How Costly is Welfare Stigma? Separating Psychological Costs from Time Costs in Food Assistance Programs

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Abstract

This paper empirically decomposes the costs of welfare participation using a model of labor supply and participation in two food assistance programs: food stamp program and WIC. The context allows for the most reliable estimates to date of the relative importance of psychological costs, or stigma, as compared to the effort required to become eligible and maintain eligibility (time costs). The relative size of these two costs has implications for policy. We find that psychological costs are four times larger on average than the time costs associated with participation in food assistance programs. The evidence on whether the incidence of psychological costs is consistent with these costs acting as an effective screening mechanism is mixed.

Keywords: Program Participation, Welfare Stigma, Labor Supply, Structural Estimation

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1 Introduction

The U.S. government spends tens of billions of dollars annually on means-tested food assistance programs, yet a sizable fraction of eligible households do not take-up these benefits.[1] In particular, Trippe and Doyle (1992) find that approximately 50 percent of households eligible for the food stamp program (FSP) did not participate in the program, while Kim (1998) estimate that only 32 percent of eligible families participated in food stamps among the working poor.[2] While participation rates in FSP, recently re-named Supplemental Nutrition Assistance Program (SNAP) to reflect changes in the program that promote nutrition and healthy eating among low income individuals, have been higher in recent years due to the increase in benefits as part of the American Recovery and Reinvestment Act, take-up is not complete. Perhaps more critical given research on early childhood development, take-up of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is just 38 percent among eligible families with children ages one to five (Currie 2003).

The decision to turn down food assistance, or welfare benefits more generally, is reconciled within standard economic theory by assuming that there is a cost associated with program participation (Moffitt 1983). This cost is usually decomposed into two parts: (1) the psychological cost from stereotyping participants as lazy or lacking ambition (i.e. stigma) and (2) the time cost from participants completing forms, traveling to the program offices, and, for the case of FSP and WIC, the hassle incurred when paying for groceries with government coupons.

This paper seeks to uncover the relative magnitude of these two costs in the context of the FSP and WIC programs. As a starting point of the analysis, we find a distinct empirical relationship between the participation decisions across these two programs. The top panel of Figure 1 shows participation rates in WIC by age of the youngest child for a

[1] website: http://www.ers.usda.gov/Publications/EIB6-7/EIB6-7.pdf.

[2] Trippe and Doyle (1992) use the Current Population Survey (CPS) from 1976 to 1990. While the mean is about 50 percent, there was some variation in take-up rates over the period.

representative sample of single female heads of household with young children taken from the 1996 Survey of Income and Program Participation (SIPP). The discontinuous drops in participation correspond to age-specific rules of the WIC program. First, there is a large drop in the value of benefits once the child is no longer an infant (after 12 months) due to the phase out of infant formula and, second, there is an eligibility cut-off when the child reaches age five.[3] The discontinuity in participation rates after the child reaches twelve months of age is consistent with the mother deciding that the reduced WIC benefits are no longer greater than the cost of participation which leads to a sizable drop in the fraction of women participating in WIC after the infant stage. The figure in the lower panel plots participation rates in FSP by age of the youngest child. Interestingly, we see discontinuities in participation in FSP at twelve and 60 months despite *no* age-specific rules for eligibility. This interrelated pattern of participation suggests some common, or fixed, cost of participating in both food assistance programs despite the autonomous operation of these programs.

We develop a structural model of labor supply and program participation to estimate this fixed cost of participation in WIC and FSP separately from the marginal cost of participating in each program. The estimation of these fixed and marginal costs is a contribution in itself because it informs policy makers about the barriers to utilizing these large-scale food assistance programs, which is important for assessing their effectiveness. However, we argue that the implications are much broader in that these costs have a meaningful interpretation due to the features of FSP and WIC. First, we propose that the fixed cost captures the psychological cost, or stigma, associated with participation because these two welfare programs both provide in-kind food benefits that are redeemed at a grocery store. Therefore, any social judgments made are likely similar and on-lookers are likely only able to infer use of some assistance program and not able to discern between the two. Second, WIC and FSP benefits are generally distributed at different offices and redemption requires two sep-

[3]This figure shows that participation rate is above zero even at ages greater than 60 months, which could be due to misreporting or due to the mother beginning another pregnancy.

arate transactions, which implies that they have distinct time requirements for maintaining eligibility and using benefits (i.e. time costs).

This paper provides the best estimates to date of these two cost components of welfare participation. Our approach has two distinct advantages as compared to the prior literature. First, our use of a structural model enables us to quantify costs in terms of dollars of foregone consumption and allows us to compute an exact ratio of the two costs. Existing published work on the different cost components is limited to Stuber and Kronebusch (2004), which addresses these components by including Likert-scale measures of stigma and other enrollment barriers and relates these to participation in TANF and Medicaid. However, this and other reduced form approaches to estimating welfare stigma, including Blundell, Fry, and Walker (1988) and Riphahn (2001), preclude a direct comparison of these cost components.

Second, our chosen context of participation in food assistance programs facilitates the interpretation of the fixed and marginal costs as stigma and time costs. This is an advantage over the Keane and Moffitt (1998) study, which also used a structural model of labor supply and multiple program participation, because their resulting fixed and marginal cost estimates do not have a clear interpretation. In particular, they estimate the extent to which the costs of participation are additive using the Aid to Families with Dependent Children (AFDC) and FSP programs and find evidence that the costs are almost entirely fixed with little marginal cost from participating in a second program. However, because AFDC participants are categorically eligible for FSP this substantially reduces the marginal cost associated with FSP. Furthermore, because the benefit processes are distinct in that AFDC sends a check in the mail, while FSP sends coupons to be redeemed at the grocery store, this marginal cost includes any psychological costs associated with using government assistance in a public environment. Therefore, it would not be appropriate to interpret their estimates of the fixed and marginal costs of participation as psychological and time costs.

The ability to distinguish what fraction of the cost of participating is attributable to psychological costs relative to time costs associated with complying with participation re-

quirements conveys important additional information that could have policy implications. For example, if the utility costs of participation are primarily due to time costs, such as paperwork and visits to program offices, policies with the goal of increasing take-up rates among eligibles could focus on streamlining the application and re-certification process. If the utility costs of participation are primarily due to psychological costs, however, then take-up rates could be increased by reducing the visibility of welfare participation, such as by using refundable credits in the federal income tax code like the Earned Income Tax Credit (EITC).[4] Alternatively, a policy initiative that promoted these programs as entitlements rather than welfare would decrease psychological costs while preserving the in-kind nature of transfer programs.[5] Prior research has provided some evidence that both time and psychological costs are important in explaining the lack of welfare program participation (Stuber and Kronebusch 2004; Schanzenbach 2009). However, a direct comparison of the cost components has been lacking to date, but would allow for more informed public policy decisions. Filling this hole in the literature is the focus of our paper.

In our model, the psychological or fixed cost associated with participation is the same regardless of whether the individual participates in WIC and FSP, or just one of these programs. The time or marginal costs are specific to each program and thus accrue separately. Our identification comes from the assumption that for those who are already participating in one of these food assistance programs there are no additional psychological costs from participating in the additional program. Clearly, this is a strong assumption and we do not expect it to hold across all the various types of welfare programs. However, the features of WIC and FSP make this interpretation credible. Our use of a static model, similar to Keane and Moffitt (1998), does not allow for the differentiation of long-term eligible and short-

[4]This assumes that psychological costs are significantly lower for income received through the tax system than through welfare programs. This is sensible due to the low visibility and the widespread usage of tax credits and deductions. Hotz and Scholz (2003) estimate that EITC participation among eligibles in 1996 was as high as 87.2 percent, which is substantially higher than take-up rates in most welfare programs.

