth enough to qualify for industries classified as a monopsony.

\(^3\) “Goods” refer to a market basket of goods. “Leisure” includes every use of time except market work, \(H\). Leisure includes sleep, home production for current consumption, education or any other activity intended to improve an individual’s utility.
Previous literature has failed to address this three-way interaction. The primary purpose of this paper is to understand how the government policy of TANF affects the labor market for low-skilled workers, with a particular focus on in-kind and non-wage benefits.

II. Review of Pertinent Literature

Section 1.1 – Introduction and Background of Welfare Literature
This literature review examines several areas within welfare, each unified by the welfare recipient and how they go about deciding to work or not. Topics including labor market effects on welfare, the role of in-kind benefits including Medicaid and Food Stamps, the role and structure of pecuniary benefits (firm and government), and the role of non-wage benefits will all be discussed \(^4\). Thus, we discuss several different welfare programs classified as one of two types: work incentive or income maintenance. A successful program outcome is measured the same under both policy types: individual economic self-sufficiency. When we speak of economic self-sufficiency with respect to the welfare population we mean an individual has exited welfare and has attained long-term employment \(^5\). The longer the welfare recipient remains off of the welfare rolls the more successful the program. Empirical as well as theoretical foundations illustrating this concept will be discussed. Both types of programs have been analyzed very extensively in the literature. However, for this research the work incentive literature is of particular interest. A consistent theme throughout most of the literature is to decrease welfare dependency through labor force participation. Chronic welfare dependency is typically defined by the situation in which an individual exits and then re-enters TANF. Another measure of chronic welfare dependency is the duration of welfare spells. Labor market participation is usually indicated by hours worked and wages. Thus, welfare dependency and labor force participation are inverses.

\(^4\) Non-pecuniary income refers only to the Guarantee.

\(^5\) Long-term employment does not carry with it a specific policy objective on earnings. An individual could still be poor, or even worse off under this objective.
Welfare literature focuses primarily on two programs: Aid for Families with Dependent Children (AFDC) and TANF. Congress established AFDC in 1935 as part of the Social Security Act. TANF replaced AFDC in 1996 when Congress passed and the President signed the Personal Responsibility and Work Reconciliation Act (PRWORA).

PRWORA changed the nature of welfare in two ways. First, PRWORA places a greater emphasis on the requirement to work compared to past policies. Secondly, PRWORA imposes time limits on an individual’s receipt of welfare.

AFDC and TANF are similar in that both programs provide eligibility for a cash transfer payment (Called the Guarantee, G, herein), Medicaid, Food Stamps, transportation, housing subsidy, childcare subsidy, and the Earned Income Tax Credit (EITC). However, AFDC was more focused on human capital accumulation, education, and training programs as a policy approach to reducing dependence on welfare. TANF focuses on immediate labor force participation that then accumulates on the job work experience leading, ideally, to higher wage rates over time. AFDC and TANF, as well as all other variations of these two policies are intended to create work incentive. The difference is that AFDC kept the welfare recipient out of the labor force until they were ready to enter given the presence of “good wages”, whereas TANF forces the welfare recipient into the labor force regardless of whether they can actually earn “good wages”, at least in the short term. Both AFDC are similar in some respects, but different with reference to others.

6 “Good wages” is a common policy term, however is undefined. “Good wages” generally refers to a job that provides labor market wages high enough to keep a family out of poverty. This, of course, is measured against some threshold which varies on the implied income level.
Under TANF, the Federal government penalizes states that fail to increase employment of recipients or to reduce the caseload. The Federal government penalizes individual states by reducing federal funding levels. TANF has changed the nature of welfare by imposing time limits and transfer floors on welfare receipts’. There is now a five-year lifetime limit on receipt of federal welfare assistance. Additionally, individuals cannot draw welfare for more than twenty-four consecutive months. Theoretically, these two policy changes were initiated in hope of reducing welfare dependency.

Emphasis here will be placed on gaining an understanding of how the welfare recipient makes choices given firm and government objectives. Labor force participation is conditioned on labor market variables, labor demand, and government policy variables. The welfare recipient has a utility function that is constrained by the economy and the government’s welfare program – policy variables. We will use utility to see how it translates into labor force participation behavior. Government and firms are also analyzed under the same framework. Government takes actual hours worked by welfare recipients and the economy as given when deciding policy variable levels. Firms choose how much labor to hire given the individual’s choice to work and the economy. It is how these three players interact among one another that we are most interested in - objectives cannot be met independently. Also, an understanding of the current welfare system and government objectives is of vital importance in trying to understand labor force participation choices of the welfare recipient because the choices made by welfare recipients are subject to the current system.

Section 1.2 – Theoretical Foundations of Welfare Literature
The theoretical literature surrounding welfare typically uses a static labor supply model illustrating how government benefits affect the labor supply of single women and examines both income and substitution effects. Moffit (1983) was one of the first to comprehensively explore this paradigm. Moffit considers a woman’s utility as a function of H (hours), Y (disposable income) and P (indicator of welfare participation). Utility is subject to a budget constraint incorporating both working and non-working benefits. Utility is maximized with respect to consumption and leisure. Danzinger (1981), Moffit (1992) and Hoynes (1997) confirm that participation in AFDC does in fact reduce labor supply via the income effect, with support for these claims found by using a static labor supply model closely resembling Moffit’s. Welfare recipients receive indirect utility by consuming both wages and non-wage benefits, constrained by a government-provided “Guarantee” and the marginal tax rate. The guarantee level is the monthly cash amount awarded to the welfare recipient while enrolled on TANF. The marginal tax rate, used under AFDC, represented the level at which the Federal Government matched the funding of each of its State’s funding levels. Moffit found that as the guarantee increases, fewer people work other things equal, and as the marginal tax rate increases fewer people work, other things equal \( \left( \frac{\partial H}{\partial G} < 0 \text{ and } \frac{\partial H}{\partial T_{\text{MTR}}} < 0 \right) \). If the government, State and Federal, gets increasingly generous, individuals will be more dependent on welfare, all else constant.

Section 1.3 – Early Empirical Work as Related to Theory
Guarantees are often referred to as the “benefit level”. For our purposes we need to think of this group of literature as “the guarantee” literature. Empirically, employment and welfare dependency have been predicted as a function of the guarantee by several authors. Blank and Ruggles (1994) find that the probability of returning to AFDC is positively affected by guarantee levels. They used a two-year panel consisting of single mothers who have exited AFDC to test this hypothesis. Blank and Ruggles (1996) follow up this paper using the same data but test the probability of an exit and the probability of becoming ineligible for AFDC. They show that the guarantee level has a negative effect on an exit, and that most women are still eligible after exiting. Blank and Ruggles’ paper supports the theory of dependency. Consistent with Blank and Ruggles, Fitzgerald (1995) also discovers an inverse relationship between the probability of an AFDC exit and guarantee levels. Hoynes and MaCurdy (1994) look at Michigan PSID data from 1968-1989 and test the probability of an exit for a single mother receiving AFDC. They found that guarantee levels explain changes in length of welfare spells in some periods, and not in other periods. Hoynes (1996) uses a subset of the welfare population. She only considers those enrolled in AFDC-UP. Regardless, the result is the same. There is a strong negative effect between the guarantee and the labor supply of AFDC-UP enrollees. In general, the guarantee level has a positive relationship with welfare dependency and a negative relationship with labor force participation.

Since TANF, empirical evidence relating to the marginal tax rate is no longer relevant. The marginal tax rate is no longer of interest because TANF has adopted a fixed block

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7 AFDC-UP was a program designed for married couples with at least one child and combined incomes
grant as its federal support system, leaving all program design in the hands of each individual state. Under TANF, the state now pays the full cost of any additional welfare spending over the amount awarded by the federal government. Policy makers, within AFDC, used the marginal tax rate as a policy tool. States complying with Federal regulations received higher funding levels through mandating a higher marginal tax rate. However, the theoretical relationship between the block grant from the Federal Government and welfare dependency should remain positive under TANF, resulting in fewer people working. Each state determines the guarantee under TANF, as well as the amounts of Medicaid, Food Stamps and other in-kind benefits. If policies do not successfully move people off the welfare rolls, states are penalized by receiving a smaller proportion of the Federal block grant in future years. The original “work incentive” literature provides a basis for our understanding of this change.

Section 1.4 – Early Work Incentive Literature and the EITC

Welfare reform has always designed programs around two well-defined goals. All welfare reform focuses on creating a system serving as a social support program with a work incentive focus. Early literature sought to describe a program that would give individuals enrolled on welfare the incentive to work, but also offer a pecuniary safety net to the welfare recipient. This early literature focused solely on the guarantee level.

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8 A marginal tax rate increase is directly correlated with welfare dependency. When states would receive more funds they would simply increase budgets, therefore increasing benefit levels. Under this agenda there was no incentive for states to be “smart” with their funding. The more they got, the more they spent, and, as shown, the less effective were welfare programs overall.
The main issue was how to allocate the guarantee in such a way that it would, on net, create a positive work incentive. Friedman’s seminal article (1962) explored work incentives of welfare. His paper was intuitive rather than formally analytical. He proposed a social program called a Negative Income Tax (NIT), whereby benefit structures are eventually decreased to zero as one works more hours; a symmetrical income tax system. Originally, individuals were given a cash benefit and for every dollar earned their benefits were reduced by the same amount. In essence, a 100 percent tax on wages. Friedman postulated that this caused disincentive to work. His rebuttal was to offer benefits at less than 100 percent and awarded based on family dynamics and social need. The actual guarantee level would then be taxed away as wages grew, but at a rate less than 100 percent. In turn, the individual has incentive to work because of higher after tax income potential through working. As a person works more, eventually the negative income tax disappears, at which point your guarantee also becomes zero. After reaching this corner solution the person is no longer enrolled on welfare and begins paying a positive tax.

Tobin (1965) and Tobin, Pechman and Miezkowski (1967), added to the Negative Income Tax literature. Both papers are more concerned than Friedman with the actual application of the negative income tax. Both agree with Friedman in that a 100 percent tax on the guarantee does in fact dilute work incentives. Tobin suggests a Negative Income Tax plan paying between 33 and 50 percent. He concludes that this type of plan will increase work incentives and may reduce the need for other types of assistance including medical care, housing and food. Each of these papers’ concludes that there is
Zeckhauser (1971) set up a sequential game between the non-poor and the poor. By assumption, the non-poor transfer money to the poor. Poor people in the economy maximize utility with respect to the wage rate and hours worked; income is a linear function of the guarantee and wages, with hours worked as the choice variable. Public assistance shows up in the budget constraint. The non-poor maximize utility with respect to the wage rate, hours worked, and the cost of the program, which is a function of the tax rate and stipend. These variables are the choice variables of the non-poor. Initially, the non-poor offer a plan to the poor, and then the poor choose the number of hours to work so as to maximize their utility. The optimal outcome for the non-poor is to offer a negative income tax and stipend, both approaching negative infinity being the optimal outcome. The poor now have incentive to work additional hours. In determining the optimal assistance program Zeckhauser models a two-move, non-zero sum game. The non-poor select a plan given the poor’s maximizing response, with the optimal plan being a negative income tax. However, the outcome is not Pareto optimal. Pareto Optimality can only occur by specifying utility functions for both players and setting up lagrangians. The result - all Pareto optimal outcomes result in negative tax rates. Zeckhauser developed a model that showed, theoretically, a positive correlation between a Negative Income Tax policy and hours worked. Incentives are explicit in Zeckhauser’s model and are a combination of the guarantee level and the income tax rate. Combinations of these two policy variables result in different choices of hours worked.
Garfinkel (1973) extended Zeckhauser’s work by illustrating different budget constraints than that specified by Zeckhauser. Each constraint illustrated different options for the welfare recipient given no program, a wage subsidy program, or a Negative Income Tax program. Garfinkel thereby demonstrated which of these budget constraints increased hours worked the most. The Negative Income Tax was modeled analytically the same way as Zeckhauser. As hours of work are increased the guarantee awarded to the welfare recipient is symmetrically taxed away until wages reach some break-even level. The wage subsidy is represented in the budget constraint as a scalar multiplied by wages. Garfinkel finds that wage subsidies increase hours of work more than negative income taxes do. If the welfare recipient is offered incentive to work through a wage subsidy or negative income tax, hours of work will in fact increase, all else constant.

Based on Garfinkel, Rea (1977) used a dynamic model to explore the effect of a negative income tax on human capital investment. Rea finds that a Negative Income Tax increases leisure and decreases human capital investment. In a significant conclusion, Rea concluded that the negative income tax could actually cause a disincentive to work. Rea’s findings give preference to wage subsidy programs rather than negative income tax and income guarantee policies.

This early literature set the foundation for modeling the budget constraint of the welfare recipient. Any type of pecuniary benefit given to an individual should increase her budget, thus creating additional utility with respect to consumption and leisure. The

I refer to “her” for most of the paper. This is without prejudice. Generally speaking the majority of welfare recipients are in fact female. This is not because females are less employable than males – or less productive for that matter. Welfare is a system designed for females. Welfare serves people with children.
major difference is how each of these policy options is modeled as related to work incentives. The wage subsidy only appears in the budget constraint when hours worked are positive. If an individual works zero hours they do not receive the wage subsidy; it is “all or nothing”. Conversely, the Negative Income Tax decreases your benefit as wages increase. In some cases this will cause disincentive to work. If a 100 percent tax is in place, the individual will not work. If the tax were less than 100 percent individuals will work more than before, but still less than they would have under a wage subsidy. However, if costs of a wage subsidy program versus a Negative Income Tax program are equivalent, the government should choose to offer a wage subsidy program. Wage subsidies are the best-case scenario for a work incentive structured welfare system and have the largest impact on the labor choice. However, wage subsidies do not provide the safety net function of welfare. More recent empirical analysis supports the claim that negative income taxes cause disincentive to work. For instance, Moffit and Kehrer (1981) and Burtless (1987) find that negative income tax plans (experiments) reduce work effort.

Each of these papers discussing the NIT uses an assumption that is not made explicit. If we assume a set of indifference curves showing a preference for leisure over work, the NIT will always reduce work effort. However, this is not the case for persons whose indifference curves show a preference for work over leisure. Each of these papers should have made this assumption explicit in their model. The overall effect of the NIT on the marginal tax rate is a function of the empirical reality of choice of work over leisure.

According to societal values and current ideology, it is typically a female with dependent children rather than a male with dependent children. Of course, it is also the female that gives birth to the child.
You will obtain different results depending on the assumptions you make about the slope of the welfare recipient’s indifference set.

Policy makers used early research on negative income taxes and wage subsidies to develop the Earned Income Tax Credit (EITC). Under the EITC, an individual’s cash guarantee does not go to zero as wages increase. If an individual is eligible, she receives a tax credit on wages so long as wages are below some break-even level. She also receives the full guarantee as long as wages are less than the break-even level. When wages reach the break-even level both the credit is reduced to zero as well as the guarantee. The individual is at the Federal level of subsistence and no longer on welfare. The major difference between the EITC and the NIT is that the guarantee does not shrink as wages increase. You either receive the guarantee or do not. The EITC has features similar to both the negative income tax and the wage subsidy.

The EITC was initially adopted in 1975 to supplement low-income families by offsetting social security payroll taxes (Eissa and Liebman, 1996). Current eligibility requires an income level less than the poverty level and at least one child in the household. EITC literature is important for two reasons. First off, it is a benefit received by current welfare recipients, and some literature shows that the EITC most significantly influences the working decision. Secondly, this literature is important in showing to how correctly model the budget constraint.