[5]See Currie and Gahvari (2008) for a review of the theoretical arguments for in-kind transfers and the varying empirical support for the proposed theories.

term eligible households as in the dynamic model of Fang and Silverman (2009). While this advantage of a dynamic model is appealing, it increases the complexity and is not needed in order to separately identify psychological and time costs.

Using a simulated estimation method, we find that, psychological costs are about four times larger than time costs on average. We use the estimated parameters of the model to calculate the amount of consumption (in dollars) that would be needed to offset the utility loss caused by the psychological and time costs of participating in a food assistance program. Our estimates imply that the the time cost of participation in FSP is about 0.67 hours per week ($5 in consumption equivalent on average) and that the time cost is about 2.68 hours per week ($20 in consumption equivalent on average) for WIC. These estimates seem sensible as WIC participation is more time-intensive than FSP participation as WIC requires the completion of periodic course and medical examinations. Our estimated psychological cost is $118 per week on average, more than four time larger than average time cost of participating in both programs. There is considerable heterogeneity in the psychological costs; the standard deviation is about $100 in consumption equivalent. As expected, the predicted psychological cost of participation is much lower for actual FSP and WIC participants, only $21 per week on average. The average psychological cost for non-participating eligibles is $74 per week. This $53 gap between the average psychological cost for participants and non-participating eligibles is more than twice as large as the combined time cost for both programs.

In Moffitt's (1983) seminal work, he recognizes that his utility cost estimate includes other factors besides psychological and time costs, such as lack of information about a program, which can be interpreted as the costs of acquiring information about welfare. We do not explicitly model knowledge of welfare programs or the cost of acquiring this information. This assumption is supported by Stuber and Kronebusch (2004), who find no evidence that confusion about eligibility is a significant predictor of participation for the case of TANF or Medicaid. Knowledge of food assistance programs, which have a forty-year history, is likely

very high among the individuals in our data (single women).

While the primary goal of this paper is to quantify the relative size of time costs and psychological costs for individuals, social welfare is not necessarily reduced one-for-one with these costs. In particular, these costs may discourage able individuals from substituting government assistance for work. If these costs play a screening role and the ensuing separating equilibrium is socially desirable, then the individual-level utility reductions overstate the impact of these costs on social welfare. This paper outlines a simple screening model to illustrate this idea and we use our empirical results to provide the most detailed examination to date of the potential screening role of stigma. We find evidence that stigma is not necessarily an effective screening mechanism. On the one hand, among low-income women, we find that psychological costs are highest for those with high wages who choose to work fewer hours, which supports psychological costs discouraging participation among able-bodied individuals. On the other hand, we do not find a consistent positive relationship between the psychological cost and the preference for leisure in that individuals with the highest leisure preference have relatively low psychological costs, which undermines the screening effectiveness.

The economic model of welfare program participation and labor supply is outlined in Section 2. Section 3 describes the benefits and eligibility rules for FSP and WIC as well as the data used for the analysis and includes a discussion of the assumptions used for identification. Section 4 gives the econometric and functional form specification and the method of estimation is discussed in Section 5. Section 6 provides the results from the structural estimation and quantifies the magnitude of the utility costs. We extend the primary empirical analysis in Section 7 with a model in which welfare stigma acts as a screening mechanism. Section 8 concludes the paper and outlines areas for future research.

2 Model

In this section we present the general static model of labor supply and program participation in a utility maximizing framework, which we apply specifically to FSP and WIC. Throughout the paper, WIC is indicated by $k = 1$ and FSP is indicated by $k = 2$. The individual jointly decides how many hours to work in the labor market and whether or not to participate in food assistance (one program or multiple programs). Individual i's utility is given by

$$U_i = U\left(L_i\,,\, C_i\right) - \Phi_i \tag{1}$$

where L_i is leisure, C_i is consumption, and Φ_i is the psychological disutility from program participation. The psychological cost, Φ_i, is a flat cost that does not depend on the amount of benefits received (Moffitt 1983).[6] We allow the psychological cost to be person-specific, which is consistent with findings in the sociology literature that stigma depends on the individual's life history and their social network (Rogers-Dillon 1995).

Because there is no household production in the model, leisure is the time remaining after completing market work and fulfilling the program-specific welfare participation requirements:

$$L_i = T - H_i - \sum_{k=1}^{2} P_{ki}\,\delta_k. \tag{2}$$

Individual i has a time endowment of T and works H_i hours a week for pay. Participation in welfare program k is indicated by $P_{ki} = 1$, while non-participation is indicated by $P_{ki} = 0$. The time required to fulfill participation requirements for welfare program k is given by δ_k, which captures time-intensive activities such as filling out forms, waiting in line, and

[6] Moffitt (1983) tested whether the utility cost of welfare participation (i.e., "welfare stigma") entered the utility function as a flat cost, a variable cost, or both. A flat cost implies a threshold, given by the level of stigma, which benefits must exceed if the individual is to participate. A variable cost means that the value of income received from welfare programs is less than that from private sources of income. Empirically, a flat cost implies that take-up rates would increase if welfare benefits were to become more generous; a variable cost alone would not have this implication. Using data on participation in Aid to Families with Dependent Children (AFDC) by single females from the Panel Study on Income Dynamics (PSID), Moffitt (1983) only finds evidence of a flat utility cost.

traveling to and from the welfare office. This cost also captures any marginal cost associated with participation including monetary costs such as transportation costs.

Consumption is the sum of after-tax income (labor and non-labor) and welfare benefits:

$$C_i = w_i H_i + N_i - \tau_i \left(w_i H_i + N_i \right) + \sum_{k=1}^{2} P_{ki} \, B_{ki}. \tag{3}$$

The wage is given by w_i and non-labor income is given by N_i. The tax function, τ_i, depends on i's family characteristics, for example, the number of dependents. It maps income (labor and non-labor) into tax liability. The value of welfare benefits from participating in program k is B_{ki} where the value of welfare benefits may depend on family characteristics. We assume that food benefits are valued similarly to cash (Smeeding 1982). The incentives created by welfare programs may influence family structure itself; however, studies find that the estimated impact is small in magnitude (Moffitt 1992). We assume that marital status, number of children, and living arrangement are exogenous and do not depend on benefit levels.

The psychological utility cost from welfare program participation is given by the following:

$$\Phi_i = \begin{cases} \phi_i & \text{if } \sum_{k=1}^{2} P_{ki} > 0 \\ 0 & \text{if } \sum_{k=1}^{2} P_{ki} = 0 \end{cases} \tag{4}$$

where $P_{ki} \in \{0, 1\}$. The individual bears psychological cost ϕ_i if she participates in any welfare program (i.e. lowered self-image as a result of relying on the government for support). This psychological cost is due to being a welfare recipient and is the same regardless of the number of welfare programs in which she participates. This assumption is the primary source of identification.

Figure 2 visually shows how the non-additivity assumption for psychological costs facilitates the separate identification of psychological costs and program-specific time costs.

First consider individuals who participate only in program 1. They incur costs ϕ_i and δ_1. The non-additivity assumption implies that the marginal cost of participating in program 2 conditional on already participating program 1 is only δ_2. Therefore, we identify δ_2 by comparing individuals who participate only in program 1 to individuals who participate in both programs. Similarly, we identify δ_1 by comparing individuals who participate only in program 2 to those who participate in both programs. If we allowed ϕ_i to be program specific, then we could not separately identify time costs from psychological costs. At minimum, this assumption allows us to separately identify the fixed and marginal costs of participation. However, the features of WIC and FSP provide a plausible justification for our interpretation of the estimates as psychological costs and time costs.

The level of welfare benefits, B_{ki}, that an individual would receive if she were to participate in program k is given by the function b_k which maps household characteristics (Z_i) and income into welfare benefits:

$$B_{ki} = b_k \left(w_i H_i, N_i, Z_i \right). \tag{5}$$

Participation in a welfare program k is subject to eligibility constraints on income, assets, and household characteristics. Because welfare participation is a binary decision, the individual faces four possible participation combinations for the case of two programs. The individual selects welfare participation and hours to maximize (1) subject to (2) through (5).

This structural model allows for a more accurate characterization of welfare program eligibility than is commonly used. In the model, welfare program participation decisions are made jointly with labor supply decisions. Therefore, most households are potentially eligible to participate in welfare programs; however, actual eligibility depends on the labor supply decision.[7] For example, a household with observed earnings greater than the eligibility cutoff could have received benefits by choosing to earn less. This model seeks to explain not only why eligible households choose not to participate, but also why other households choose to

[7]Eligibility for WIC depends primarily on the presence of children in the household. Children are taken as exogenous, so households without children are not eligible regardless of the chosen labor supply.

earn more than the eligibility cutoff and thus preclude welfare participation. The eligibility requirements are explained in Section 3.1.

3 Program Characteristics, Data, and Identification

In this section we first highlight the program features of WIC and FSP and how we incorporate the benefit structure into the estimation. Second, we discuss the data used in the analysis. Finally, we expand on the assumptions underlying our estimation.

3.1 Benefit Calculation and Eligibility Requirements

The eligibility requirements and benefit formula used in this paper closely approximate the national eligibility standards for both programs. WIC was established in 1972 as a program to provide nutritional support to women who are pregnant or breast-feeding and to children under age five. WIC provides paper coupons that specify exactly what and how much food can be purchased.[8] These food items include infant formula, juice, milk, cereal, and protein-rich foods (such as peanut butter and beans). In addition to the restriction on household demographics, a family is eligible for WIC benefits if its income is less than 185 percent of the federal poverty level. The program also stipulates that individuals need to be at risk in terms of nutritional status. In practice, however, women and children who meet the income requirement are deemed eligible for WIC benefits because nutritional risk is broadly defined in that low-income children are classified as being nutritionally at risk (Currie 2003).

For eligible families, WIC benefits do not decrease with income. Benefits depend on the

[8]Currently, some states are adopting Electronic Benefit Transfer (EBT) systems for WIC. As of March 2008, only New Mexico and Wyoming had adopted statewide EBT system for WIC; eleven states are currently piloting the program (source: http://www.fns.usda.gov/wic/EBT/wicebtstatus.htm).

age and number of children, as well as on whether or not the woman is pregnant.

$$B_{1i} = \begin{cases} 0 & \text{if } i \text{ has no children} < \text{age 5 and is not pregnant} \\ \bar{B}_{1i} & \text{if } w_i H_i + N_i \leq 1.85(\text{poverty}_i) \text{ and } \{\text{children} < \text{age 5 or is pregnant}\} \end{cases} \tag{6}$$

where $\bar{B}_{1i}$ is the dollar value of the food items qualified for based on family characteristics. Benefits are equal to zero if there are no children under age five and the woman is not pregnant or if income exceeds 185 percent of the poverty threshold for that family size. Unlike FSP, WIC benefits are specified in quantities of food, not as a dollar value. For this analysis, we convert the food items into dollar amounts using inflation-adjusted prices of these goods. The food items covered by WIC depend on family characteristics, hence the value of benefits depends on the family's composition. Table 1 shows the value to the family by age of child in 1997 dollars. Prices were computed using 2006 prices per ounce of food product and deflated using the CPI-U. Prices per ounce were selected from large-size packages to use the lowest available price to err on the side of undervaluing the benefits to avoid overestimating the role of psychological and time costs in the participation decision.

Eligibility for FSP requires satisfying two income tests: 1) *gross income test*, or that income cannot exceed 130 percent of the poverty threshold for that family size; and 2) *net income test*, or that gross income less 20 percent of earned income and child care costs (set to be \$125 per child under age 5), cannot exceed the poverty threshold.[9] We approximate the third eligibility requirement for FSP, the *asset test*, by assuming that those individuals with liquid assets in excess of \$5000 are not eligible.[10] We select an asset cutoff above the actual FSP level of \$2000 (or \$3000 for families with an elderly individual) because in practice,

[9]Actual eligibility includes a deduction for excess housing costs and opportunities for larger child care deductions; however, since we do not observe these expenditures we err in the direction of under-predicting benefits to avoid over-predicting psychological and time costs.

[10]Assets are defined as liquid if they are held in checking or interest-earning accounts. Assets held in stocks or bonds are not subject to this asset limit because, if these assets are held in pension accounts, they would not be counted against the asset limits by the Food Stamp Program office.

recipients often "spend down" their assets or hide them in order to meet the asset threshold.

In this paper, FSP benefits, B_{2i}, are given by:

$$B_{2i} = max\{\bar{B}_{2i} - 0.3\,(0.8\,w_i\,H_i + N_i - 125 \text{ children}_i)\,, 0\} \tag{7}$$

where children_i is the number of children under age five in the household. The maximum benefit level, $\bar{B}_{2i}$, depends on the number of persons in the family. FSP benefits are reduced at a rate of 30 percent for each additional dollar of net income (including transfers from AFDC or TANF) and are bounded below by zero.[11]

Historically, FSP distributed coupons that could be used to purchase any food item at participating stores, excluding alcohol, tobacco, and some prepared foods. In 1993, Maryland instituted an electronic benefit transfer (EBT) system to modernize the process. A mandate was passed in 1996 which required all states to adopt EBT by 2002. The adoption of EBT was slow; by 2000, only twenty states had initiated pilot programs. This paper analyzes participation in the fall of 1997, which is well before the full adoption of EBT. Future work could compare estimates of psychological costs and time costs before and after the adoption of the electronic system, but this is beyond the scope of this paper.

3.2 Data

The data used for the study is a sample of female household heads from the Survey of Income and Program Participation, 1996 (SIPP96).[12] Our sample consists of non-married women of working age who are in households where they are the sole decision-maker. Households with multiple agents of working age were eliminated to alleviate concerns about joint labor supply decisions within a household, leaving us with 5,541 heads of household, representing

[11] While not explicit in equation 7, earned income includes all labor income in the household.

[12] Recent research on survey measures of participation has found that the SIPP is less prone to underreporting bias relative to other large-scale surveys, such as the Current Population Survey (Meyer and Sullivan 2008).

approximately 17 million women.[13]

The selected sample represents a large fraction of welfare participants. In 1997, 60 percent of households that participated in food stamps and 40 percent of households that participated in WIC had an unmarried female household head. In the same year, 44 percent of households that participated in FSP and 28 percent of households that participated in WIC also satisfied the single-decision maker restriction. While the selected sample does not represent the full welfare-eligible population, it does represent a substantial part of that population.

We analyze data from the fall of 1997, which was before the transition to state-determined welfare was complete to limit confusion regarding time limits by the eligible population due to the Welfare Reform Act of 1996.[14] The family composition was defined as of September 1997, with pregnancy imputed using later waves of the SIPP96. Participation in FSP and WIC was taken from two months, September and October, to allow for a longer time window to observe participation. This means that a family is considered a participant if any member participated in FSP or WIC during either of these two months.

The descriptive statistics for the sample are given in Table 2 and were computed using sample weights. After restricting the sample to women household heads of working age (18 to 64), the average age of these women is about 41 years old. Roughly one-third of these women are of minority status. Over 35 percent have a post-secondary degree and 28 percent have only a high school diploma; the average years of schooling is 13.5. Most of these women live in an urban area and roughly one-third live in Southern states. Nearly 40 percent have children under the age of 18 living with them and approximately 14 percent have a child

[13]Within our sample, determining who is the head of household is usually straightforward because we have eliminated households with multiple working adults, the exception being if these adults are children still living at home. For more ambiguous family arrangements, the assignment of household head status is based on earned income, age, whether the women is a mother, and who owns the welfare benefits (when applicable). We only include households consisting of individuals or families; we did not allow for unrelated secondary individuals or subfamilies (as classified in SIPP). Because we limit our sample to households with a single decision-maker and do not include households with unrelated individuals, our households closely correspond to a food stamp unit.