Conventional labor theory predicts that the tax credit does in fact encourage labor force participation of those who are not currently employed. However, labor theory also
predicts that hours worked by those already working are reduced as a result of the tax credit. Meyer and Rosenbaum (2001) look at the Earned Income Tax Credit (EITC) and its effect on welfare and the labor supply of single mothers between the years 1984-1996, using data from the Current Population Survey. The main focus of their model is to determine how welfare policies have affected employment levels of single mothers. They focus on wages rather than hours worked, noting that the probability of a woman working is the probability of the expected utility of working being greater than the probability of expected utility of not working. The model incorporates the fact that an individual can work while on welfare, thus incorporates wages, non-wage benefits, and in-kind benefits when estimating utility. Using difference in differences estimation and probit models, Meyer and Rosenbaum find that the EITC accounted for 60 percent of the increase in employment of single mothers, while changes in welfare agendas, Medicaid, childcare, and Food Stamps had no significant effects. They did get the correct signs on the policy variables, but overall these relationships were not found to be statistically significant. Thus, they find that tax incentives have the biggest impact on the decision to work.

Section 1.5 – In-kind benefits

In-kind benefits are a choice variable of current welfare recipients’. Government provided in-kind benefits include Medicaid, Food Stamps, childcare, transportation, and any other in-kind benefit awarded to the welfare recipient by the government.  

Other non-pecuniary benefits include subsidies for clothing, tolls, car repair, meals and short term lodging, educational expenses, relocation, testing – diagnostic, medical exams, hair cuts, licenses/certifications, union/professional organizations, counseling certificate, personal hygiene,
However, particular interest is placed on Medicaid, childcare, and Food Stamps. These three in-kind benefits are the largest expenditure categories. Using income/leisure models, the general idea is that Medicaid and other benefits create a notch in the budget line. Benefits are lost when the welfare recipient goes across this notch (often called the breakeven point) thus jumping down to a lower indifference curve and losing utility, all else constant. The size of the notch depends on the availability of private sector insurance (employer provided insurance). Welfare recipients weigh both options and remain on welfare if there is a bigger Medicaid (benefit) notch. It is generally thought that as the welfare recipient increases work hours she more likely will be offered employer-provided insurance, thus creating an insurance notch after so many hours of work and placing her on a higher indifference curve. Given the relative size of the two notches, the welfare recipient decides to work or not. The decision to work is weighed heavily on the difference between the Medicaid and private sector insurance notches. It is a major misrepresentation of the budget constraint to only consider the guarantee and market wages. In-kind benefits are therefore represented in the budget constraint as “shift parameters”.

Most welfare literature captures the Medicaid notch resulting from in-kind benefits received from the government. However, little existing research acknowledges the existence of employer provided non-wage benefits. Non-wage benefits reduce the in-kind notch, but as discussed earlier, the existence of employer-provided insurance could, in some cases, create an even bigger notch than the existing welfare in-kind benefit notch.
Yelowitz (1995) looks at the impact of Medicaid expansions on labor supply. He specifies a static labor supply model, where utility is a function of leisure and other goods given a constant pre-tax wage rate. Yelowitz uses the traditional framework, where the budget set is non-linear due to the presence of Medicaid. As Medicaid is expanded, the Medicaid notch shifts out the budget constraint, increasing income limits. He finds that changes in income limits increase labor force participation and decrease AFDC participation. Yelowitz finds that AFDC participation decreases more than labor force participation increases. His results show Medicaid expansions as having positive effects on labor force participation and negative effects on AFDC participation. He finds that Medicaid expansions only reduce AFDC participation by 1.2 percentage points and only increase the probability of working by .9 of a percentage point.

One shortcoming of the Yelowitz study was its assumption that there are no insurance alternatives. The small effect of Medicaid reform could be due to the “crowding out” which occurs during Medicaid expansions. Cutler and Gruber (1996) find that Medicaid expansions cause firms to offer less medical insurance. This also induces firms to hire more labor, because per unit labor costs are less.

It is generally conceded that many women stay enrolled on TANF because of guaranteed access to Medicaid. Blank (1989) measures Medicaid’s effect on AFDC participation, labor market involvement, and Medicaid usage. Using a utility maximizing model and

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11 One way of expanding Medicaid is to increase minimum income requirements. This is usually the cause of a Medicaid expansion.
probit and tobit estimation of AFDC and Medicaid, Blank hypothesizes that women who value health insurance remain on AFDC to retain Medicaid benefits. Higher levels of AFDC and Food Stamp Guarantees increase participation levels, while mean state Medicaid insurance values do not. Therefore, Blank concludes that Medicaid coverage has no effect on AFDC participation. Blank uses general Medicaid proxies to model and estimate individual choice. This is an empirical misspecification, and because of this, her results should be considered invalid. It is also a misrepresentation to assign general approximate Medicaid expenditures to all individuals.

Winkler (1991) evaluates the impact of Medicaid on the labor supply of women. Using an income-leisure model she hypothesizes that, because Medicaid benefits are correlated with AFDC participation, if Medicaid benefits are increased more people will enter the AFDC program or remain enrolled. On aggregate, Medicaid expansions lead to fewer hours worked. Using the Current Population Survey (CPS) and a Heckman two-step probit model, Winkler finds that Medicaid generosity has a significant negative effect on the probability of working. However, Winkler uses only the guarantee and ignores other forms of income, primarily wages\textsuperscript{12}. This is a misspecification of the welfare recipient budget constraint. Additionally, she omits employer provided health insurance. We know this reduces the notch in the budget constraint, and in some cases reverses the direction of the notch. Winkler’s paper is a classic case of model misspecification by assumption, probably due to data limitations.

\textsuperscript{12} Many studies fail to consider \( w \) (market earnings) as well as \( G \) (non-market earnings). Any author failing to consider both is not representing the cycle properly. In order to follow individuals over time one needs to consider
Moffit and Wolfe (1992) expand on Winkler and Blank’s ideas’ by looking at the effect of Medicaid on both welfare participation and labor force participation. They build on Blank and Winkler, but differ in two unique ways. First, they develop a measure of individual family expected medical expenditures and health status. Secondly, they incorporate employer provided health insurance and its impact on the decision to exit welfare. Their probit model showed a significant negative effect between full-time disposable income and welfare participation, and a significant positive relationship between full-time disposable income and labor force participation. Moreover, cash guarantees and food stamp guarantees have significant positive effects on welfare participation and significant negative effects on the decision to work. Most important, both Medicaid and private insurance significantly affected labor force participation. However, the private health insurance effect is 2-3 times larger than the Medicaid effect. The main conclusion is that Medicaid expansions create an incentive to remain on welfare and a disincentive to work. Also, private insurance creates a very strong negative effect on welfare participation and a strong positive effect on the decision to work. This analysis is thorough. The only issue is the use of Medicaid proxies in the estimation of individual Medicaid expenditures.

Montgomery and Navin (2000) use aggregate data across states to see if Medicaid benefit levels affect the labor supply of female-headed households. They expand on Winkler’s ideas by testing whether different Medicaid benefit levels across states affect the labor supply of female-headed households. Using the Current Population Survey from 1980-

the life cycle of the individual as a worker and a welfare recipient in order to capture the decisions of welfare dependency and labor force participation.
1993, they find that higher welfare spending reduces employment and hours worked, and that Medicaid expansions have a significant negative effect on employment. Unlike Winkler, Montgomery and Navin considered wages, and compare the utility of working to the utility of not working.

One problem with most of the empirical analysis surrounding Medicaid coverage is that it only focuses on Medicaid. For the most part, most of these exclude other in-kind benefits. Other than Moffit and Wolfe, most analyses tend to ignore employer provided health insurance due to lack of data availability.

**Section 1.6 – Waivers**

A lot of experimental design took place in the 1990's as an application of welfare reform. Waiver programs allowed states to experiment with alternatives to traditional AFDC plans. Many of these waiver programs resemble TANF, focusing on strong work requirements through job search. The waiver period can be thought of as a foundation for understanding how correctly to model TANF.

Friedlander and Hamilton (1996) examined an experimental model of a welfare system that would function similar to TANF. They tested whether imposing an obligation to work, and implementation of these policies that lead to work, actually increase

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13 Waiver programs existed pre-1996. TANF turned discretion over to each individual state, and the waiver period was granted to enable states to test different welfare policies so that when TANF eventually took over as the dominant welfare policy, they would be prepared with the type of program they wanted to undertake. Extensive experimental analysis was administered during this period.
employment levels and reduce welfare dependency. From 1985 to 1987 the county of San Diego initiated a program known as the Saturation Work Initiative Model (SWIM). It took a sample of people currently enrolled in AFDC and placed them in work assignments and other types of employment-directed programs. Results show 75 percent of those who participated in SWIM were employed compared to 68 percent for the control group, a difference statistically significant at the 5 percent level.

Bloom and Michalopoulous (2001), Fein et al. (2001) and O’Neill and Hill (2001) all look at the effect that similar waiver programs have had on employment, program participation, and wages. Each of these papers found waivers to have a positive effect on employment and wages. O’Neill and Hill Bloom and Michalopoulous, and Fein in that they find a negative effect on AFDC participation, whereas the others’ find no effect on AFDC participation. They suggest that the effects on wages and employment are due to the enforcement of work requirements, not from marginal incentive changes. Similar results are found by Bartik and Eberts (1999), Blank (2001), Figlio and Ailiak (1999), Wallace and Blank (1999) and Ziliak et al. (2000).

Schoeni and Blank (2000) evaluate TANF during the transition from AFDC to TANF by comparing the 1992-1996 waiver period to the 1997-1998 TANF period. They found that TANF significantly reduced welfare participation compared to the waiver period, but found no significant effect on the wage rate or hours worked. However, the results may be misleading due to a large number of pre-TANF observations and a very limited sample in terms of post-TANF observations. Sample composition is not correctly designed. This paper is a classic example of sample selection bias.
One issue with studying waiver programs is that only short-term effects of program reform are considered. Friedlander, Greenberg, and Robins (1997) evaluate the long-term aspects of government programs for the disadvantaged. Since welfare’s initial inception in 1935, they find no support for positive long-term effects on employment, wages, poverty, income inequality, and welfare participation. Although most evaluations of the welfare population conclude that there are positive, significant effects of training programs in the short-run, they find that there is no evidence to support this claim over the longer-term. One explanation is the skills learned by participants are not valued by employers over the long-term.

Section 1.7 – The Importance of Demographics

One possible reason for the lack of long-term success is that the welfare population is structurally disadvantaged in the labor force. Demographic variables, which have been included in virtually all studies, may offer some explanation. Harris (1993) uses a panel of data evaluating single mothers enrolled on AFDC within a three-year period and estimates the probability of an exit given different guarantee levels and a vector of demographic variables. She finds the guarantee level to be insignificant, and that a mother enrolled on AFDC exits 2/3 of the time because of an employment opportunity, but only when the marginal benefits from working are better than those from not working. Harris (1996) follows up her own work by looking at a 6 year panel, this time finding the probability of a single mother re-entering AFDC given prior enrollment. Once again, Harris finds the guarantee to be insignificant. She claims that analyzing
welfare is not always about the recipient weighing the costs and benefits of exiting/returning. She finds human capital levels and labor market variables to be unimportant. More important factors are those such as age, number of children, education, and marriage. A woman’s taste for leisure and home production and the existing social atmosphere significantly influences repeat periods on welfare. One shortcoming, is the failure to also include in-kind benefits. Again, a misspecification of the welfare recipient budget constraint.

**Section 1.8 – The Importance of Controlling for the Labor Market**

More recent literature has added labor market variables as predictors of welfare participation. Hoynes (2000) looks at demand-side labor factors that may influence an AFDC exit/return as a cause of welfare dependency using a discrete time hazard model. Hoynes estimates the probability of an exit/return and length of welfare spell on a vector of demographic variables (includes supply-side) and a vector of labor market variables (demand-side). She finds a significant relationship between labor market conditions, welfare exits/returns, and length of welfare spell. When wages are higher, and labor market conditions are expansionary, the welfare recipient is more likely to exit welfare and not return. Given a high unemployment rate or declining wages in the service-sector, the welfare recipient is more likely to return to welfare or be a long-term recipient. Harris (1996), Meyer (1993), and Pavetti (1993) also find county unemployment rates to significantly predict welfare returns and other demand-side factors including wage rates and hours worked. Studies such as Bane and Ellwood (1983), Hutchens, (1981) and O’Neill (1984) find a positive correlation between wages and welfare exits; all of these
studies are of a dynamic nature. Static models pertaining to welfare such as Moffit (1992) have also concluded that higher wages predict lower welfare participation rates. In all, labor market conditions are strong predictors of welfare dependency, thus, should be considered as such.

III. Conclusion

These studies suggest that supply and demand side labor effects, demographics, as well as costs and benefits should all be considered. Much of the literature has captured some of these ideas, but has failed to analyze the process collectively and comprehensively. Much of the literature contains model misspecifications, both theoretical as well as empirical misspecification. There is also a lot of sample selection bias present in the literature.

One issue has not been resolved. Do labor market conditions predict employment more than benefit levels? There also needs to be empirical work done on a panel consisting of both welfare history and employment history. A complete panel would jointly measure welfare dependence, labor force participation, and employment history. More importantly, research on welfare needs to always address the role of non-wage benefits. In the past, it has not. There are two choices confronting individuals: to work or to be on welfare (they can choose both). These two choices must fully consider demand conditions and the full mix of money and non-money transfers as well as wage rates and employer fringes.
I. Welfare Recipient Utility Maximization Problem

Section 2.1.1 – Theoretical Model, The Welfare Consumer

This chapter theoretically analyzes the working decision of the welfare recipient with the goal of discovering what factors predict hours worked. The theory will also determine which factors influence welfare dependency. The model below is a switching model where the parameter \( h \) indicates the work choice. When \( h = 1 \), the individual is on TANF and when \( h = 0 \) the individual is not on TANF. Two assumptions are made with respect to the above model: consumers only receive the guarantee, in-kind benefits, and the EITC when on TANF; otherwise they do not. Welfare recipients’ gain utility by being enrolled in TANF, \( U_G \), or by being employed by a firm, \( U_F \). Utility in both cases is a function of consumption, \( X \), Leisure, \( L \), and benefits, \( B \). Benefits, \( B \), and consumption, \( X \), are imperfect substitutes of one another. Benefits received are either in-kind benefits or employer non-wage benefits. We assume \( a + b + c = 1 \), indicating the relative weight the individual places on the three goods. The following model will be used to analyze these ideas:

\[
\begin{align*}
Max U &= h U_G + (1 - h) U_F \\
where, h &= \begin{cases} \frac{1}{Y \leq Y^*} \\ 0 & \text{if } Y > Y^* \end{cases}
\end{align*}
\]

By substitution, this becomes,
Max \( U = aX^2 + bL^2 + c(B_G^2 + (1 - h)B_H^2) \)
\[ s.t. \, hT + wH(\bar{\sigma}h + 1) + wHt(h - 1) = P_X X + (1 - h)P_B B_F + h(P_B B_G) \]
and \( A = H + L \)
where \( Y = hT + wH(\bar{\sigma}h + 1) + wHt(h - 1) \)

\[
X = \text{Consumption} \\
L = \text{Leisure} \\
B = \text{Benefits, G = Gov., F = Firm} \\
T = \text{Lump sum transfer} \\
w = \text{Market wage rate} \\
H = \text{Hours worked} \\
h(\bar{\sigma} + 1) = \text{EITC} \\
t = \text{Income tax rate} \\
h = \text{TANF participation indicator} \\
A = \text{Total allotted time} \\
Y = \text{Total income} \\
0 < \bar{\sigma} < 1
\]

When \( h = 1 \), income is below the break-even level, \( Y^* \); therefore the welfare recipient qualifies for TANF and enrolls in the program. TANF income is

\( Y = T + wH(\bar{\sigma} + 1), \text{with } Y \leq Y^* \). Utility is subject to this income constraint. When enrolled in welfare, recipients are guaranteed at least \( T \), the lump-sum guarantee awarded to the welfare recipient. Therefore, if the welfare recipient works \( H = 0 \) she has an income of \( T \). Welfare recipients can also work \( H > 0 \) hours and receive the market wage rate, \( w \). Under current welfare legislation, any wages earned while on welfare are eligible for the EITC, as long as income is below the break-even level\(^{14}\). The EITC is modeled as \( (\bar{\sigma} + 1) \), with \( 0 < \bar{\sigma} < 1 \). Thus, working welfare recipients enrolled in TANF

\(^{14}\) If you are on welfare your income is below EITC income eligibility. So, if on welfare, you are in fact eligible for the EITC. We assume, for simplification, that an individual receives the EITC while on welfare, paying no taxes. When an individual exits the welfare system she can still qualify for the EITC depending on income, however, not through the welfare recipient budget constraint. The tax reduction at
with total income below the breakeven level, are eligible to receive the lump-sum
guarantee, $T$ and the earned income tax credit, $(1 + \sigma)$. The earned income tax credit is
typically given in three phases, starting at 40 percent of income, leveling off, and then
paying out at 20 percent. We assume that there is a single level, $\sigma$. We assume in-kind
benefits are paid for by the government, and are treated as non-pecuniary income. Once
an individual is on TANF, the amount of the government guarantee and earned income
tax credit are exogenous to the welfare recipient. The welfare recipient chooses how
many hours to work and how much to consume given the governments choice variables.