[14]We also selected this wave due to availability of asset information in the topical module.

young enough to meet the eligibility requirement of WIC (under age 5).

The lower panel of Table 2 shows the descriptive statistics for income, assets, and hours worked. Non-labor income includes the earned income from other members in the family as well as interest income, property income, and means-tested government transfers. The distribution of the value of liquid assets, which is used in the FSP eligibility test for assets, is highly skewed: the mean value is $3760, while the median is $232. In addition, less than 13 percent of households fail the asset test. Three-fourths of these women had positive weekly hours at some point over the four month window (July 1997 to October 1997) and the average weekly hours was just over 30. For those with zero hours of market work from July to October, we impute their hourly wage; the procedure is described in Section 4.

Table 3 displays the participation rates and benefit values for FSP and WIC. Not controlling for eligibility, nearly six percent of the sample participates in WIC and 16 percent participates in FSP; four percent of women participate in both programs. Of those women who meet the WIC requirement based on the ages of children in the household (under age 5), 38 percent participate in WIC. For WIC, participation rates by child's age allow for a comparison to the rates reported by Currie (2003). Table 3 reports that participation rates in WIC are highest for households with an infant (67 percent) and drop substantially for those with children between ages one and five (36 percent); these numbers correspond closely to Currie's finding of 73 percent and 38 percent, respectively.

Returning to Table 3, the bottom panel reports summary statistics for the maximum welfare benefits. Maximum monthly benefits for FSP were computed using family size and state of residence and are equal to the value of benefits at zero dollars of net income. The value of WIC benefits was computed based on the price of the bundle of goods covered for each family member (see Table 1). This maximum benefit value, and not the observed level of benefits, is relevant to the model because it gives the information necessary to determine what the benefit level would be for any potential labor supply decision.

3.3 Discussion of Assumptions

One important assumption in our analysis is that we abstract from information costs. We assume that the household head is aware of both welfare programs and maximizes utility by choosing hours of work and whether or not to participate in food-assistance programs. This assumption is supported by Stuber and Kronebusch (2004) as well as evidence from food assistance programs in that much of the movement in participation rates for WIC cannot be explained by information costs. In particular, Currie (2003) finds that the participation rates in WIC vary dramatically by child's age: the take-up rate for eligible families with an infant (i.e., a child under age one) is 73 percent, but drops to 38 percent for eligible families with children between ages one and five because the value of WIC benefits is lower for children over age one. For WIC, it is clear that many non-participating eligible families know about the program because they are former participants. Using the panel dimension of the 1996 SIPP we observe the future WIC participation decision of WIC participants with an infant in 1997. Only 50 percent of those households continued to participate during 1998 (when the child was age 1), and only 44 percent continued to participate during 1999 (when the child was age 2). This large drop in participation by these households cannot be due to a lack of information about the program.

If women in our sample are unaware of government-provided food assistance then our estimate of psychological costs includes lack of information. However, if individuals know that assistance is available, but do not participate because learning the details of a specific program is too costly, then information costs are absorbed in the time cost estimates. We believe the latter is more justifiable given the long history of these two programs (i.e., both began in the early 1970s) and because we limit our sample to female household heads. Given that our estimated time costs are relatively small, this potential bias does not affect the paper's main conclusions. While Daponte, Sanders, and Taylor (1999) show that households with accurate information about FSP have higher participation rates, they also find evidence

that the acquisition of information is endogenous: households with higher expected benefits are more likely to acquire information about the program. They find that FSP participation rates rose sharply with the amount of qualified benefits, increasing from 40 percent for the first quartile to 93 percent for the fourth quartile. This is consistent with individuals basing participation decisions on a cost-benefit calculation and with the cost of acquiring information as a program-specific cost and inconsistent with non-participants lacking of information about the availability of in-kind assistance.

The key assumption that provides identification of the utility cost decomposition is that there are no additional psychological costs from participation in a second food-assistance program. We cannot test this assumption directly, but we can present evidence consistent with this assumption. In particular, the drop in WIC benefits at the qualifying child's first birthday and again at the child's fifth birthday provide exogenous variation in the WIC participation rate. This drop in benefits is associated with a drop in WIC participation at age 1 and age 5 as previously discussed (upper panel of Figure 1). Our identifying assumption implies that FSP participation should also drop at these points because the marginal cost of FSP participation is much lower for a WIC program participant, even though child age has no direct affect on FSP benefits. As shown in lower panel of Figure 1, FSP participation rates are affected by child age. There are discontinuities in FSP participation at the points where WIC benefits are discontinuously reduced, which is consistent with our identifying assumption that psychological costs are non-additive.

4 Econometric and Functional Form Specification

Several reduced-form analysis of welfare participation provide insight into which factors might be associated with the psychological cost of participating in welfare. Blundell, Fry and Walker (1988) find that education and the age of children in the household affect the probability of participation in the U.K. Standard Housing Benefit. Riphahn (2001) finds that

participation rates in the German social insurance program are higher for single-parents, for parents with children under the age of seven, and for those living in cities with higher poverty levels. She interprets these findings as indicating that stigma is lower for families with these characteristics. Like Blundell, Fry, and Walker (1988), she finds that the probability of participation decreases in education attainment. Our analysis incorporates some of these characteristics in the estimation of psychological costs.

The psychological cost incurred by an individual from participating in either or both welfare programs, ϕ_i, is given by

$$\phi_i = X_i \beta + \epsilon_i \tag{8}$$

where X_i is a vector of observed characteristics for individual i and ϵ_i is an error term that accounts for heterogeneity in psychological costs across individuals.

The vector X_i includes measures of education, children, age, race, region, urban/rural, as well as an indicator for participation in AFDC by the individual.[15] We do not model participation in AFDC explicitly because it adds additional complexity to the estimation without added benefit: the program is distinctly different from WIC and FSP (i.e. not food assistance) and therefore does not help in our identification of psychological and time costs. To address concerns about treating AFDC participation as exogenous, we also run our estimation only on individuals who do not participate in AFDC. This only reduces our sample by 480 individuals to a size of 5,061, but reduces the number of participants in WIC or FSP by 440 individuals from 1,011 to 571. We present results from both the full sample and the restricted sample in Section 6.

The other source of heterogeneity in the model is over preference for leisure, or distaste for work. The leisure parameter in the utility function is stochastic and given by:

$$\Gamma_i = X_i \gamma + \eta_i. \tag{9}$$

[15] AFDC participants have already incurred the psychological cost, so including this term in equation 8 allows for an appropriate reduction in ϕ_i.

where X_i is the the same vector as in equation 8 and η_i is an error term that accounts for heterogeneity in preference for leisure, such that higher values of η_i correspond to higher preference for leisure. The two error terms each have zero mean and are assumed to be joint normal with a correlation of ρ.

We use a CES utility function with the psychological cost term entering additively:

$$U = \left[\Gamma_i \left(L_i\right)^{\alpha} + \left(1 - \Gamma_i\right) \left(C_i\right)^{\alpha}\right]^{\frac{1}{\alpha}} - \Phi_i. \tag{10}$$

The parameter α dictates the degree of substitutability between leisure and consumption. The parameter Γ_i indicates the preference for leisure with a larger value of Γ_i implying a stronger preference for leisure.

Estimating the model requires a wage, w_i, for each household. However, about one quarter of women in this data are not employed and thus do not have an observable wage. We predict a wage for these women using a Heckman selection procedure similar to Keane and Moffitt (1998) estimated from standard human capital variables, such as age and education, and other demographic controls, such as ethnicity. We use non-labor income and an indicator for children under age 5 as the exclusion restrictions. Table 4 shows the estimates from the log wage equation and selection equation assuming a joint normal distribution. Earnings and hours data were averaged over four months, July through October, in order to smooth over shocks and give a more accurate measure of labor supply.

The estimates correspond to those typically found in the literature: wage is concave in age, increasing in education, higher for women who live in urban areas, and lower for women who identify themselves as black, Hispanic, or Native American relative to white (excluded group) and for those living in southern states. The mean predicted wage for those with positive hours is \$11.79 per hour. The mean predicted wage of those who are not employed is \$9.48, over two dollars less than those with positive hours of market work. The wage w_i is modeled to include an error term, ν_i, to account for measurement or prediction error in

the wage:

$$w_i = \text{predicted wage}_i + \nu_i. \tag{11}$$

Consumption in equation 3 is the sum of imputed wage income and reported non-wage income minus federal income taxes, which are computed for each household head using information on income and number of dependents.[16]

We estimate the utility function parameters, time cost parameters, the parameters of the psychological cost equation, and the parameters of the preference for leisure equation, as well as σ_ϵ, σ_η, σ_ν, and ρ. This vector of parameters is indicated by θ. The primary focus of the analysis is to compare the estimates of the time cost parameters, δ_{WIC} and δ_{FSP} to the implied psychological cost derived from the parameter estimates in equation 8.

5 Estimation

The individual's budget set is non-convex and intractable due to the tax function, FSP benefit function, and WIC eligibility cutoff, making it difficult to derive a closed-form labor supply function or to use stepwise-linear techniques. Instead, we compartmentalize hours of work into 4 discrete bins representing no employment, part-time employment, full-time employment, and more than full-time employment. The hours bin is denoted by h_i.[17] The log-likelihood for individual i is given by:

$$\begin{aligned}\ln \ell_i = \sum_{j=1}^{4} \Big[&\ln\big(\Pr\left[h_i = j, P_{1i} = 1, P_{2i} = 1 | X_i, \theta\right]\big)(P_{1i})(P_{2i}) + \ln\big(\Pr\left[h_i = j, P_{1i} = 1, P_{2i} = 0 | X_i, \theta\right]\big)(P_{1i})(1 - P_{2i}) \\ &+ \ln\big(\Pr\left[h_i = j, P_{1i} = 0, P_{2i} = 1 | X_i, \theta\right]\big)(1 - P_{1i})(P_{2i}) + \ln\big(\Pr\left[h_i = j, P_{1i} = 0, P_{2i} = 0 | X_i, \theta\right]\big)(1 - P_{1i})(1 - P_{2i}) \Big]\end{aligned}$$

where $j \in \{1, 2, 3, 4\}$ represents the hours of work choices $\{0, 25, 40, 55\}$.

The probabilities in the log-likelihood equation above are computed using simulated

[16] For the tax calculation, we assume everyone takes the standard deduction and we include the EITC.

[17] Observed hours are assigned to each bin by creating a range between bins 2, 3, and 4 that spans half the distance to the next bin. This procedure is common in estimating structural models, for example, Keane and Moffitt (1998) consider 3 hours choices: 0, 20, 40.

methods. A large number of draws (D total draws) are taken from the joint distribution of the error terms in the psychological cost, leisure preference, and wage equations. The simulated probability $\Pr_S[h_i, P_{1i}, P_{2i}]$ is given by:

$$\Pr_S[h_i, P_{1i}, P_{2i}] = \frac{1}{D}\sum_{d=1}^{D} \mathbb{1}(h_{id} = h_i, P_{1id} = P_{1i}, P_{2id} = P_{2i}) \tag{12}$$

where d denotes a simulation draw for η, ϵ, and ν. The indicator function on the right hand side is equal to one when the simulated hours and participation values all equal the observed values for a particular individual. The log-likelihood is evaluated given a vector of parameter values, θ, and then an optimization routine is used to update θ in order to improve the log-likelihood value. We use a simplex method rather than standard quasi-Newton or conjugate gradient methods because the non-convexity of the budget set makes these more standard methods less reliable. Once the solver converges, a new starting value for θ is chosen and the estimation is performed again. This is done many times in an effort to eliminate local maximum values in the log-likelihood function. Although this does not guarantee that a global maximum will be found, the robustness of the parameter estimates to different initial parameter values and the fact that the estimates are economically sensible suggest that the estimation procedure is reliable.

The simulated log-likelihood parameter estimates are asymptotically unbiased as the number of simulation draws grows large. The results presented in Section 6 were computed using 3000 simulation draws. The standard errors are computed as the inverse of the outer-product of the simulated scores. This procedure requires calculating the matrix of contribution to the gradient, $G(\theta)$, but does not require computation of the full Hessian. Calculating the Hessian is computationally difficult because the derivatives of the likelihood function must be found numerically.[18] The matrix of contribution to the gradient is an N

[18]The Hessian matrix is often computed as part of the estimation procedure. However, this is not the case when the optimization relies primarily on a simplex method. Because the simplex method does not rely on derivatives of the log-likelihood function, these derivatives must be computed numerically once the

x J matrix where N is the number of observations and J is the dimension of the vector of parameters, θ. The elements of $G(\theta)$ are given by:

$$G_{ij}(\theta) = \frac{\partial \ln \ell_i(\theta)}{\partial \theta_j} \tag{13}$$

and are calculated using the finite difference method.

The variance-covariance matrix is computed as the inverse of the outer-product of $G(\hat{\theta})$:

$$V(\hat{\theta}) = \left[G'(\hat{\theta})G(\hat{\theta})\right]^{-1}. \tag{14}$$

6 Results

We apply the procedure outlined in Section 5 to compute estimates of the structural parameters from the model developed in Section 2. The estimates for the psychological costs and leisure preference equations are given in Table 5, while the estimates of the time requirements and other utility parameter estimates are shown in Table 6. We estimate the model using the full sample and a sample restricted to individuals not participating in AFDC. The results previewed in the introduction all come from the sample restricted to individuals not participating in AFDC.

The psychological cost estimates from Table 5 are similar across the two samples. The signs and statistical significance of the parameter estimates are generally the same. The point estimates do not have the same interpretation across the two samples because the utility parameter are different, so we will only comment on the overall picture and leave the interpretation for later.

The leisure preference parameter, Γ, is bounded between 0 and 1 which means parameter estimates for the leisure preference equation that are seemingly small could still be quite

estimation procedure is completed.

important. Overall, the pattern of the estimates for the leisure parameters is similar across the two samples.

It is clear from both samples that those with more schooling face a higher psychological cost of welfare program participation and there is some evidence for a lower preference for leisure time, perhaps due to better work options. A second important factor in explaining both psychological cost and leisure preference is the presence of young children (under age 5) in the household. The psychological cost of welfare program participation is substantially lower for mothers of young children as compared to women with only older children or no children.

The indicator for AFDC participation is only included when the full data sample is used. The estimates imply that the psychological cost from participating in FSP or WIC are substantially lower for AFDC participants. This is expected given that these individuals have already incurred the psychological costs of being a participant in the AFDC program. In the leisure preference equation, the AFDC participation dummy implies that conditional on the predicted wage, AFDC participants work fewer hours on average.

There is some evidence of racial differences in the psychological cost of welfare participation. These estimates suggest that conditional on other factors including wage and welfare program benefits, Black women are more likely to participate than White or Asian women. The estimates also suggest that psychological costs are lower for Hispanic women than for White women, though the difference is not statistically significant. We also find that psychological costs are higher for individuals who live in the West and the South (relative to the Midwest), perhaps reflecting geographic variation in public perception of welfare participants.