When $h = 0$, income is greater than the breakeven level because the welfare recipient is
working. Income received is equivalent to $Y = wH - twH, with Y > Y^*$. Thus, the worker
no longer qualifies for the guarantee and earned income tax credit. The term $- twH$
indicates the income taxes she must pay. We assume the tax rate is bound between zero
and one ($0 \leq t \leq 1$). Non-pecuniary income is in the form of non-wage benefits received
from the employer. The level of non-wage benefits can range from zero to an amount
even greater than was received when on TANF.

The two cases discussed are represented graphically below. Using the specified model
there are two alternatives: 1) the combination of the two budget constraints produces a
concave outcome or 2) the combination of the two budget constraints produces a convex
outcome. Figure 1, below, assumes $B_G = B_F = 0 and t, \sigma > 0$.

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the higher income level can be seen through a lower income tax rate modeled in the worker budget constraint.
Figure 1 depicts outcome number 1, where the combination of the two budget constraints produces a result of a concave budget constraint. When the welfare recipient is faced with this budget constraint, the slope of the budget constraint when $h = 0$ is less than the slope of the budget constraint when $h = 1$. This implies that $(\sigma + 1) > (1 - t)$, which is true by assumption. The obvious result here is that the welfare recipient likely has incentive to remain on the welfare rolls because income plus the wage subsidy outweighs the option of working and paying taxes. Utility maximization will of course depend on preference, and given this picture there exists a unique utility maximization solution occurring where the recipient chooses to work enough to be off TANF if $a >> b$, suggesting that the welfare recipient prefers consumption to leisure.
Figure 2 shows the second outcome, where the result of the two budget constraints produces a combined result of one convex budget constraint. This can occur when preferences are weighted heavily towards income, not leisure. The slope of the budget constraint when $h = 0$ is now greater than the slope of the budget constraint when $h = 1$. This implies that $(\sigma + 1) < (1 - t)$. The welfare recipient has incentive to work harder and for more hours when faced with this picture. Now, the benefits from working more than the break-even level of hours produces a more preferred result. Also, the welfare recipient is more inclined to work because the benefits received from remaining on the welfare rolls are much less than those that could have been received when working (indicated through preference). One solution exists where the two budget constraints intersect. At this point the welfare recipient is indifferent between working and not working. At this point there is no unique solution. However, according to the specified model this case will never happen unless $\sigma < 0$ and $|\sigma| > t$. The model constrains the EITC between zero and one, thus, Figure 2 is not a possibility, assuming a unique
solution. Because we specify a switching model, our first step is to find utility
maximizing outcomes under each option, \( h = 0 \) and \( h = 1 \). \(^{15}\)

**Section 2.1.2 – First Order Conditions, Consumer Problem**

When the individual enrolls in TANF, because \( Y < Y^* \), the first order necessary
conditions are \(^{16}\),

\[
\frac{\partial U_G}{\partial X} = 2aX - \lambda P_X = 0 \\
\frac{\partial U_G}{\partial L} = 2bL - \lambda [w(\sigma + 1)] = 0 \\
\frac{\partial U_G}{\partial B_G} = 2cB_G - \lambda P_{B_G} = 0 \\
\frac{\partial U_G}{\partial \lambda} = T + wH(\sigma + 1) - P_X X - P_{B_G} B_G = 0
\]

The First order necessary conditions for individuals not on TANF, and employed \( (Y > Y^* \)
and \( H > 0 \) ) are,

\[
\frac{\partial U}{\partial X} = 2aX - \lambda P_X = 0 \\
\frac{\partial U}{\partial L} = 2bL - \lambda w(1 - t) = 0 \\
\frac{\partial U}{\partial B_F} = 2cB_F - \lambda P_{B_F} = 0 \\
\frac{\partial U}{\partial \lambda} = wH - wHt - P_X X - P_{B_F} B_F = 0
\]

\(^{15}\) We assume there are no corner solutions. This means that we are eliminating persons that never work at
any wage rate and those who will never seek TANF no matter how poor.
\(^{16}\) The functional forms and equality constraints are such that we assume that the second order conditions
are met under both conditions, \( h = 0 \) and \( h = 1 \).
Section 2.1.3 – Derivation of the Optimal Hours Worked Functions, Consumer Problem

From the first order conditions, the optimal amount of leisure was found, \( L^* \). Labor supply of the welfare recipient given that she receives TANF takes the following form:

\[
\hat{H} = A - L^* = A - \left[ \frac{(aw(\sigma + 1))(T + w(A - L)(\sigma + 1) - P_{B_G}B_G)}{bP_X^2} \right] \quad (A)
\]

From the first order conditions, the optimal amount of leisure is found, \( L^* \). The labor supply of an individual, given that she is not on TANF takes the following form:

\[
\hat{H} = A - L^* = A - \left[ \frac{(aw(1-t))(w(A - L)(1-t) - P_{B_F}B_F)}{P_X^2b} \right] \quad (B)
\]

From (A) and (B) above we can see that \( \hat{H}(A) < \hat{H}(B) \) as long as more government in-kind benefits are offered compared to firm non-wage benefits (\( P_{B_G}B_G < P_{B_F}B_F \)). Under this scenario, \( L^*(A) > L^*(B) \). We already know that \( Y < Y^* \) in (A) implying the individual has more leisure than income. Realistically, \( B_G \) is much greater than \( B_F \).

If \( B_G = B_F = 0 \) the opposite is true. Both of these functions tell us that hours of work cannot be compared between (A) and (B) without giving special consideration to non-wage and in-kind benefit levels. These levels cause the utility function to “switch”. The switching effect captures both benefit notches as discussed in the review of literature.

Section 2.1.4 – Comparative Statics, Consumer Problem - On TANF
Now that optimal labor supply functions have been derived and discussed, comparative
statics are found. Under which conditions these functions switch is discussed in detail.
The following hypotheses involving the signs of different comparative statics will be
tested:
\[
\frac{\partial H}{\partial w} \geq 0
\]
\[
\frac{\partial H}{\partial \sigma} \geq 0
\]
\[
\frac{\partial H}{\partial t} \leq 0
\]
\[
\frac{\partial H}{\partial T} \leq 0
\]
The main result is to show how hours worked vary given different income levels,
comparing wages to the guarantee and considering non-wage and in-kind benefit levels as
well. Hours worked is always an increasing function of the market wage rate. Thus, the
higher the wage rate the more you will work \(^{17}\). The EITC should also have a positive
effect on the number of hours worked. This has previously been shown in the literature
(Eissa and Liebman, 1996). Income taxes are negatively correlated with hours worked.
If income taxes are relatively high, the welfare recipient will reduce work effort. Lastly,
the higher the government guarantee, the less incentive there is to work. As the income
tax increases, net wages decrease, ceteris paribus.

\(^{17}\) We assume that the welfare recipient does not face a backward bending supply curve.
Comparative statics for the welfare recipient enrolled on TANF coming from (A) are,

\[ \frac{\partial H}{\partial w} = \frac{a(1 + \sigma)[T + (1 + \sigma)2wH - P_{xG} B_G]}{-bP^2_x} < or > 0 \]  
\[ (1A) \]

\[ \frac{\partial H}{\partial \sigma} = \frac{aw[T + 2wH(1 + \sigma) - P_{xG} B_G]}{-bP^2_x} < or > 0 \]  
\[ (2A) \]

\[ \frac{\partial H}{\partial t} = 0 \]  
\[ (3A) \]

\[ \frac{\partial H}{\partial T} = \frac{aw(1 + \sigma)}{-bP^2_x} < 0 \]  
\[ (4A) \]

Section 2.1.5 – Discussion of Comparative Statics - On TANF

From (2A) we see that hours worked while enrolled on TANF with respect to the market wage rate and the EITC can be either positive or negative. Because the denominator is negative, if the dollar value of TANF pecuniary income is greater than the dollar value of in-kind benefits the welfare recipient will work less hours given a higher wage rate. On the other hand, if the dollar value of TANF pecuniary income is less than the dollar value of in-kind benefits the welfare recipient will work more given a higher wage rate. We are on the positively sloped labor supply curve only if most of our compensation is in benefits. The income effect dominates the substitution effect under the condition \[ \frac{\partial H}{\partial w} < 0. \]
If $\frac{\partial H}{\partial w} > 0$ then $P_{B_G} > T + (1 + \varnothing)2wH$. From this, we get $\frac{P_{B_G} - T}{2(1 + \varnothing)} > wH$. This comparative static result states that the dollar value of in-kind benefits is greater than the dollar value of TANF pecuniary income. In order to induce work effort the government needs to keep in-kind benefit levels low. If in-kind benefits are kept high, while cash payments are kept low, welfare recipients will work more hours given a higher wage rate. There is also a wealth effect present. Given the fact that welfare recipients are receiving high levels of in-kind benefits, it is reasonable to assume they will work more hours in order to afford a better quality of life. When consuming high levels of Medicaid, Food Stamps, transportation, etc., the individual becomes comfortable with current consumption levels. Therefore, given the opportunity to work at a higher market wage rate the welfare recipient will work more hours due to the wealth effect for which it creates, all else constant. However, this effect only occurs when welfare recipients receive a level of in-kind benefits greater than TANF pecuniary income.

If $\frac{\partial H}{\partial w} < 0$ then $P_{B_G} < T + (1 + \varnothing)2wH$. From this, we get $\frac{P_{B_G} - T}{2(1 + \varnothing)} < wH$. Here, the dollar amount of in-kind benefits is less than the dollar value of TANF pecuniary income. Recipients’ choose to work fewer hours given a higher wage rate; the income effect dominates the wealth effect. If the guarantee and the pecuniary value received from the EITC are set higher than in-kind benefits, the welfare recipient will not work more hours because she strictly prefers leisure. Adjacent to this, she is receiving enough TAFN pecuniary income to meet her chosen quality of life. A combination of either lowering TANF pecuniary income, or increasing in-kind benefits, or both, would change
the sign of this derivative and induce work effort. The most obvious result is that the
government can directly influence work effort through policy. Policies include setting
mandated benefit levels, optimal guarantee levels, and the EITC. Each of these policies
under optimal conditions will increase work effort.

If the government offers a higher guarantee, the welfare recipient will always work fewer
hours, $\frac{\partial H}{\partial T} < 0$. This derivative is very consistent with all other welfare literature. Since
the value of $T$ also affects the sign of $\frac{\partial H}{\partial w}$. The government should be concerned with
the guarantee level, and in turn this policy can either induce or reduce work effort.

Welfare recipients are more concerned with the level of in-kind benefits and TANF
pecuniary income than with labor market conditions. However, labor market conditions
do determine the market wage rate and in-kind benefit levels. Labor market conditions
can induce/reduce work effort through the wage rate and job openings, but by evaluating
the comparative statics it seems more plausible to assume that work effort is more a
function of benefit levels (guarantee and in-kind) than labor market conditions when
enrolled on TANF.
Section 2.1.6 – Comparative Statics, Consumer Problem - Off TANF

The comparative statics for individuals not currently enrolled on TANF are,

\[
\frac{\partial H}{\partial w} = a(1-t) \left[ \frac{2wH(1+t) - P_{B_F} B_F}{-b P_F^2} \right] < or > 0 \tag{1B}
\]

\[
\frac{\partial H}{\partial t} = a w \left[ \frac{-2wH(1-t) + P_{B_F} B_F}{-b P_F^2} \right] < or > 0 \tag{2B}
\]

\[
\frac{\partial H}{\partial \sigma} = 0 \tag{3B}
\]

\[
\frac{\partial H}{\partial \sigma} = 0 \tag{4B}
\]

Section 2.1.7 – Discussion of Comparative Statics - Off TANF

The derivative \( \frac{\partial H}{\partial w} \) is greater than zero so long as the dollar value of non-wage firm benefits is greater than the dollar value of firm pecuniary income received from working.

Contrary, \( \frac{\partial H}{\partial w} \) is less than zero as long as the dollar amount of earnings from working is greater than the dollar amount of non-wage benefits from working. If the firm does not offer any form of medical insurance or any other benefits, the individual will work fewer hours, everything else held constant. Individuals value non-wage benefits. Therefore, if she is offered none, she will work fewer hours, other things equal. She is more likely to re-enter TANF given this scenario, where she can receive in-kind benefits and still work.
Alternatively, if the firm is offering some level of non-wage benefits, and the dollar value is greater than earnings, the individual will work more given a higher wage rate. Because the individual is earning positive income along with non-wage benefits, she is more likely to stay off TANF and continue working for the firm for which she is employed.

The derivative $\frac{\partial H}{\partial t}$ has similar implications as hours worked with respect to the wage rate. If the firm offers no non-wage benefits, the individual will work more given a higher income tax rate. With no non-wage benefits, the individual will have to work more given a higher income tax rate in order to maintain the same quality of life. Alternatively, if the individual is receiving more non-wage benefits than firm pecuniary income, they will actually reduce work effort given a higher tax rate.