Table 6 shows the estimates for δ_{WIC}, the weekly time cost of participating in WIC, and δ_{FSP}, the weekly time cost of participating FSP. For the full sample, these estimates imply that receiving benefits and maintaining eligibility for FSP requires about 0.29 hours per week, while the estimated time cost associated with obtaining benefits through WIC is higher

(approximately 1.72 hours per week). Receipt of benefits through WIC involves doctors visits, nutritional education, and more restrictions on redeeming benefits, which explains the greater time requirement. When we restrict the sample to non-AFDC participants, our time estimates increase: weekly time requirement for FSP is 0.68, while the time requirement for WIC is 2.68. We favor these results because the latter sample corresponds more closely to the paper's intended identification of stigma and time costs from participation in food assistance programs.

If the identifying assumption (i.e. psychological costs are non-additive) does not hold, any program specific psychological costs would bias the program specific time costs upward. The estimated time cost for the FSP is small suggesting that any marginal psychological costs for this program would also be small implying that our assumption holds at least approximately. The larger time costs for WIC could indicate that there are important additional psychological costs imposed with WIC participation.

The estimated standard deviation of the error terms for leisure preference (σ_η), psychological cost (σ_ϵ), and wage measurement error (σ_ν) are all quite large. This suggests that there is still substantial variation in the labor supply and welfare program participation decisions that is not accounted for by the variables in our model. The parameter ρ measures the correlations between the leisure preference and psychological error terms. The elasticity of substitution parameter, α, indicates the degree of substitutability of leisure for consumption.

The estimated utility function allows us to express the psychological cost parameter estimates in units of additional consumption (i.e. convert from utils to dollars) that would be needed to exactly offset the change in utility implied by a one unit change in the variable. This is reported in Table 7 in 1997 dollar units. The utility function is evaluated at the mean consumption, leisure and leisure preference values. The average predicted weekly psychological costs associated with participation for the full sample is approximately \$82 while for the sample that excludes AFDC participants it is \$118. One reason that the average predicted psychological cost is lower in the full sample is because there are a large

number of AFDC participants who are predicted to have a much lower psychological cost of WIC or FSP participation given that they are already participating in AFDC. Our estimates imply that having young children (under age 5) more than completely offsets the average level of psychological cost for single women. The same is true for Black women.

Comparing the participation decision predicted by the estimation to actual participation behavior is one way to evaluate the accuracy of our model and empirical specification. Table 8 shows actual versus predicted participation behavior for FSP and WIC. The predicted participation choice for each individual is calculated as the participation combination that yields the highest utility given a value of zero for all error terms. If the observable characteristics in the empirical specification perfectly predicted participation, there would be no weight in the off-diagonal elements of the tables. For FSP, the observable characteristics are able to correctly predict participation for about 89 percent of individuals; these characteristics correctly predict WIC participation for about 94 percent of individuals. The substantial fraction of incorrect predictions is not surprising given the importance of unobserved heterogeneity in determining welfare participation.

We find that psychological costs are a substantial component of the utility cost of food assistance program participation and that they have an important influence on an individual's decision to participate or not. This implies that there are important potential effects in terms of increased participation from policies that reduce the psychological costs associated with welfare participation – such as increasing the level of transfer payments in the income tax system – relative to policies that streamline the benefits process. Our findings indicate that policies that increase the negative stereotypes surrounding program usage – both for traditional welfare programs or for other social insurance programs – will result in substantial psychological costs for participants and serve as a barrier to participation.

7 Stigma as a Screening Mechanism

While the primary goal has been to empirically separate time costs from the psychological costs associated with welfare participation, these individual-level costs do not necessarily imply a commensurate reduction in social welfare. The utility costs of welfare participation may be a useful way of distinguishing potential welfare recipients who are of high-ability from those of low-ability if both have low income. Nichols and Zechhauser (1982) note that "ordeals" required for participation, such as "demeaning qualification tests and tedious administrative procedures," may serve a sorting role (p. 376). Namely, because welfare benefits are available to all individuals with low income, some high-ability individuals may choose to earn less in order to qualify. If the government only wants to provide income transfers to those individuals with low ability, without a selection mechanism it will be unable to distinguish high- and low-ability individuals who both report low income. Hence, in the context of asymmetric information (i.e. the government only observes income, not ability), welfare stigma may act as a screening, or self-targeting, mechanism and enable the government to achieve its policy goals (Currie and Gahvari 2008; Stuber and Schlesinger 2006).

The secondary goal of this paper is to determine whether our empirical results are supportive of psychological costs acting as an effective screening mechanism. Below we outline a simple model to show the conditions under which the utility costs associated with welfare participation could be used as a screening mechanism. In this model agents are either high-ability type (θ_H) who earn wage w_H or low-ability type (θ_L) who earn w_L. If the agent is fully employed, low-ability types earn I_L and high-ability types earn I_H. However, high-ability types can also choose to work less and earn I_L. Hence, conditional on I_L, the agent could be either low- or high-ability.[19] In our model, the government wants to provide welfare benefits

[19]For simplicity, we only allow high-ability types to have two possible levels of income, I_H and I_L. However, because we are thinking of the distribution of type conditional on income, the assumption of the model that only high-ability types have a "choice" over income is not restrictive because one can always construct another income level $I_{L'} < I_L$ that low ability types earn if they are only partially employed.

to low-ability agents but not to high-ability agents. However, it only observes income, not ability (or wage), and thus cannot determine whether agents who earn I_L are low-ability or high-ability without a screening mechanism.

This model could alternatively be expressed in terms of Γ, the utility parameter that indicates the preference for leisure. In this equivalent set-up agents either have a strong preference for leisure, Γ_H, or have a low preference for leisure, Γ_L. High-ability agents who work less and earn I_L do so because they have a higher preference for leisure, while low-ability types who earn I_L have a low preference for leisure.[20] Therefore, conditional on I_L, the agents are either Γ_H (corresponding to θ_H) types who thus actually have the potential to earn I_H, or Γ_L (corresponding to θ_L) types who earn I_L by being "fully employed." Again, we assume that the government wants to provide welfare benefits to low income agents with Γ_L and not to low income agents with Γ_H.

In this context, introducing welfare stigma to the model may help the government achieve its policy goal. Welfare stigma imposes a cost, ϕ, on agents who choose to participate in the welfare program. An agent who participates in the welfare program receives benefits which increase utility by B. Therefore, an agent chooses to participate if $B > \phi(\theta)$, where θ represents the agent's type, either θ_H or θ_L. If welfare stigma imposes a higher utility cost on high-ability (or high-leisure types) conditional on income, then it will discourage these agents from participating in the welfare program (i.e. psychological cost has increasing differences in type). In this model, if $\phi(\theta_H) > B > \phi(\theta_L)$ then introducing welfare stigma allows the government to offer welfare benefits to all agents with income I_L and yet only provide welfare benefits to the low-ability agents. All high-ability agents choose to earn I_H and do not receive welfare benefits because the utility cost from welfare stigma is greater than the utility gain from the welfare benefits. Thus, introduction of welfare stigma would have social benefit. However, if ϕ is uncorrelated with type, or has decreasing differences in type, then welfare stigma is not a useful means of achieving the government's goal and

[20] Otherwise, these low-types would have earned an income level less than I_L.

simply imposes a cost on the agents.

While the above model is a simplistic characterization of the potential screening role of psychological costs, the implication is that the cost that stigma imposes on society is less than the aggregated individual-level costs if stigma is an effective screening mechanism. The incidence of time costs are consistent with the screening mechanism desired by the government because time costs are higher for individuals with higher wages. This paper provides the most nuanced examination of the potential screening role of stigma because in our model we can evaluate the relationship between psychological costs and wages as well as the relationship between psychological costs and preference for leisure.