From the comparative statics discussed above, one sees that the decision to work is weighted heavily on non-wage benefits as well as the market wage rate. Given our model, remaining employed and off TANF is more sensitive to non-wage benefits (i.e., medical insurance), and less sensitive to labor market conditions (i.e., wage rates and income taxes). Labor market conditions directly determine the current wage rate for a given quality of labor.
Section 2.1.8 – Corollaries Summarizing Consumer Problem On and Off of TANF

Each comparative static derived from the welfare recipient maximization problem can be summarized by the following corollaries:

\[
\frac{\partial H}{\partial w} > 0 \text{ so long as } P_{B_G} B_G > T + 2wH(1+\sigma), \text{ otherwise } < 0 \quad \text{Corollary (1.A)}
\]

\[
\frac{\partial H}{\partial \sigma} > 0 \text{ so long as } P_{B_G} B_G > T + wH(1+\sigma), \text{ otherwise } < 0 \quad \text{Corollary (2.A)}
\]

\[
\frac{\partial H}{\partial T} \text{ is always } < 0 \quad \text{Corollary (3.A)}
\]

\[
\frac{\partial H}{\partial t} > 0 \text{ so long as } P_{B_F} B_F > 2wH(1+t), \text{ otherwise } < 0 \quad \text{Corollary (1.B)}
\]

\[
\frac{\partial H}{\partial t} > 0 \text{ so long as } P_{B_F} B_F < 2wH(1-t), \text{ otherwise } < 0 \quad \text{Corollary (2.B)}
\]

Each corollary above will be tested empirically. The first three, known as (1.A)-(3.A) are the corollaries corresponding to current welfare recipients. Corollaries (1.B) and (2.B) represent the corollaries for individuals not enrolled on TANF.
II. Firm Profit Maximization Problem:

Section 2.2.1 – Theoretical Model, Firm

We determined earlier that labor supply is dependent upon $w$ and $B_G$. Firms, of course, decide what to offer based on profit maximization. Thus, firms

$$\text{Max } \pi = P_Y Y - TC$$

where, $Y = \alpha K^2 + \beta H^2 + 2\mu K H$

and $TC = (w + P_E) H + P_K K$

thus, $\text{Max } \pi = P_Y (\alpha K^2 + \beta H^2 + 2\mu K H) - (w + P_E) H - P_K K$

$H = \text{Labor Hours Hired}$

$K = \text{Units of Capital Hired}$

$w = \text{Market Wage Rate Before Taxes}$

$P_E = \text{Employer Non-Wage Benefits}$

$P_K = \text{Cost of capital}$

$P_Y = \text{Vector of Market Output prices}$

$Y = \text{Vector of Output levels, in Units}$

The model represents all firms interested in unskilled, low-income labor. Firms hire both capital ($K$) and labor hours ($H$) as their factor inputs for producing good $Y$, according to the above production function. We use a quadratic production function which implies that output is increasing in both $H$ and $K$. The second constraint represents the total cost ($TC$) of producing $Y$. Total cost depends on how many hours of labor are hired and the units of capital hired in the production of $Y$. Total cost is increasing in both $L$ and $K$. Each hour of work hired depends on the market wage rate ($w$) and the average per unit cost of employer provided non-wage benefits ($P_E$) relative to the worker’s marginal
revenue product \((MRP)\). Non-wage benefits can include health insurance and other employer provided benefits, for instance, a matching 401k plan. One of the key elements of the above equation is the parameter \(P_E\), which is the amount of employer provided non-wage benefits offered to the employee, with particular interest on employer provided health insurance. If the firm knows that the employee, i.e., welfare recipient, receives Medicaid benefits, the firm will offer \(P_E = 0\) in employee medical benefits. During times of Medicaid expansion a “crowding out” of private insurance exists, suggesting that firms are less likely to offer medical coverage to their employees (Gruber, 1996).

The firm takes all prices \((w, P, P_k, P_e)\) as given and chooses \(K\) and \(L\). The firm competes in a perfectly competitive labor market setting\(^{18}\). At this point the market solves for \(w\) given \(H\) and \(\hat{H}\), derived in Section 2.1.3.

**Section 2.2.2 – First Order Conditions, Firm Problem**

First order necessary conditions for the firm profit maximization problem are,

\[
\frac{\partial \pi}{\partial K} = P_y (2\alpha K + 2\mu \hat{H}) - P_k = 0
\]

\[
\frac{\partial \pi}{\partial H} = P_y \left(2\beta \hat{H} + 2\mu K \left[-aw^2(1-t) \frac{P^2}{bP_X^2}\right]\right) - w - P_{o_f} - P_E = 0
\]

\(^{18}\) A reasonable assumption considering most on welfare work in service sector jobs hiring low-skilled labor. Most industries worked in by those on welfare consider labor to be replaceable, labor is homogenous.
Section 2.2.3 – Derivation of the Optimal Hours Worked Function, Firm Problem

We solve the first order conditions for $\bar{H}$, thus finding the input demand function for hours worked. $\bar{H}$ represents the optimal amount of hours hired per employee such that profits are maximized in a given period \(^{19}\). The following is the optimized function:

$$\bar{H} = \frac{P_k \left[ P_k \mu \left( -\alpha w^2 (1-t)^3 \right) - \alpha (w + P_e) \right]}{2 P_t \left[ \alpha \beta P_k \left( \mu (w + P_e) - \beta P_k \right) + \mu \right]}$$  \hspace{1cm} (C)

Section 2.2.4 – Comparative Statics, Firm Problem

Several comparative statics are found, which capture firm behavior given work decision on the labor side. Firms are concerned with only the costs of employment; therefore, they are concerned with the wage rate and non-wage benefits given to each employee and its overall effect on the number of hours worked per employee. The following are comparative static’s found from the derived input labor demand functions, $\bar{H}$:

\(^{19}\) The optimal capital units hired are not of concern for our purposes. We only consider labor given a substitute input good, in this case, capital.
Section 2.2.5 – Discussion of Comparative Statics, Firm Problem

The comparative statics for the firm problem are very ambiguous. Derivatives 

\[
\frac{\partial H}{\partial w} \text{ and } \frac{\partial H}{\partial P_e} \]

can be > 0 or < 0. Each is always > 0 so long as\( \beta P_k > \mu (w + P_e) \). This implies that even when wage rates and non-wage benefits are increasing the firm will hire more labor so long as labor costs are less than the costs of employing additional capital.

Conversely, if \( \beta P_k < \mu (w + P_e) \) the firm will not hire more hours when wage rates or costs of non-wage benefits are rising. However, not in every case. If \( P_i \) is large,

implying \( VMP_L \) is large, then \( \frac{\partial H}{\partial w} \) and \( \frac{\partial H}{\partial P_e} \) are always > 0. The system breaks down in expansionary times – assuming expansionary times are directly correlated with inflation.

When output prices are high, and increasing, firms will hire more labor given a higher wage rate. The opposite is true under lower output prices.
The comparative static \( \frac{\partial H}{\partial P_k} > 0 \) if \( \beta P_k > \mu(w + P_e) \).

Consistent with economic theory, if the cost of capital is increasing, everything else held constant, firms will hire more labor hours.

The comparative static \( \frac{\partial H}{\partial P_e} > 0 \) if \( \beta P_k > \mu(w + P_e) \).

This implies that capital is more expensive than labor and output prices are increasing, therefore the firm hires more labor.

The firm is very sensitive to labor market conditions, as would be expected. If output prices are increasing, firms are willing to hire more hours of work, given increasing wage rates and more costly non-wage benefits. However, if market conditions are recessionary, firms will not hire additional labor unless labor is cheaper than capital.

**Section 2.2.6 – Corollaries Summarizing the Firm Problem**

We can summarize the firm problem with five corollaries that will be directly tested empirically. They are

\[
\frac{\partial H}{\partial w} > 0 \ \text{so long as} \ \frac{\beta}{\mu} P_k - P_e, \ \text{otherwise} < 0 \quad \text{Corollary (1.C)}
\]

\[
\frac{\partial H}{\partial P_e} > 0 \ \text{so long as} \ P_e < \frac{\beta}{\mu} P_k - w, \ \text{otherwise} < 0 \quad \text{Corollary (2.C)}
\]
\[ \frac{\partial H}{\partial P_k} > 0 \text{ so long as } P_k > \frac{\mu(w + P_e)}{\beta}, \text{ otherwise } < 0 \]

Corollary (3.C)

\[ \frac{\partial H}{\partial P_T} > 0 \text{ so long as } \beta P_k > \mu(w + P_e), \text{ otherwise } < 0 \]

Corollary (4.C)

It is important to note here that each corollary described above is very dependent upon output prices. Typically in expansionary times the general price level rises, output increases, and unemployment decreases. If firms are receiving more for their production, all else held constant, they will hire more labor hours. Thus, in expansionary times, regardless of the production function and overall efficiency, firms are more likely to hire labor. Corollaries (1.C) – (4.C) change sign as \( P_T \rightarrow \infty \).

III. Government Minimization Problem:

Section 2.3.1 – Theoretical Model, Government

Recent welfare reform has as a stated goal to reduce welfare dependency by employing those enrolled on welfare. Thus, it is the goal of the government sector to maximize employment levels of welfare recipients. Policy goals are often evaluated against a target. Thus, we assume the government specifies a target level of employment and then sets policy variables to minimize the difference between the target and the actual numbers employed. By maximizing employment levels of those on welfare, you’re really focusing your policies on decreasing the caseload. The objective function specified
below considers these policy goals. Additionally, the government program faces a budget constraint and is therefore concerned with in-kind benefit payments and the number of people on welfare. The government objective function specified below follows the analysis of Barro and Gordon (1983).

\[
\text{Min } Z = \chi G^2 + (1 - \chi)C^2 \\
\text{where } \quad G = \left[ \hat{H} - k\tilde{H} \right] \\
\text{and s.t. } C = M - \gamma P_{\text{Bc}} - \psi T
\]

The government wants to minimize \( Z \), which can be interpreted as the cost to the government of the welfare program \(^{20}\). A quadratic specification is used to illustrate this cost. The first difference in this equation represents the policy objective of the government. The clear objective of all policies currently are to increase the number of recipients employed; representation above is in terms of hours worked equivalent to \( \left[ \hat{H} - k\tilde{H} \right]^2 \). The government sets periodic targets, represented by \( \tilde{H} \). Actual hours worked by welfare recipients when enrolled on TANF are represented by \( \hat{H} \). It is assumed that as hours of work increase, welfare dependency decreases, typically represented as an exit from the system. The parameter \( k \) represents the cost to the state of not meeting its target. If the state does not meet its current target, the Federal government will decrease future funding levels. Current legislation states that additional

\(^{20}\) The theoretical model specified is in accordance with current legislation in Washington State. WorkFirst has one primary goal, which is to drive those on the rolls into the labor force. After a short time in the labor force, the welfare recipient must find a job. Employment is the primary goal under TANF, and certainly in Washington State. Secondly, all State governments have a second goal to spend their allotted budget without going over budget.
monies are given to states with successful welfare agendas; those who are failing at policy objectives receive fewer monies in the future. If TANF meets mandated goals the Federal government increases funding levels. This shows up directly in the budget constraint as \( M \).

A quadratic specification implies that program costs rise at an increasing rate with any deviation from the state’s objectives. The second objective of the government is represented by \( M - \gamma P_{B_g} - \psi T \). The total budget faced by the state government in a given period is represented by \( M \). This budget is the total monies that the State has to allocate in terms of benefits in a given period. The budget is assumed to be exogenous and established through some political process. Variable \( T \) is total guarantee payments and \( P_{B_g} \) represents the total dollar amount of in-kind benefits paid out. In-kind benefits include Food Stamps, Medicaid, transportation, childcare, and other in-kind benefits paid out to individual recipients. Consider

\[
\gamma P_{B_g} = \gamma \sum_{i=1}^{C} \left( M_i P_{M_i} + CC_i P_{CC_i} + TR_i P_{TR_i} + FS_i P_{FS_i} + O_i P_{O_i} \right).
\]

This equation represents the complete vector of in-kind benefits given to the recipient and explains the components of \( P_{B_g} \). All benefit levels depend on the budget, and the budget depends on how well the State does in meeting its current policy objectives.

The EITC costs the Federal government \( wH \). Since the Federal government incurs the cost of the EITC, it is exogenous to the state problem. The government has direct control

\[ \text{\textsuperscript{21}} \text{The term } \hat{H} - \bar{H} \text{ is assumed to be } \leq 0 \text{ always. If targets are met, or if actual levels are greater than targeted levels, the objective function is } \gamma = 0. \text{ If targets are not met, the further away from the target, the} \]
of the amount of in-kind benefits given to each recipient, \( P_{\text{gi}} \), and the average guarantee amount given to each recipient, \( T \). These are the decision variables facing the State government. The State has the goal of minimizing this difference. The State intends to spend its entire allotted budget, but does not want to go over budget. Either case produces an increasing relationship between costs and deviations from budget expectations.

The government’s primary objective is to get the individual employed. Thus, the government will set optimal levels of \( T \) and \( P_{\text{gi}} \) given the welfare recipient’s optimized hours worked function, 

\[
\hat{H} = A - L = A - \left[ \frac{(aw(\sigma + 1))(T + w(A - L)(\sigma + 1) - P_{\text{gi}} B_G)}{bP_X^2} \right],
\]

when on TANF. Therefore, \( \hat{H} \) will be substituted into the government objective function.

**Section 2.3.2 – First Order Conditions, Government Problem**

First order conditions for the government problem are,

\[
\frac{\partial Z}{\partial T} = 2\left[\hat{H} - k\hat{H}\right] - \frac{aw(\sigma + 1)}{bP_X^2} - 2\psi(1 - \chi) (M - \gamma P_{\text{gi}} \psi T) = 0
\]

\[
\frac{\partial Z}{\partial P_{\text{gi}}} = 2\left[\hat{H} - k\hat{H}\right] \frac{B_G}{bP_X^2} - 2\gamma(1 - \chi) (M - \gamma P_{\text{gi}} \psi T) = 0
\]
Section 2.3.3 – Derivation of the Optimal Level of The Guarantee and In-Kind Benefit Vector, Government Problem

From the necessary first order conditions derived in Section 2.3.2, supply functions for $T$ and $P_{h_c}$ are found. They are,

$$T = \frac{B_c M aw (1 + \sigma) - \chi aw^2 \sigma^2 - 2 \chi aw^2 H \sigma - \gamma \beta X b k H - \chi aw^2 H + \gamma \beta X b A}{aw(B_c \psi (1 + \sigma) + \gamma (1 + \sigma))} \quad (D)$$

$$P_{h_c} = \frac{\psi \chi aw^2 \sigma^2 + 2 \psi \chi aw^2 H \sigma + M aw \sigma - \psi \beta X b A + \psi \chi aw^2 H + \psi \beta X b k H + M aw}{aw(B_c \psi (1 + \sigma) + \gamma (1 + \sigma))} \quad (E)$$

Section 2.3.4 – Comparative Statics, Government Problem

Theoretically, the following relationships should occur:

$$\frac{\partial T}{\partial w} \left( \frac{\partial P_{h_c}}{\partial w} \right) < or > 0$$

$$\frac{\partial T}{\partial B_c} \left( \frac{\partial P_{h_c}}{\partial B_c} \right) < or > 0$$

$$\frac{\partial T}{\partial \sigma} \left( \frac{\partial P_{h_c}}{\partial \sigma} \right) < or > 0$$

$$\frac{\partial T}{\partial H} \left( \frac{\partial P_{h_c}}{\partial H} \right) < or > 0$$
From the supply functions derived in Section 2.3.3, the following comparative statics are found for $T$:

\[
\frac{\partial T}{\partial w} = \frac{\gamma(P_x^2 b(kH - A) - aw^2 H(\sigma^2 + 2\sigma + 1))}{aw^2 (B_c \psi(\sigma + 1) + \gamma(1 + \sigma))}
\]

\[(1D)\]

\[
\frac{\partial T}{\partial \sigma} = \frac{\gamma(P_x^2 b(kH - A) - aw^2 H(\sigma^2 + 2\sigma + 1))}{aw(1 + \sigma)(B_c \psi(1 + \sigma) + \gamma(1 + \sigma))}
\]

\[(2D)\]

\[
\frac{\partial T}{\partial B_c} = \frac{Maw(1 + \sigma) + \gamma aw^2 H(\sigma^2 + 2\sigma + 1) + P_x^2 b(A - kH)}{(aw(B_c \psi + \gamma))(B_c \psi(1 + \sigma) + \gamma(1 + \sigma))}
\]

\[(3D)\]

\[
\frac{\partial T}{\partial H} = \frac{-\gamma P_x^2 bk}{aw(B_c \psi(1 + \sigma) + \gamma(1 + \sigma))}
\]

\[(4D)\]

Below are the comparative statics for $P_{B_c}$:

\[
\frac{\partial P_{B_c}}{\partial w} = \frac{\psi aw^2 H(\sigma^2 + 2\sigma + 1) + Maw(\sigma + 1) + \psi P_x^2 b(kH - A)}{aw^2 (B_c \psi(1 + \sigma) + \gamma(1 + \sigma))}
\]

\[(1E)\]

\[
\frac{\partial P_{B_c}}{\partial B_c} = \frac{\psi aw^2 H(\sigma^2 + 2\sigma + 1) + Maw(\sigma + 1) + \psi P_x^2 b(kH - A)}{(aw(\psi(1 + \sigma)))(aw(B_c \psi(1 + \sigma) + \gamma(1 + \sigma)))^2}
\]

\[(2E)\]
Section 2.3.5 – Discussion of Comparative Statics, Government Problem

Each of the comparative statics is ambiguous as to sign. However, there can be definite conclusions drawn from each comparative static given different scenarios regarding particular parameters. Both in-kind ($P_{BG}$) and pecuniary ($T$) benefits have an inverse relationship with the market wage rate as long as the policy parameters sum to one, $\gamma + \psi = 1$ \(^{22}\). When the policy parameters are constrained as such, the economic relationships make sense. Constraining these parameters can be justified. We have assumed already that the government spends its entire budget. This is represented by equality in the budget constraint; under these conditions the government always spends its entire budget. We also assume that the budget allocated to the State is spent entirely on the guarantee and in-kind benefits \(^{23}\). Parameters $\psi$ and $\gamma$ are simply the weights assigned to pecuniary and in-kind benefits. The policy parameter constraint is multiplicative and can be thought of as a multiplier used for balancing the budget.

\[ \frac{\partial P_{BG}}{\partial \sigma} = \frac{2\psi aw^2 H (\sigma + 1) + Maw}{aw(B_G \psi (1 + \sigma) + \gamma (1 + \sigma))} - \frac{\psi aw^2 H (\sigma^2 + 2\sigma + 1) + Maw(\sigma + 1) + \psi P^2 \beta (k H - A)}{(aw(B_G \psi + \gamma))(aw(B_G \psi (1 + \sigma) + \gamma (1 + \sigma)))^2} \]  

\[ \frac{\partial P_{BG}}{\partial H} = \frac{\psi P^2 \beta k}{aw(B_G \psi (1 + \sigma) + \gamma (1 + \sigma))} \]  

\(^{22}\) Parameters $\psi$ and $\gamma$ are the weights that the State places on the guarantee level versus in-kind benefit levels. For instance, the state may find it necessary to give a higher proportion of the allotted budget in terms of in-kind benefits, thus making $\psi < \gamma$.
Under the above conditions, \( \frac{\partial T}{\partial B_G} \) and \( \frac{\partial P_{BG}}{\partial B_G} \) are always < 0. If the welfare recipient is consuming more and more in-kind benefits, the government will reduce in-kind benefit payment levels. If in-kind benefit levels are increasing, fewer individuals are working, resulting in higher costs to the government. Therefore the government will decrease the payment level of both the guarantee and in-kind benefits in order to promote employment.

Both \( \frac{\partial T}{\partial (1 + \omega)} \) and \( \frac{\partial P_{BG}}{\partial (1 + \omega)} \) are < 0. If the Federal Government offers a higher earned income tax credit, the State Government will lower both the guarantee and in-kind benefits. Again, this is a clear objective for the promotion of employment.

Section 2.3.6 – Corollaries Summarizing the Government Problem

From the comparative statics derived from the optimized government minimization problem we define the following corollaries assuming \( k\bar{H} - A < 0 \), which assumes \( k = 1 \):

\[
\frac{\partial T}{\partial w} < 0 \quad \text{Corollary (1.D)}
\]

\[
\frac{\partial T}{\partial \bar{\sigma}} < 0 \quad \text{Corollary (2.D)}
\]

23 We assume that \( M \) is only a portion of the total budget, and that this portion is entirely allocated for expenditures.
\[
\frac{\partial T}{\partial B_{g}} > 0 \text{ so long as } Maw(1 + \sigma) + \gamma aw^2 H (\sigma^2 + 2\sigma + 1) > bP_X^2 (k\tilde{H} - A) \quad \text{Corollary (3.D)}
\]
otherwise \(< 0
\]

\[
\frac{\partial T}{\partial \tilde{H}} < 0 \quad \text{Corollary (4.D)}
\]

\[
\frac{\partial P_{k}}{\partial w} > 0 \quad \text{Corollary (1.E)}
\]

\[
\frac{\partial P_{k}}{\partial \sigma} > 0 \quad \text{Corollary (2.E)}
\]

\[
\frac{\partial P_{k}}{\partial B_{g}} > 0 \text{ so long as } Maw(1 + \sigma) + \gamma aw^2 H (\sigma^2 + 2\sigma + 1) < bP_X^2 (k\tilde{H} - A) \quad \text{Corollary (3.E)}
\]
otherwise \(< 0
\]

\[
\frac{\partial P_{k}}{\partial \tilde{H}} > 0 \quad \text{Corollary (4.E)}
\]

Each corollary above will be tested empirically. Consistently seen in each corollary is a relationship between firm non-wage benefits and government in-kind benefits. If one is offered over the other, signs of each of the above corollaries can change. Welfare receipt is very dependent on the level of in-kind benefits offered. When labor market conditions enter the picture things become more complex. If the economy is expanding, employment is more likely than if the opposite were true.
CHAPTER 3

I. **Introduction:**

An issue stressed in the empirical literature is how to estimate wages for the non-working. For example, a problem when trying to estimate a mother’s wage rate for home production. When evaluating welfare this issue is of no concern. Individuals earn pecuniary income and receive in-kind or non-wage benefits in one of two ways. Individuals work and earn the market wage rate and dollar value of non-wage employee benefits, or remain enrolled on TANF and receive the guarantee and in-kind benefit package (dollar value of). The major assumption here is that the individual either works and meets an income threshold or remains on welfare. Other choices are not considered. Our panel follows welfare receipt and labor force participation history by month. The welfare recipient can work positive hours while on TANF. The major contribution of this work is that our panel accounts for time off welfare; we do not solely consider time on TANF.

This analysis focuses on Washington State’s welfare program WorkFirst. WorkFirst is Washington State’s implementation of TANF and is designed according to PRWORA. WorkFirst forces the welfare recipient to participate in programs directly related to finding and retaining a job. Actively seeking employment is the main criteria for welfare receipt under WorkFirst. If an individual is not meeting the criteria set out by the program her enrollment can be terminated.

WorkFirst became effective July 1997 and was constructed and budgeted to cost approximately $200 million annually. Additionally, WorkFirst receives a portion of the
$16.5 billion a year block grant awarded by the Federal Government. Washington State then budgets its own program, WorkFirst, according to its own policy initiatives. One stipulation - future Federal funding distributions allocated to Washington State are a function of current performance.

Since AFDC’s inception in 1935, no program has produced successful long-term employment results. Current legislation is centered on programs designed with strong work requirements and the imposition of time limits. At the State level, program success is achieved by improving the labor supply of the welfare recipient. Evaluations of success usually entail analysis surrounding wage progression, length of employment, and length of program exit. WorkFirst requires welfare recipients to work. In turn, employment builds work experience. Work experience, in theory, leads to self-sufficiency.

WorkFirst is designed to move each welfare recipient through the program in a progressive, cumulative nature. For illustrative purposes, consider an individual entering the program for the first time. A DSHS case manager screens the demographics of the new client. A remediation program is identified to determine whether WorkFirst is the correct placement given a particular profile. For instance, if someone has an incurable mental condition they would be better placed under SSI (Social Security Insurance). If the problem is temporary, for instance some cases of substance abuse, the welfare recipient will be sent to a program specifically designed to deal with substance abuse issues. Once barriers to work have been removed, the welfare recipient is considered
“ready for work” and referred to the Employment Security Department (ESD). The first step for ESD is to enroll the welfare recipient into the “Job Search” component. Job Search is a package of structured activities designed to help participants find and keep jobs. In general, TANF clients progress through a series of workshops and activities teaching resume building, how to look for jobs, how to network with other TANF participants, etc. Participants in Job Search are tracked for 12 weeks, and are expected to attend and treat the workshops as work. While enrolled, welfare recipients are expected to spend 40 hours per week in Job Search related activities. Paid employment is to be found within the 12-week period. Welfare recipients failing to find paid employment are referred back to a DSHS case manager for issue resolution.

A number of clients will successfully enter the labor market while in Job Search. A job marks completion of the Job Search component. At this point, the Employment Security Department places the welfare recipient in a full time (FT) or part time (PT) employment component. Job Search completers, having successfully been placed in unsubsidized employment, are further coached through WorkFirst’s Post-Employment Services (WPLEX) component. WPLEX is designed to promote job retention and wage progression for employed TANF and post-TANF participants. Post-employment activities are mandatory for those who are working part-time and receiving TANF benefits. The expectation for those employed part-time is full-time participation in TANF – to spend time off in search of full-time work. Those not participating accordingly lose their TANF grant. Post-employment activities are voluntary for full-time workers on TANF, and those clients who exit TANF because of an employment

24 Demographics are defined herein to include race, gender, age, family composition, health status,
opportunity. The intent is to provide services assisting welfare recipients in increasing their wages in the promotion of job retention.

If the welfare recipient does not complete the initial Job Search component, which implies they could not find a job, they are referred back to DSHS and enrolled in a different component – known herein as “alternative components.” Alternative components focus on the accumulation of human capital and work experience. For instance, those struggling in the labor market are often enrolled in the “Community Jobs” (CJ) component – CJ can extend for 9 months. CJ provides subsidized employment while assisting welfare recipients to independently transition to unsubsidized employment. Clients approaching completion are again enrolled in Job Search.

A number of clients will successfully exit TANF. An exit is usually associated with long-term employment. Former TANF clients will most likely find employment in entry-level jobs, at low wages, and in occupations with high turnover rates. Accordingly, many individuals return to TANF after exiting. “Returners” are referred back to the Employment Security Department’s Job Search component where, in addition to the standard array of job search preparation discussed previously, they are enrolled in the “Returners Workshop” component.

As discussed, WorkFirst is designed around several components. Each component has a specific goal, and all components are set up to work in a progressive and cumulative nature. There are many variations of this progression we speak of, but the actual
progression and success of this flow is not of much concern here. What is of importance
is the decision given the policy. It is very possible for welfare recipients to remain on
welfare for long periods of time under the current system, even with time limits.
Alternatively, many welfare recipients only participate for a short period of time. It is the
concern of this paper to determine empirically what factors influence the welfare
recipient’s decision to work given firm and government objectives. As seen theoretically,
several factors drive this decision. In particular, firm non-wage benefit levels, welfare in-
kind benefit levels, and labor market conditions. These relationships have already been
determined theoretically by the corollaries derived in the previous section. Now, we
must test the corollaries derived in Sections 2.1.8, 2.2.6, and 2.3.6, empirically.

II. The Panel:

The sample used in this analysis follows a cohort of individuals from January 1998
through the end of December 2002 (n = 74670). Our cohort consists of all unduplicated
welfare recipients on TANF the quarter prior to January 1998. Since TANF was adopted
by Washington State as of July 1997, this marks the start of TANF in Washington State.
There have been no changes in welfare reform during this period, thus there is no need to
analyze policy changes. Employment history and welfare history of each individual in
our cohort is followed within this time period.
IV. Empirical Methodology:

Theoretically, two labor supply equations have been derived. Equation (A) represents the welfare recipient and equation (B) represents an individual who has exited TANF. Both equations are linear functions of the guarantee and market wages as well as in-kind benefits and non-wage benefits. Both equations represent optimized functions of consumption and leisure too. The following is the empirical specification of these functions:

\[
\hat{H}_A = \beta_X X_i + \beta_L L_i + \beta_W W_i + \beta_T T_i + \beta_D D_i + \epsilon_A
\]  

(1.1)

\[
\hat{H}_B = \beta_X X_i + \beta_L L_i + \beta_W W_i + \beta_D D_i + \epsilon_B
\]  

(1.2)

- \(X_i\) = Vector of Demographic Variables
- \(L_i\) = Vector of Labor Market Variables
- \(D_i\) = Dichotomously Coded Medical Insurance Type Variables
- \(T_i\) = Guarantee and in-kind benefits received When Enrolled on TANF
- \(W_i\) = Wage Rate

Demographic variables include education level, age of the welfare recipient, age of youngest child, number of children, marital status, number of adults in home, and the ability to speak English as a primary language. Demographics are an important factor when considering employment and used as control variables. For instance, if an individual is poorly educated, has several children, and her youngest child is an infant, she is less likely to be employed and to increase her hours of work. Likewise, this person is more likely to be welfare dependent.

Labor market variables are also used as control variables to depict the condition of Washington State’s economy by month and region over the duration of the panel.
Unemployment rates, monthly wages, employment levels, and Unemployment Insurance claims are all strong measures of labor market conditions in Washington State.

Several dichotomous independent variables are used to indicate insurance type. There are three insurance variable indicator types used: Medicaid, Transitional Medicaid, and employer provided health insurance\(^{25}\). If an individual has no insurance a zero is entered across all four variable types.

Equations (1.1) and (1.2) contain all of the above-discussed elements. The difference is that equation (1.1) contains the guarantee and in-kind benefits. Equation (1.1) estimates hours worked of those enrolled on TANF, therefore is a function of welfare receipt.

Given the welfare and work choice we now want to estimate equations (1.1) and (1.2) simultaneously\(^{26}\). Heckman (1979) discusses the bias resulting from nonrandomly selected samples when estimating behavior as an “omitted variables” bias. Heckman suggests a consistent method for estimating empirical models with sample selection bias. The result is a two-step approach estimation. The first step consists of using a bivariate normal model for the selection equation and the second step an ordinary least squares equation for estimating the behavioral equation with the selected sample.

---

\(^{25}\) Not one individual in the panel has an individual insurance policy. Individual policies are very expensive, and this suggests that current as well as potential welfare recipients only subscribe to health insurance directly provided to them.

\(^{26}\) If we estimate (1.1) and (1.2) independently we cannot compare the results. The comparison has no validity. Likewise, if we estimate the two systems simultaneously, heterogeneity is strongly present.
The first step probit model captures our theoretical “switch”. This welfare to work choice can be generalized by utilizing a discrete dependent variable similar to that of Nakosteen, et al. (1980). We will let \( U^w_i \) represent welfare recipient \( i \)'s utility of remaining on welfare, while \( U^e_i \) will denote \( i \)'s utility of exiting welfare. If \( X_i \) is a set of individual characteristics unique to recipient \( i \), the corresponding linear random utility model takes the following form:

\[
U^w_i = \beta^w_i'X_i + \epsilon^w_i \quad \text{and} \quad U^e_i = \beta^e_i'X_i + \epsilon^e_i \tag{1.3}
\]

The utilities of each of these choices are unobservable; however, the choice made by each recipient \( i \) reveals which choice provides greater utility, by assumption. If we define \( W_i \) to be the observable choice that \( i \) makes, we can let \( W_i \) equal zero when \( U^e_i > U^w_i \), otherwise \( W_i \) equals one. If we let \( F \) represent the cumulative normal distribution function, \( \beta = \beta^e - \beta^w \), and \( \epsilon = \epsilon^e - \epsilon^w \), then the probability that \( W_i \) equals one is\(^{27}\)

\[
P(W_i = 1|X_i) = F(\beta'X_i + \epsilon) > 0 \tag{1.4}
\]

provided that the disturbances of system (1.3) are normally distributed. The probit model is the most appropriate method for estimating the probability of Washington State WorkFirst participants who find work and exit welfare, given a vector of independent

\(^{27}\) See appendix
variables. An estimate of the following probit equation is obtained using maximum likelihood estimation techniques.

\[ TANF_i = \beta_X X_i + \beta_L L_i + \beta_w w_i + \beta_T T_i + \beta_{CC} P_{CC_i} + \beta_{ME} P_{ME_i} + \beta_{FS} P_{FS_i} + \beta_D D_i + \epsilon_i \]  

\[(1.5)\]

Where \( TANF_i = \begin{cases} 1 & \text{if } T_i > 0 \\ 0 & \text{if } T_i = 0 \end{cases} \)

\( X_i = \text{Vector of demographic variables} \)

\( L_i = \text{Vector of labor demand variables} \)

\( w_i = \text{Wage rate} \)

\( T_i = \text{Guarantee and Food Stamps} \)

\( P_{CC_i} = \text{Child-care received} \)

\( P_{ME_i} = \text{Medicaid received} \)