If the psychological cost is an effective screening mechanism it should be increasing in the wage and increasing in the preference for leisure. To evaluate whether stigma is an effective screening mechanism, we examine these relationships for low-income individuals. Table 9 reports the averaged predicted psychological cost by wage in Panel A and by preference for leisure in Panel B. The sample is split into three income groups: the bottom 25 percent is labeled low income, the top 25 percent is labeled high income, and the remaining 50 percent is labeled middle income.

The evidence is mixed. Panel A of Table 9 shows that the average psychological cost for low-income individuals is increasing in the wage.[21] The pattern of psychological cost increasing in the wage holds for the middle- and high-income groups as well. In addition, Panel B shows that average psychological cost is increasing with the preference for leisure for the first three quintiles in the low-income group. However, average psychological cost for low-income individuals is *not* strictly increasing in the preference for leisure parameter in Panel B. While we find that individuals with a moderate preference for leisure have relatively high psychological costs on average, the individuals with the highest preference for leisure have relatively low psychological costs.

[21]There are so few individuals from the low-income group in the top two wage quintiles that these cells can effectively be ignored.

The evidence from Panel B reflects information about the correlation of the unobservables in the psychological cost and leisure preference equations. The estimated correlation, ρ, between the leisure preference error term, η, and the psychological cost error term, ϵ, is -.0614 implying that those with an unexplained (by the variables in the model) higher preference for leisure have an unexplained lower psychological cost on average. This is what is driving the overall negative relationship in Panel B, which undermines the ability of psychological costs to serve as a fully effective screening mechanism.

8 Conclusion

In this paper, we develop a model of labor supply and welfare program participation that we use to estimate the costs associated with participating in FSP and WIC using a sample of female household heads from the SIPP. We separately estimate the fixed costs of participating in either program from the marginal cost of each program. This paper differs from previous studies of welfare costs in that the context provides a meaningful interpretation, namely we interpret the fixed costs as psychological costs (i.e. stigma) and the marginal costs as time costs.

We estimate the model using a simulated maximum likelihood procedure. We find that the time requirement associated with participation in FSP is a little less than 3 hours per month and the estimated time requirement associated with WIC is about 11 hours per month. In consumption equivalent, this is $20 per month for FSP and $80 per month for WIC. This difference in time requirement is consistent with the more time-intensive activities associated with WIC, including doctor visits, nutritional education, and more restrictions on WIC benefit redemption. These time cost estimates also include any marginal psychological costs and other non-time marginal costs (such as the monetary cost of transportation) and thus are likely biased upward. However, We find the implied dollar equivalent of the psychological cost to be about $475 per month on average, more than four times larger than the time

cost. The psychological cost for actual participants is much less, about $85 per month. In addition, our results suggest that psychological costs are not a fully effective way to prevent able workers from using government assistance as a substitute for working in that we find that the relationship between psychological cost and preference for leisure is non-monotonic.

One limitation of this study is the imputation of eligibility. In the sample of low-income households interviewed by Daponte, Sanders, and Taylor (1999), only 51 percent of households that met the gross income test of 130 percent of poverty also met the asset and net income tests. While we address this concern by imposing both the gross income test and an approximation of the net income as well as a monetary asset test, we are unable to enforce eligibility conditions relating to vehicular assets. In addition, the role of information as a barrier to participation is not captured our model. While we justify this assumption by citing empirical support, further work is needed to assess the influence of lack of information relative to time and psychological costs.

The estimated model could be used to assess the social welfare implications of different transfer policies, such as policies that reduce the visibility of program usage. Such a policy could include tightening welfare program eligibility requirements while expanding the EITC program in a way that preserves existing expenditures levels. Additionally, future work could evaluate the adoption of the EBT system by applying the model in this paper to more recent data to assess the effect of this policy change on psychological costs. Given the large estimates of the psychological costs of welfare participation obtained in this paper, policies that reduce the visibility of participation will likely increase social welfare.

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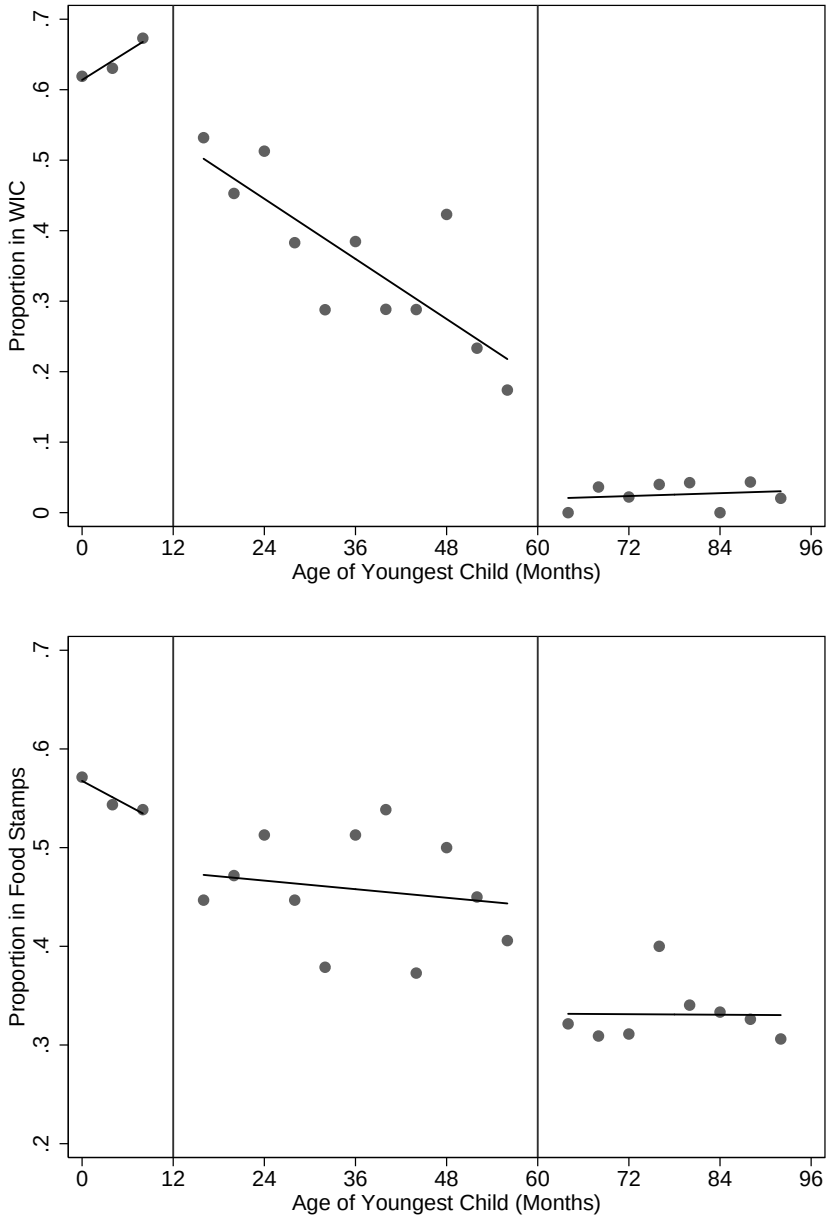
Figure 1: Food Stamp Program Participation Rate by Age of Youngest Child



Source: Figures generated using sample of female heads of household with young children from the 1996 Survey of Income and Program Participation (see Section 3.2). The data points give program participation rates for each 4-month child age group for the full sample, not conditioning on eligibility.