\( P_{FS_i} = \text{Other in-kind benefits received} \)

\( D_i = \text{Vector of dichotomous medical insurance type indicators} \)

\( i = 1, \ldots, 74670 \) and \( t = 1, \ldots, 60 \)

We assume that \( \epsilon_i \sim N(0, \sigma^2) \). Equation (1.5) is estimated by maximizing a probit likelihood function with respect to the included independent variables.

\[ H_s S = \phi_X X_s + \phi_L L_s + \phi_w w_s + \phi_T T_s + \phi_{CC} P_{CC_s} + \phi_{ME} P_{ME_s} + \phi_{FS} P_{FS_s} + \phi_D D_s + \phi_S S_s + \nu_i \]  

\[(1.6)\]

Where, \( S_s = \text{selectivity variable} \)

and \( H_s = \text{hours worked in the } t^{th} \text{ month} \)

\[28\] TANF participation is determined by whether an individual received her guarantee in a given month.
Equation (1.6) assumes that \( v_i \sim N(0, \sigma^2_v) \). Equation (1.6) represents what is often referred to as a “Heckit” model. All independent variables are the same as in (1.5), except for \( S_u \) and \( H_u | S_u \). Thus, equation (1.6) estimates hours worked by individual \( i \) in period \( t \) given the probability that the same individual in the same period is on TANF. More specifically, we have a direct estimate of hours worked given the “switch” that was modeled theoretically. We estimate equation (1.6) and test whether the following relationships hold true or not:

\[
\beta_w > 0, \beta_T < 0, \beta_{CC} < 0, \beta_{ME} < 0, \beta_O \geq 0, \beta_X < 0, \beta_L < 0
\]

A welfare exit and more hours worked should only occur for two reasons: a higher wage rate or employer provided health insurance, all else constant (\( \beta_w > 0 \) or \( \beta_D > 0 \)). Alternatively, welfare dependency is increased when expenditures in the major categories are increasing (Medicaid, \( \beta_{ME} < 0 \), childcare, \( \beta_{CC} < 0 \), and the guarantee and Food Stamps, \( \beta_T < 0 \)). Dependency here is defined as a reduction in hours worked. We also hypothesize that other expenditure categories have no relationship, or possibly a positive relationship on hours worked. This expenditure category is usually directly related to employment, therefore should increase hours worked or have no relationship because they are not major expenditures in total dollar value (\( \beta \geq 0 \)). All labor market variables should have a negative relationship with hours worked. The higher the unemployment rate, the more UI claims the less likely an individual increases hours worked (\( \beta_L < 0 \)). Market wage rate growth and general price level growth should increase hours worked. Demographic variables in general should show a negative relationship with hours worked. This, of course, depends on the definition of demographic profile further
discussed in the results section. Generally speaking, hours worked should decrease when individual socio economic issues arise. Socio economic issues can include physical disability, birth of additional children, age, a large number of children, mental illness, and poor health.

IV. The Data:

All data used relies on four data sources: JOBS Automated System (JAS), The Automated Client Eligibility System (ACES), Unemployment Insurance (UI) and ES202 Files. JAS is maintained by ESD and DSHS, ACES is maintained by DSHS, and UI and ES202 Files are maintained by ESD. Washington State has an agency agreement whereby all three sources of data are shared.

1. JAS – JAS tracks individual progress through WorkFirst. The data is maintained jointly by ESD and DSHS. JAS offers many data sets. By merging several of these we have found all of the available demographics by individual, by month.

2. ACES – ACES is maintained solely by DSHS and includes information on individual guarantees in-kind benefit levels, and some additional demographics.

3. UI – Unemployment Insurance files contain information regarding hours worked and wages by individual, by quarter. However, these data do not capture any employment done “under the table”. These files also contain several labor market variables.

4. ES202 – These files contain employment and average market wages by county and city by month. These data will be matched up to the region which the individual resides, and also to the region the individual is working in.
The EITC will be calculated according to its established criteria. EITC payments are based on the number of children in the household and wages. All individuals enrolled in TANF are eligible for the EITC; therefore we can assume that everyone in the panel is eligible for the EITC as long as she qualifies through her wages. Actual values of the EITC are found by determining the tax benefit each individual is eligible given her wages. We assume that all individuals file a federal income tax return. In most instances the case manager helps the welfare recipient file her tax returns. Lastly, all estimates of the EITC are based on IRS tax tables. The EITC is the only proxy used in this analysis.

Medicaid and child-care expenditures are by month and individual. These expenditure levels represent State and Federal money spent on each individual in a given month. An individual can receive these benefits on and off of TANF and our panel does capture this economic reality. Each of these variables is provided for by DSHS. From welfare administrative records it is known whether an individual is receiving Food Stamps, Medicaid, and child-care benefits by month, and the actual amount that is paid on the individuals behalf is known with great accuracy. DSHS also tracks guarantee levels and Food Stamp levels. However, DSHS does not separate the two. Food Stamps and the guarantee show up as one variable in the data.

All demographic variables are compiled by merging the JAS and ACES systems. Demographic variables include education, number of children, age of youngest child,

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29 UI data include files from the EmployerDB as well as the UIBenefitsDB.

30 In Fiscal 2002 88 percent of all clients on TANF in Washington State eligible to file an income tax return did so. The IRS provided this percentage.
welfare recipient date of birth, marital status, race, gender, and other socioeconomic factors.

1. Education level only considers education levels throughout the duration of the panel. For instance, in 1998 the individual may have been a high-school dropout, and in 1999 the individual received their GED and in 2002 they received a bachelors degree. Therefore, if the individual is continuing education throughout the panel they should be more employable and less dependent upon the welfare system. The greater the number, the more educated the individual. Thus, we expect a positive relationship between hours worked and education, everything else held constant. However, it may be the case that there is no significant relationship because typically welfare recipients are a poorly educated group.

2. Number of children should be negatively correlated with hours worked. The actual measure represents the number of dependents living in the household of the welfare recipient. This variable can change, and does change for some individuals throughout the duration of the panel.

3. Age of youngest child should have a positive correlation with hours worked. This implies the younger the child the less likely an individual will work more hours. Age of youngest child also changes throughout the duration of the panel, for instance, a new birth in year 2000 replaces the previous entry.

4. Date of birth represents the age of the individual. As time progresses, each individual grows older in our panel. The actual relationship to hours worked is unknown, however we hypothesize that there is no significant relationship.
5. Other socioeconomic factors include race, gender, and disability. There are also a number of variables flagging those who are students, disabled, English speaking, convicted felons, and whether the individual is married or not.

More recent literature stresses the importance of labor market variables as predictors of employment and welfare dependency. Labor market variables used in this analysis only pertain to the overall regional economy of Washington State. The most commonly used predictor of labor market conditions in the literature has been the unemployment rate. For our purposes, county Unemployment rates are matched by month to each individual in the panel. Unemployment rates should be negatively correlated with hours worked. Other county labor market variables included in our model are UI claims and employment levels by month. If unemployment insurance claims are increasing hours worked should decrease, all else constant. Employment levels are used as a proxy for business cycle fluctuations and should indicate positive regional growth. Employment should be positively correlated with hours worked. On the other hand, UI claims are used to flag recessionary times. In recessionary times UI claims are increasing while hours worked are decreasing.

Monthly wages are matched to each individual. Monthly wages represent the individual’s actual earned wages in a given month. Monthly wages should have a strong positive effect on hours worked, but more importantly, when wages are rising they have a strong adverse effect on welfare dependency. Theoretically, the actual relationship can switch depending on non-wage and in-kind benefit levels offered by the firm and the State, respectively.
V. Results

Table 1 summarizes the demographic descriptive statistics of our cohort. Most typically, an individual is thirty-six years old and of European descent (White); this individual is unmarried, speaks English as their first language, a female, and has a high school education. A typical individual’s youngest child is, on average, eleven years of age and a typical household has approximately two dependent children living at home. Age of youngest child, age of the individual, education, and number of dependent children each vary greatly with standard deviations of 5.9, 8.59, 3.22, 1.17, respectively. Thus, individual households can have a wide variety of demographic profiles. Within one standard deviation of the mean any individual household can have between one and three dependent children with their youngest child’s age ranging from five to seventeen years old. Age of the individual can range between 28 and 44 years old with an education ranging from the ninth grade level to three years of college.
TABLE 1 - DESCRIPTIVE STATISTICS, DEMOGRAPHICS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Adults in House</td>
<td>1.15</td>
<td>0.37</td>
<td>69115</td>
</tr>
<tr>
<td>Number of Children</td>
<td>1.87</td>
<td>1.17</td>
<td>69115</td>
</tr>
<tr>
<td>Age of Youngest Child</td>
<td>11.34</td>
<td>5.90</td>
<td>69115</td>
</tr>
<tr>
<td>Age of Recipient</td>
<td>36.39</td>
<td>8.59</td>
<td>74670</td>
</tr>
<tr>
<td>Education</td>
<td>12.75</td>
<td>3.22</td>
<td>74670</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Proportion</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>0.1119</td>
<td>74670</td>
</tr>
<tr>
<td>White</td>
<td>0.7015</td>
<td>74670</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0.0155</td>
<td>74670</td>
</tr>
<tr>
<td>Asian</td>
<td>0.0321</td>
<td>74670</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0779</td>
<td>74669</td>
</tr>
<tr>
<td>Other Ethnicity</td>
<td>0.0898</td>
<td>74670</td>
</tr>
<tr>
<td>Visually Disabled</td>
<td>0.0006</td>
<td>74670</td>
</tr>
<tr>
<td>Male</td>
<td>0.1018</td>
<td>74670</td>
</tr>
<tr>
<td>Female</td>
<td>0.8982</td>
<td>74670</td>
</tr>
<tr>
<td>English Speaking</td>
<td>0.9249</td>
<td>74670</td>
</tr>
<tr>
<td>Student</td>
<td>0.0591</td>
<td>74670</td>
</tr>
<tr>
<td>Needs Interpreter</td>
<td>0.0590</td>
<td>74670</td>
</tr>
<tr>
<td>Felon Indicator</td>
<td>0.0023</td>
<td>74670</td>
</tr>
<tr>
<td>Student</td>
<td>0.0591</td>
<td>74670</td>
</tr>
<tr>
<td>Married</td>
<td>0.1875</td>
<td>72041</td>
</tr>
</tbody>
</table>

Table 2 summarizes the descriptive statistics for the government policy variables, insurance variables, and regional labor market variables. In any given month an individual on welfare receives in total $513.20 from the State, on average. This includes in-kind benefits as well as unearned income and the guarantee. Each of the policy variables shows a lot of variation. An individual could receive, within one standard deviation of the mean, up to $1566.59 per month from the government.
A typical individual in our panel earns $492.09 from working. This includes wages and unearned income. There is a lot of variation in unearned income and monthly wages. Thus, within one standard deviation, an individual could earn up to $1577.62 per month from working.

Labor market conditions vary greatly by region and by month. Unemployment rates are the most stable of the three variables considered. Unemployment rates can range from 3.76 percent to 8.8 percent in any given month. UI claims vary greatly however, from zero to five-thousand, and actual employment levels also vary greatly by region, by month.

Our cohort is insured predominately by Medicaid (92.5%). However, there are a large number of individuals covered under an employer provided insurance policy (7.4%). Transitional Medicaid was more predominate under AFDC. There is only a small group of individuals covered by a Transitional Medicaid policy under TANF (less than 1%) 31.

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31 We do not include Transitional Medicaid as an independent variable in our regressions because less than 1 percent of our panel is covered under this insurance type. Also, the only reason for considering this type
Table 2 - Descriptive Statistics, Policy, Insurance, and Labor Variables

<table>
<thead>
<tr>
<th>Policy Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unearned Income</td>
<td>$49.57</td>
<td>$340.89</td>
<td>4502757</td>
</tr>
<tr>
<td>Guarantee and Food Stamps</td>
<td>$153.67</td>
<td>$252.95</td>
<td>4502757</td>
</tr>
<tr>
<td>Medicaid Income</td>
<td>$155.03</td>
<td>$57.28</td>
<td>4502757</td>
</tr>
<tr>
<td>EITC</td>
<td>$63.97</td>
<td>$101.31</td>
<td>4502757</td>
</tr>
<tr>
<td>Sub Category Amount</td>
<td>$7</td>
<td>$55.34</td>
<td>4502757</td>
</tr>
<tr>
<td>Child Care Income</td>
<td>$83.96</td>
<td>$245.62</td>
<td>4502757</td>
</tr>
<tr>
<td>Child Care Hours</td>
<td>45.07</td>
<td>127.64</td>
<td>4502757</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Labor Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI Claims</td>
<td>2508.84</td>
<td>2506.77</td>
<td>4497770</td>
</tr>
<tr>
<td>Employment</td>
<td>324958.79</td>
<td>357297.33</td>
<td>4502757</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>6.28</td>
<td>2.52</td>
<td>4502757</td>
</tr>
<tr>
<td>Monthly Wages</td>
<td>$442.52</td>
<td>$744.64</td>
<td>4502757</td>
</tr>
<tr>
<td>Monthly Hours</td>
<td>45.33</td>
<td>66.97</td>
<td>4502757</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insurance Variables</th>
<th>Proportion</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer Provided Insurance</td>
<td>0.07406</td>
<td>74670</td>
</tr>
<tr>
<td>Medicaid</td>
<td>0.92549</td>
<td>74670</td>
</tr>
<tr>
<td>Transitional Medicaid</td>
<td>0.00007</td>
<td>74670</td>
</tr>
</tbody>
</table>

Table 3 displays the probit model statistics. The model is highly significant with a likelihood ratio test statistic of 5286611.52 with 19 degrees of freedom. The associated p-value is less than .0001. Our sample size is 4,160,855, with approximately 1 percent of our cohort not considered because of missing values.
Table 3 - Probit Procedure Model Statistics

<table>
<thead>
<tr>
<th>Test</th>
<th>Chi-Square</th>
<th>DF</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood Ratio</td>
<td>5286611.52</td>
<td>19</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Score</td>
<td>3254863.52</td>
<td>19</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Wald</td>
<td>585.1359</td>
<td>19</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>4160855</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Intercept</th>
<th>Intercept and Covariates</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC</td>
<td>5286971.9</td>
<td>398.384</td>
</tr>
<tr>
<td>SC</td>
<td>5286985.1</td>
<td>663.208</td>
</tr>
<tr>
<td>-2 Log L</td>
<td>5286969.9</td>
<td>358.384</td>
</tr>
</tbody>
</table>

Maximum likelihood estimates for the probit model are included in Table 4. The guarantee and food stamp level as well as the EITC are the only significant policy variables. The guarantee plus Food Stamp benefit is a strong positive predictor of TANF participation. If government places upward pressure on the guarantee and Food Stamp payout level, individuals are more likely to become dependent on welfare, all else constant.

Labor market variables need to be interpreted independently. UI claims have a significant negative effect on TANF participation. Thus, the more recessionary the economy, the more likely an individual is to participate in TANF. Monthly wages also have a significant negative effect on welfare participation. Thus, if wages are growing an individual is more likely to exit TANF. Employment has a significant positive

Medicaid is not as widely awarded for TANF recipients as it was for AFDC recipients.
relationship with TANF participation. When firms are hiring additional units of labor welfare recipients are more likely to exit the welfare rolls. Hours worked has a significant positive relationship with TANF participation. As a welfare recipient increases hours worked they are more likely to remain on the welfare rolls.

Only one demographic variable is significant, age of youngest child. Age of youngest child has a significant positive correlation with TANF participation. If a welfare recipient has a young child in their home they are more likely to remain on the welfare rolls.

Both insurance variables are highly significant. If an individual has Medicaid they are less apt to remain on the welfare rolls. If an individual has an employer provided insurance benefit they are also less likely to remain on TANF.
## Table 4 - Probit Maximum Likelihood Estimates

<table>
<thead>
<tr>
<th>Policy Variables</th>
<th>Parameter</th>
<th>Std. Error</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unearned Income</td>
<td>0.000038</td>
<td>0.000044</td>
<td>0.7323</td>
<td>0.3921</td>
</tr>
<tr>
<td>Guarantee and Food Stamps</td>
<td>9.9931</td>
<td>0.4373</td>
<td>522.2735</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Childcare</td>
<td>-0.00009</td>
<td>0.000754</td>
<td>0.0157</td>
<td>0.9002</td>
</tr>
<tr>
<td>Medicaid</td>
<td>-0.00318</td>
<td>0.00341</td>
<td>0.8685</td>
<td>0.3514</td>
</tr>
<tr>
<td>EITC</td>
<td>0.000594</td>
<td>0.000169</td>
<td>12.4089</td>
<td>0.0004</td>
</tr>
<tr>
<td>Sub Category Amount</td>
<td>-0.00092</td>
<td>0.00417</td>
<td>0.0489</td>
<td>0.825</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Labor Variables</th>
<th>Parameter</th>
<th>Std. Error</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI Claims</td>
<td>-0.00034</td>
<td>0.000177</td>
<td>3.6077</td>
<td>0.0575</td>
</tr>
<tr>
<td>Employment</td>
<td>-2.52E-06</td>
<td>1.13E-06</td>
<td>4.9902</td>
<td>0.0255</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>0.0464</td>
<td>0.0759</td>
<td>0.3742</td>
<td>0.5407</td>
</tr>
<tr>
<td>Monthly Wages</td>
<td>-0.00228</td>
<td>0.000743</td>
<td>9.4397</td>
<td>0.0021</td>
</tr>
<tr>
<td>Monthly Hours</td>
<td>0.0125</td>
<td>0.00492</td>
<td>6.4233</td>
<td>0.0113</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Parameter</th>
<th>Std. Error</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Adults in Home</td>
<td>0.4094</td>
<td>0.5506</td>
<td>0.5528</td>
<td>0.4572</td>
</tr>
<tr>
<td>Number of Children in Home</td>
<td>0.0264</td>
<td>0.1743</td>
<td>0.023</td>
<td>0.8796</td>
</tr>
<tr>
<td>Married</td>
<td>-0.6882</td>
<td>0.5995</td>
<td>1.3175</td>
<td>0.251</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0821</td>
<td>0.0532</td>
<td>2.3856</td>
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<tr>
<td>English as First Language</td>
<td>1.2486</td>
<td>0.8892</td>
<td>1.9716</td>
<td>0.1603</td>
</tr>
<tr>
<td>Age of Youngest Child</td>
<td>0.0469</td>
<td>0.0247</td>
<td>3.5926</td>
<td>0.058</td>
</tr>
<tr>
<td>Age of Welfare Recipient</td>
<td>0.0428</td>
<td>0.0236</td>
<td>3.2971</td>
<td>0.0694</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insurance Variables</th>
<th>Parameter</th>
<th>Std. Error</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer Provided Insurance</td>
<td>-14.2602</td>
<td>1.6091</td>
<td>78.54</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Medicaid</td>
<td>-9.2816</td>
<td>1591.7</td>
<td>75.98</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
The OLS model statistics are shown in Table 5. The model is very significant with a p-value of less than .0001 ($F = 1578502$). Almost 88 percent of the variation in hours worked can be explained by the included policy, labor, demographic, insurance, and selectivity variables.

<table>
<thead>
<tr>
<th>Table 5 - OLS Model Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analysis of Variance</strong></td>
</tr>
<tr>
<td>Source</td>
</tr>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Error</td>
</tr>
<tr>
<td>Corrected Total</td>
</tr>
<tr>
<td>Root MSE</td>
</tr>
<tr>
<td>Dependent</td>
</tr>
<tr>
<td>Coeff Var</td>
</tr>
<tr>
<td>R-Square</td>
</tr>
<tr>
<td>Adj R-Sq</td>
</tr>
</tbody>
</table>

Each OLS regression coefficient is included in Table 6. All Policy variables have the appropriate sign, except for childcare. Theoretically, we suggested that any benefit, in-kind or otherwise, caused disincentive to work, assuming there are no non-wage benefit alternatives. Childcare, however, has a positive coefficient. This has a nice economic explanation. As the State increases childcare expenditures for a particular individual, that individual works more hours. Moreover, if you are increasing hours worked you need someone to watch your children, and in the State of Washington the government pays this expenditure, and in many cases payment of childcare is awarded to individuals on or off of welfare. Childcare has not received much attention in the literature, however, it is a generally conceded belief that childcare awarded as an in-kind benefit reduces work effort. Our analysis denies this general belief. Overall, childcare is one of the top three
expenditure categories and thus should receive more attention in future work. Our analysis has found childcare to be a policy variable significantly reducing welfare dependency.

The EITC is also positively correlated with hours worked. Our work is consistent with Eissa and Liebman (1996) and Meyer and Rosenbaum (2001) both in sign and significance. The Earned Income Tax Credit, all else constant, causes incentive to work more hours. As a policy tool the EITC reduces welfare dependency.

Unearned income enters as a variable on the left hand side of an individual’s budget constraint. Unearned income is all other income received other than from working. The most common type of unearned income for welfare recipients is child support. Empirically, an individual will work fewer hours when they have income support from a source other than working. Unearned income is a variable that had not received previous attention in the literature. Given the significance and sign of our unearned income coefficient it is plausible to conclude that future research should include unearned income. Future policy should acknowledge those with high levels of unearned income. Given budgetary contractions it may be in the best interests of the State to reduce funding levels to those receiving income from other sources.

Medicaid expenditures have a negative relationship with hours worked. The sign of our Medicaid coefficient is consistent with Yelowitz (1995), Blank (1989), Winkler (1991), Montgomery and Navin (2000), Moffit and Wolfe (1992), and Meyer and Rosenbaum (2001). The difference between these studies and our study is the use of proxies versus
actual expenditure amounts. The use of actual expenditure levels predicts hours worked better than proxies used in previous studies. Our results show a strong negative relationship between Medicaid and hours worked, while these other authors had trouble obtaining significant results.

One can interpret the negative sign of the Medicaid coefficient in several ways. An individual in poor health values Medicaid more than an individual in good health. Those in poor health rely on the State to pay their medical bills. Thus, those with poor health status are more likely to reduce work effort as a strategy to remain on TANF. An alternative explanation is similar to our theoretical explanation. An individual who consumes a lot of Medicaid will reduce work effort as a strategy to remain welfare dependent because this individual knows she has no insurance alternative in the form of non-wage benefits. This is a plausible explanation considering only 7.4 percent of our cohort is covered under an employer provided insurance plan.

The guarantee and Food Stamp level has a significant negative correlation with hours worked. Our empirical results are consistent with Danzinger (1981), Moffit (1992), Blank and Ruggles (1994), Fitzgerald (1995), and Hoynes (1997). The empirical relationship between the guarantee and hours worked is very consistent with our theory also (Corollary (3.A)). Food Stamps and the guarantee level cause disincentive to work and increase welfare dependency, all else constant.

Recent literature including Moffit (1992), Meyer (1993), Pavetti (1993), Harris (1996), and Hoynes (2000), all find local labor demand conditions to significantly predict work
effort. Consistent with these papers all of our labor market variables are significant. However, given the importance of labor demand on welfare participation, we have included a few additional variables.

Two of our labor market variables have a negative sign while the other two have positive signs. County UI claims and unemployment rates have a negative relationship with hours worked, while county employment levels and individual monthly wages have a positive relationship with hours worked. The empirical sign and overall significance of each of these variables have nice economic interpretation.

Labor market variables are included empirically to control for the economy, both recessionary as well as expansionary economies. UI claims and unemployment rates were included to determine whether recessionary economic conditions reduce work effort. Because both parameters have a significant negative correlation with hours worked we conclude that individuals reduce work effort, or are forced to do so, when unemployment insurance claims are rising or unemployment rates are rising. Both variables together suggest that individuals reduce work effort in recessionary times.

Monthly wages and employment levels are included to determine whether expansionary economic conditions induce work effort. Both parameters show a significant positive relationship with hours worked. Therefore, in expansionary times individuals work more hours. In theory, wage growth is a result of an expansionary economy. Our theoretical firm profit max problem derived a corollary, suggesting firms hire more labor in an
expansionary economy. There is empirical support for this claim, because employment and hours worked are positively correlated with hours worked.

Consistent with Harris (1993) and Harris (1996) we find demographics to significantly predict work effort. All demographic variables are significant except for the number of adults in home. Age of youngest child and number of children in home have a significant positive relationship with hours worked. The older the youngest child the more hours an individual will work. Also, Individuals increase their work effort the more children they have. It may be that it is not beneficial on the margin to have additional children. This makes economic sense when we consider this against the guarantee and in-kind benefit levels awarded per child. The sign of the age of the youngest child suggests that when an infant is present in the home, the mother is more likely to stay at home. Our empirical results support this idea.

Education level, age of the welfare recipient, English as a primary language, and marriage are all significant negative predictors of hours worked. The more educated the individual, the less hours they work. To have a full understanding of the actual economic interpretation we need more information. One theory is that more education provides better quality of life; this could be attributed to working fewer hours, or not as many jobs.

As the welfare recipient ages they work fewer hours. An individual is at a socioeconomic disadvantage given they are older, uneducated, and have more children than the average welfare recipient. Our empirical results confirm this demographic profile’s negative relationship with hours worked.
The negative sign of the marriage coefficient also has a nice economic interpretation. Those who are married work fewer hours. A home with two adults can divvy up work effort and home production. Because of this, each individual, on average, will work fewer hours.

Those who speak English as their primary language work fewer hours than those who do not speak English. Thus, a non-English speaking adult works more hours. One theory is that a Non-English speaking adult has to work more hours than English speaking adults because they are disadvantaged in the labor market. All else constant, those who do not speak English as their primary language work more hours to make up for a lower wage rate in order to consume the same bundle of goods as the English speaking adult.

Both insurance variables have a positive relationship with hours worked, however only employer provided insurance is significant. Employer provided insurance has a strong significant positive effect on hours worked. Empirically, the positive sign of this coefficient supports theoretical utility max and profit max corollaries. In the presence of employer provided insurance individuals will work more because employer provided insurance offsets the cost of purchasing insurance to the welfare recipient given a fixed consumption level. Also, the marginal benefit received from receiving employer provided insurance must be greater than the marginal cost, which can be thought of as a potential loss of welfare benefits. We also know from our theoretical corollaries that firms hire more labor when they offer employer provided health insurance, all else constant. Medicaid is insignificant because virtually all individuals are covered under
Medicaid in our cohort. However, consistent with our theoretical model we find empirical evidence that individuals increase work effort in the presence of non-wage benefits.

<table>
<thead>
<tr>
<th>Table 6 – Regression Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy Variables</strong></td>
</tr>
<tr>
<td>Unearned Income</td>
</tr>
<tr>
<td>Guarantee and Food Stamps</td>
</tr>
<tr>
<td>Childcare</td>
</tr>
<tr>
<td>Medicaid</td>
</tr>
<tr>
<td>EITC</td>
</tr>
<tr>
<td>Sub Category Amount</td>
</tr>
<tr>
<td><strong>Labor Variables</strong></td>
</tr>
<tr>
<td>UI Claims</td>
</tr>
<tr>
<td>Employment</td>
</tr>
<tr>
<td>Unemployment Rate</td>
</tr>
<tr>
<td>Monthly Wages</td>
</tr>
<tr>
<td><strong>Demographic Variables</strong></td>
</tr>
<tr>
<td>Number of Adults in Home</td>
</tr>
<tr>
<td>Number of Children in Home</td>
</tr>
<tr>
<td>Married</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>English as First Language</td>
</tr>
<tr>
<td>Age of Youngest Child</td>
</tr>
<tr>
<td>Age of Welfare Recipient</td>
</tr>
<tr>
<td><strong>Insurance Variables</strong></td>
</tr>
<tr>
<td>Medicaid</td>
</tr>
<tr>
<td>Employer Provided Insurance</td>
</tr>
<tr>
<td>Selectivity Variable</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Selectivity Variable</td>
</tr>
</tbody>
</table>

There are two relatively high VIF scores. Multicollinearity exists between UI claims and employment levels. These two variables predict local labor market conditions. They predict in opposite ways, hence the explanation of multicollinearity. However, to have a complete understanding of regional labor markets we need to condition for both expansionary as well as recessionary economies, and throwing out one of these variables or combining them takes away from this conditioning. VIF scores along with their significance levels are shown in Table 7.

**Table 7 - Test for Multicollinearity**

| Policy Variable                  | Pr > |t|   | VIF          |
|---------------------------------|------|----|--------------|
| Unearned Income                 | <.0001 |    | 1.00635      |
| Guarantee and Food Stamps       | <.0001 |    | 2.69765      |
| Childcare                       | <.0001 |    | 1.14257      |
| Medicaid                        | <.0001 |    | 1.69459      |
| EITC                            | <.0001 |    | 1.30332      |
| Sub Category Amount             | <.0001 |    | 1.01834      |

| Labor Variables                 | Pr > |t|   | VIF          |
|---------------------------------|------|----|--------------|
| UI Claims                       | <.0001 |    | 5.89253      |
| Employment                      | <.0001 |    | 7.01247      |
| Unemployment Rate               | <.0001 |    | 1.53983      |
| Monthly Wages                   | <.0001 |    | 1.30568      |

| Demographic Variables           | Pr > |t|   | VIF          |
|---------------------------------|------|----|--------------|
| Number of Adults in Home        | 0.2386 |    | 1.5747      |
| Number of Children in Home      | <.0001 |    | 1.45247      |
| Married                         | <.0001 |    | 1.65351      |
| Education                       | <.0001 |    | 1.07759      |
| English as First Language       | <.0001 |    | 1.31568      |
| Age of Youngest Child           | <.0001 |    | 1.66542      |
Age of Welfare Recipient  
Pr > |t|  VIF  
Medicaid <.0001 1.0028  
Employer Provided Insurance <.0001 1.00017  
Selectivity Variable  
Pr > |t|  VIF  
Selectivity Variable <.0001 4.59236  

VI. Conclusions:

Policy, labor, demographic, and insurance variables all play an important role in the decision making process of the welfare recipient. Contrary to much of the previous literature regarding welfare, the decision to work is more than just one of these factors. The work decision is in interaction of firms, State and Federal government, and welfare recipients given the overall shape of national and local economies. Empirically, we modeled the theoretical decision to work.

Government can increase work effort by reducing Medicaid, Food Stamps, the guarantee, and other in-kind benefits levels excluding childcare. The State of Washington can also increase work effort by increasing childcare expenditures per person. The Federal government can create additional incentive to work by increasing the EITC level, or by reformulating EITC payouts. All of these policy tools used by State and Federal government play a significant role in reducing welfare dependency.

Our empirical results coupled with our theoretical corollaries also indicate the importance of local labor market conditions and their role in welfare dependency. Specifically, firms
are more likely to hire welfare recipients in expansionary times than in recessionary times.

Individuals make their decision to work given firm level decision making. When firms offer higher wages and non-wage benefits welfare recipients will work more hours, all else constant. Empirically we found firm decision making to be dependent upon local labor market conditions, thus firm level decisions can only be made given current economic conditions.

CHAPTER 4

Introduction:

Theoretically we explained how the welfare recipient interacts with firms and the State government in making optimal choices regarding work hours, and more importantly, the decision to remain on or off of welfare. Theoretically, welfare dependency, which is inversely related to hours worked, depends upon the complete vector of in-kind and non-wage benefits received from the State Government and firms, respectively. Non-wage and in-kind benefit levels coupled with labor market conditions are the best predictors of hours worked. The decision to work is not a function of just one of these parameters, but
a function of all of these variables. Local labor markets, demographics, firm behavior in response to economic conditions, and government policy all affect the decision to work.

**Policy Recommendations:**

Welfare has two primary objectives regardless of the current welfare program or differing regional policies. The first objective is to provide a safety net to families with dependent children and the second objective is to create an environment creating incentive for individuals to exit the welfare rolls. The second stated objective implies self-sufficiency. State and Federal government use several policy tools as means of meeting each of these objectives. Policy tools include the EITC, the guarantee, childcare, Food Stamps, Medicaid, and other in-kind benefits, all of which are major expenditure categories at both the State and Federal levels. Our analysis has discovered two expenditure categories, policy tools, which increase work effort. Childcare and the EITC increase work effort while all other policy tools reduce work effort.

Childcare is categorized as an in-kind benefit. Theoretically, any in-kind benefit causes disincentive to work. However, our empirical model predicts the opposite sign for childcare. Higher levels of childcare expenditures positively predict hours worked and the overall relationship between hours worked and childcare is a significant one. Thus, the state should continue to offer childcare to the working poor, and should consider focusing more resources towards childcare programs and facilities, all else constant. Childcare by its nature serves as a safety net for the working poor. However, it is the only safety net inducing work effort. Therefore, Childcare should be used as a policy tool for reducing
welfare dependency, and given our empirical results the State should find success using childcare as a policy tool given the two discussed objectives.

The EITC and hours worked are positively correlated, and the overall relationship is significant. As a policy tool, the Federal government can continue to offer the EITC as an incentive to work. Our results confirm this relationship.

Childcare and the EITC create work incentive. If governments are to spend additional money and have to decide which categories to allocate its budget to, these two categories seem logical. Childcare and the EITC reduce welfare dependency, all else constant.

Other policy tools including Medicaid, Food Stamps, and the Guarantee can also induce work effort. However, the government has to determine what it considers to be a safety net, for instance determining the subsistence level of those individuals in particular regions with children. The only way of increasing work effort is if the State is pricing the aforementioned benefits too high. If so, the government can lower Medicaid, Food Stamps and the Guarantee, and in doing so reduce welfare dependency.

Our analysis has shown that those individuals covered under an employer provided health insurance plan show more work effort. Our results suggest that individuals become less welfare dependent given an insurance alternative to Medicaid. Theoretically, welfare recipients only exit welfare and increase their work effort in the presence of an insurance alternative and other non-wage benefits. Empirically, the relationship holds. Those individuals in our cohort with employer provided insurance work significantly more
hours than those without an employer provided insurance package. Individuals should work more hours when they no longer fear losing their health insurance benefits for themselves and their children. Given this the government may want to initiate policy that requires firms to give health insurance to the working poor. Even if the State or Federal government subsidizes part of the bill, overall the cost of the subsidy may be less than the cost of keeping those individuals on welfare for long periods of time. From a policy standpoint our results suggest more emphasis on childcare, the EITC, and private health insurance markets.

Welfare recipients, like most individuals in society suffer most in recessionary times. Caseloads have always followed business cycles, and our results do not suggest anything different. Each labor market variable included in our analysis predicted hours worked correctly. As a policy the government should try and correct for labor market conditions. Thus, initiate policies given the labor market. An application would be to understand labor markets regionally and project those industries unaffected by business cycles. Once these “high-demand” industries are flagged State governments can target these industries as employment opportunities for welfare recipients. In the past, the government as well as previous literature has not acknowledged the business cycle. Our results suggest that they both should.

Demographics play an important role in determining welfare dependency. Particular individuals with very identifiable and distinct demographic profiles are by their nature extremely welfare dependent. There is a percentage of the caseload that will never become self-sufficient, and more importantly never intend to leave the welfare rolls
without strong time limit enforcement. In many cases a large percentage of the State’s budget is spent on trying to help type of demographic profile. As a policy maybe they should consider other alternatives. For instance, focusing a higher proportion of resources on those individuals equipped with a set of demographics that can achieve self-sufficiency. By focusing on demographics the government can flag those who have the potential to exit the welfare rolls and those who do not. Overall program success and societal welfare could be improved by focusing on the stronger demographic group.

**Direction of Future Research:**

Empirically the decision to work has been modeled. Our “Heckit” model has explained the driving forces of welfare dependency. Because the study focused only on Washington State, WorkFirst was also modeled. This paper analyzed choices of State government, firms, and the welfare recipient, and how these three players interact given each of their respective objectives. However, WorkFirst as a program addressing welfare reform was not analyzed.

This analysis has provided additional insight into the thinking patterns of those currently enrolled on and off of TANF. The comprehensive nature and completeness of this paper has added extensively to existing literature. Our major contribution is that we have captured behavior of those on welfare as well as those off of welfare whom had formerly been a welfare recipient. However, there are still many areas in dire need of new research. Particular interest should be placed on TANF and its overall effectiveness, which we will now discuss in detail.
Two policy implications have arisen from TANF. First, TANF is entirely focused on strong work requirements. Specifically, the program is designed to reduce welfare dependency through labor force participation; this in itself is a new paradigm in the world of welfare. TANF immediately places clients in the labor force, and after a short time recipients are required to be working. If they are not working within a specified time frame they are reevaluated and with high probability their guarantee is reduced. Contrary to this, AFDC focused its policies on the quality and accumulation of human capital. After establishing human capital individuals are then “possibly” ready for labor force participation.

The second major policy change of TANF is imposition of time limits on consecutive and lifetime welfare receipt. Individuals cannot draw welfare for more than 24 consecutive months and cannot be on welfare for more than 60 months lifetime. However, each State can exempt 20 percent of its current caseload from this sanction. Research needs to fully address these policy implications. For example, a paper estimating length of welfare spell and number of spells under AFDC and TANF. One would hypothesize that individuals should have shorter spells under TANF and possibly more exit and entry (recidivism). An additional paper should try and determine which specific factors create long-term spells, short-term spells, and recidivism. Is it policy, the labor market, or demographics which determine long-term welfare receipt, short-term receipt, and recidivism? This is the research question which has not yet been evaluated in the literature.
Research needs to discover which policies reduce welfare dependency most. Is welfare dependency reduced more under a human capital accumulation setting or one that focuses entirely on work requirements, or some combination of both? This is a major policy question not yet addressed in the literature. As an introduction to this idea, a formal model could assume that wage growth is a function of two types of accumulation: human capital and work experience. Work experience can then be measured as cumulative hours worked given varying degrees of work quality which would enter multiplicatively. Human capital can be measured as hours of training and education given quality level. Quality would again enter multiplicatively. Welfare data provides good estimates of both human capital and work experience. Now, given a theoretical model of wage growth the outcome would be a welfare exit through work production, where work production is measured as hours worked. One could compare AFDC to TANF under this framework.

TANF imposes strong work requirements and the goal of current legislation is to get individuals employed. Thus, additional research should address whether the theoretical foundations of this implication are actually working. For instance, in theory labor force participation should lead to employment, and employment leads to the accumulation of work experience. Given this, the wage rate is a function of work experience. Thus, research should try and determine whether the accumulation of work experience under current legislation actually predicts higher wage rates and less welfare dependency. Moreover, the overall quality of the work experience for which the individual is accumulating should also be addressed. Does the accumulation of work experience reduce welfare dependency, and does the quality of work experience matter? This is a
research question that should be addressed by the literature that has not yet been addressed.

There has been virtually no research addressing welfare duration, meaning length of welfare spell. To my knowledge, there has been no consideration of multiple spells. This paper has explained an exit, and additionally hours worked at different points in time. These ideas can be expanded by explaining welfare spells, specifically length, given the same parameters used in this analysis. What determines long-term welfare dependency? What factors, variables, produce long-term employment spells, short-term spells, and recidivism? The same questions need to evaluate welfare spell length. It is the goal of any welfare program to produce long-term results, thus, length of spell and duration should receive much more consideration in the literature.

State programs focus entirely on job placement. Success of a particular program usually results in positive wage progression, a program exit, and limited re-entry. First, programs should be evaluated as they are designed. For example, WorkFirst is designed to work progressively, cumulatively. An individual enters the program, works through a component, moves to another component, works through that component, etc. WorkFirst consists of three stages. Research should evaluate WorkFirst at each stage, and evaluate those who progress through each stage versus a control group of those who drop out. Are individuals better off if they progress through WorkFirst as it is set up when compared to those who do not? For those that do not progress cumulatively, why? This research question has not been addressed in the literature. The same analysis can be applied to
other states too. To do such, one might think about a conditional probability model or possibly a nested logit model. These models will measure cumulative progression nicely.

Congruent to this, no welfare program actually evaluates or forecasts labor market conditions. Programs, and evaluation of welfare programs, are much too focused on the supply side of the labor market. Welfare in general, including WorkFirst, is currently designed to improve labor supply. However, current programs do not correctly consider labor demand, and more importantly current and projected labor market conditions. This may be due to DSHS control of welfare in each of the 50 United States. DSHS does not have the capability to correctly understand labor markets.

Labor market experiments, thus analysis, should have been conducted more during the waiver period, however, they were not. How do we administer a program preparing labor supply to meet labor demand conditions?

One way to analyze the inherent limitations of WorkFirst - an approach similar to most other State programs - is to conceptualize the labor market as generally contemplated by economists. In the simplest framework, labor supply is postulated as a positive function of the wage rate. That is, \( L^s = f(w) \). For workers individually and as an aggregate, the total quantity of labor time available rises with the wage rate, \( w \). It appears that all State programs, including WorkFirst, attempt to increase labor supply. Ceteris paribus, increases in labor supply will place downward pressure on the market wage rate until the minimum wage floor is reached. The necessary result will then be surplus labor, i.e., unemployment. As the ostensible goal of TANF is substitution of wage earning
employment for federal income payments, WorkFirst type programs will fail to achieve their objective in the absence of changes in labor demand after that floor is reached.

Typically economists believe the demand for labor depends on the “value of labor’s marginal product”, i.e., \( L^D = MP_L P_Y \). “Value” depends on the market price for the product \( P_Y \), while marginal product \( MP_L \) represents physical output associated with an additional worker hired. The “labor demand boom” of the late 1990s was driven by both strong product demand and technological change that significantly increased worker productivity. Long-term success of TANF and WorkFirst will depend upon matching labor supply and labor demand: the very forces that increase labor supply must concurrently improve labor productivity so that employers will hire more workers. In the absence of such a response, long-term impacts of TANF will drive people from the welfare rolls to the sidewalk. Research needs to address this issue as well as all of the other issues discussed.

Welfare spell length can also be explained by addressing length of employment spell as a function of employment quality. Quality can be thought of as those industries providing high wage rates and non-wage benefits. Employment offering both should induce longer-term employment, and for the welfare recipient shorter time served on the welfare rolls. One could address these questions by finding employment types of short-term welfare recipients and long-term welfare recipients. Are there any trends present? What about those who enter and exit welfare repeatedly (recidivism)? What types of jobs is this type of welfare recipient typically taking? These are all questions needing attention in current literature.
TANF marked a radical change in the Federal Government’s approach to income support. Under TANF the constraint is on total funding, not program design and implementation. State’s receive a portion of a $16.5 billion block grant, with no additional monies, and retain total control of the program provided it adheres to policies passed under PRWORA. States can receive a greater portion of the block grant in future years if their programs are successful. Success is measured by wage progression in a long-term job coupled with a long-term welfare exit. Thus, an interesting competitive carrot exists in the funding scheme for TANF: individual States can increase total funding for an incomes program, but only by reducing the funding level for other states. This success, however, may be short-lived. Pursuit of self-interest should lead individuals to migrate towards States with higher funding levels associated with past success and thereby increase demands on those limited resources. If those States are unable to effectively assimilate those individuals in accordance with PRWORA, subsequent funding will decline and problems associated with poverty will increase.

APPENDIX

Appendix 1

The probability that $W = 1$ is

$$P(W = 1|\mathbf{X}) = P\left(U^e > U^w\right)$$

$$= P\left(\beta^e \mathbf{X} + \varepsilon^e > \beta^w \mathbf{X} + \varepsilon^w|\mathbf{X}\right)$$

$$= P\left(\beta^e \mathbf{X} + \varepsilon^e - \beta^e \mathbf{X} - \varepsilon^e > 0|\mathbf{X}\right)$$

$$= P\left(\varepsilon > 0|\mathbf{X}\right)$$

$$= F\left(\beta^e \mathbf{X} + \varepsilon > 0\right)$$

where $F$ is denotes the cumulative normal distribution function, $\beta = \beta^e - \beta^w$, and $\varepsilon = \varepsilon^e - \varepsilon^w$. 


Appendix 2: SAS Code

libname dis 'C:\My Documents';

%macro slct;
1
%mend slct;

%macro nonslct;
0
%mend nonslct;

%macro prbtlhs;
dependent
%mend prbtlhs;

%macro prbtrhs;
unearned ben_amt sumpayment_cc sumuiclaims employment
unemployment_rate
monthlywages monthlyhours subcatamount num_adlt num_chld
married
education emp_prov_ins medicaid transitional_medicaid
english_speaking
age_youngest age_recipient premium eitc
%mend prbtrhs;

%macro olslhs;
monthlyhours
%mend olslhs;

%macro olsrhs;
unearned ben_amt sumpayment_cc sumuiclaims employment
unemployment_rate
monthlywages subcatamount num_adlt num_chld married
education emp_prov_ins medicaid transitional_medicaid
english_speaking
age_youngest age_recipient premium eitc
%mend olsrhs;

data a(keep=%prbtrhs %prbtlhs %olslhs %olsrhs);
set dis.panel;
title2 'means of all variables used in estimation';
proc means;

proc sort data=a; by descending %prbtlhs;

proc probit order=data;
class %prbtlhs;
model %prbtlhs=%prbtrhs/covb;
output out=imr xbeta=gammaw;
title2 'first stage: probit estimates of selection';
run;

data x(keep=intercep %prbtrhs)
   w(keep=intercep %prbtrhs)
   xstar(keep=intercep %olsrhs lambda);
   delta(keep=delta)
   h(keep=h)
   b(keep=%olslhs %olsrhs lambda);

retain intercep %prbtrhs %olsrhs %olslhs;
set imr;
if (%prbtlhs eq %slct) then
   lambda=(1/sqrt(2*3.14159)*exp(-
             1*gammaw**2/2))/probnorm(gammaw);
   else if (%prbtlhs eq %nonslct) then
      lambda=(1/sqrt(2*3.14159)*exp(-
             1*gammaw**2/2))/(probnorm(gammaw)-1);
   else lambda=.;

intercep=1;
h=lambda**2+lambda*gammaw;
delta=h;
if (%prbtlhs eq %slct) then do;
   output delta;
   output w;
   output xstar;
   output b;
end;
output x;
output h;

proc reg data=b outtest=olsest;
   model %olslhs=%olsrhs lambda;
   output out=err residual=e;
   title2 'second stage: ols estimates of model';
run;
GLOSSARY OF TECHNICAL TERMINOLOGY

Income = wages, taxes, rent, and profit - less taxes plus transfers

Wages = (wage rate)x(hours worked), \( wH \)

Wage Rate = hourly wage rate before taxes, \( w \)

TANF and Firm Pecuniary Income (benefits) = Refers to either the firm or the government. On the firm side it includes after tax wages. On the government side it includes the guarantee plus after EITC wages.

In-Kind Benefits = Any benefit awarded to the welfare recipient in non-pecuniary form.

Non-Wage Benefits = Any benefit awarded to an individual in non-pecuniary form.
Guarantee = Monthly transfer awarded to the welfare recipient while enrolled on TANF.

Individual = Includes current, former and future welfare recipients.

Welfare Recipient = Includes only those individuals currently enrolled on TANF.

Marginal Tax Rate = This was a policy tool used by the Federal Government during AFDC. It is the rate at which the Federal Government matches State Government program funding levels.

Income Tax Rate = Tax rate on wages.

BIBLIOGRAPHY