Figure 2: Psychological and Time Cost of Participation

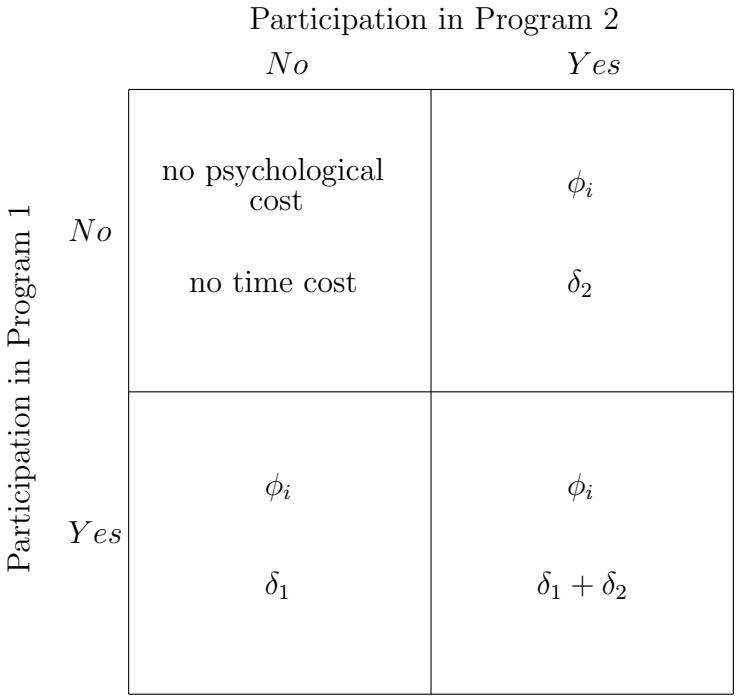


Table 1: Value of WIC Benefits

Family Member	Monthly Value of Food Items ($1997)
Infant: 0 to 3 months	$97.66
Infant: 4 to 12 months	$105.41
Child: 1 to 5 years	$31.26
Mother: Pregnant or Breast-feeding	$33.59

Sources: Food items from www.fns.usda.wic/benefitsandservices/foodpkgtable.htm

Prices: www.giantfood.com and prices deflated using CPI-U: www.bls.ogv/cpi

Table 2: Descriptive Statistics (*Weighted*)

Demographic Characteristics	Mean	St. Error	Minimum	Maximum
Age	40.6	0.2	18	64
White	65.1%	0.7%	0	1
Black	23.0%	0.6%	0	1
Hispanic	7.8%	0.4%	0	1
Asian or Native Amer.	3.9%	0.3%	0	1
Years of Schooling	13.5	0.04	0	20
Master's Degree or higher	7.7%	0.4%	0	1
Bachelor's Degree	15.8%	0.5%	0	1
Associate's Degree	12.1%	0.5%	0	1
Some College	21.6%	0.6%	0	1
High School Graduate	28.0%	0.6%	0	1
High School Dropout	8.6%	0.4%	0	1
Junior High Dropout	6.3%	0.3%	0	1
Live in Urban Area	82.9%	0.5%	0	1
South	34.2%	0.7%	0	1
Family Size	1.9	0.2	1	13
Any Children in Family (*under age 18*)	39.3%	0.7%	0	1
Number of Children (*under age 18*)	0.7	0.02	0	10
Child under age 5 (*WIC eligible*)	13.8%	0.5%	0	1
Teen in Family	16.0%	0.5%	0	1
Elderly Dependent	3.4%	0.2%	0	1

Labor Force Participation and Income	Mean	St. Error	Minimum	Maximum
Non-Labor Income (*weekly*)	$138	$4	$0	$11,258
Positive Non-Labor Income	82.6%	0.6%	0	1
Liquid Assets	$3760	$200	$0	$275,279
Liquid Assets (Median)	$232			
Positive Hours	76.6%	0.6%	0	1
Weekly Hours of Work	32.0	0.3	0	154

Table 3: Welfare Participation and Benefits

Program Participation	Mean	St. Error	Min	Max
WIC	5.7%	0.3%	0	1
FSP	15.7%	0.5%	0	1
WIC and FSP	4.0%	0.3%	0	1
WIC (with a Child under age 5)	38.3%	1.8%	0	1
WIC (with an Infant)	66.5%	4.2%	0	1
WIC (with a Child age 1 to 5)	36.0%	1.9%	0	1

Monthly Benefit	Mean	St. Error	Min	Max
Maximum FSP Benefits	\$208	\$108	\$121	\$1,180
Value of WIC Benefits (Child $<$ 5 years old)	\$53	\$37	\$31	\$242

Table 4: Hourly Wage - Heckman Selection Correction

	Ln Wage		Positive Hours	
Characteristics	Coefficient	St. Error	Coefficient	St. Error
Age	0.050	(0.004)**	0.057	(0.012)**
Age - Squared	-0.001	(0.000)**	-0.001	(0.000)**
Master's or higher	0.560	(0.029)**	0.779	(0.103)**
Bachelor's Degree	0.422	(0.022)**	0.370	(0.069)**
Associate's Degree	0.219	(0.023)**	0.412	(0.073)**
Some College	0.146	(0.019)**	0.192	(0.057)**
High School Dropout	-0.130	(0.031)**	-0.473	(0.068)**
Junior High Dropout	-0.184	(0.043)**	-0.783	(0.078)**
Black	-0.056	(0.017)**	-0.154	(0.050)**
Hispanic	-0.102	(0.027)**	-0.055	(0.076)
Asian	0.046	(0.051)	0.072	(0.170)
Native American	-0.051	(0.045)	-0.111	(0.128)
South	-0.094	(0.014)**	0.013	(0.043)
Urban	0.156	(0.018)**	0.135	(0.053)*
Presence of Children under Age 5			-0.504	(0.061)**
Non-Labor Income (weekly)			-0.001	(0.000)**
Constant	0.951	(0.093)**	0.209	(0.251)
Total Observations	5,541			
Censored Observations	1,335			
Log-likelihood	-4932.2			

Notes: Heckman selection model estimated on sample from SIPP 1996 (see Section 3.2).
** Significant at 1%; * Significant at 5%

Table 5: Psychological Cost and Leisure Preference Estimates

	Full Sample		No AFDC	
Variable	Psychological Cost (Utils)	Leisure Preference	Psychological Cost (Utils)	Leisure Preference
Years of Schooling	4.786**	-0.0101**	2.897**	-0.0102
	(0.262)	(0.0006)	(0.209)	(0.0223)
Kids under age 5	-43.364**	-0.0237**	-29.877**	-0.0321**
	(3.902)	(0.0047)	(3.071)	(0.0021)
Urban	5.197*	0.0076	4.887	0.0103
	(2.243)	(0.0005)	(2.505)	(0.0069)
AFDC participant	-62.977**	0.1520**	-	-
	(10.037)	(0.0127)	-	-
Black	-33.048**	0.0088**	-22.078**	0.0115
	(3.278)	(0.0007)	(3.860)	(0.0322)
Hispanic	-14.553	-0.0003	-11.808	0.0050
	(7.467)	(0.0070)	(6.781)	(0.0081)
Asian	32.863	-0.0043	32.177	-0.0054
	(70.518)	(0.0220)	(70.800)	(0.0200)
Native American	-29.647*	0.0196**	-19.090	0.0287*
	(13.293)	(0.0042)	(11.190)	(0.0138)
South region	11.134**	0.0252**	7.789*	0.0202**
	(1.839)	(0.0050)	(3.457)	(0.0066)
West region	20.036**	0.0254**	17.605**	0.0266**
	(5.157)	(0.0065)	(5.269)	(0.0042)
Northeast region	2.262	0.0242**	1.576	0.0225*
	(2.627)	(0.0078)	(3.452)	(0.0093)
Constant	-26.299**	0.6988**	-21.348**	0.6967**
	(1.271)	(0.0086)	(0.225)	(0.0004)
Observations	5,541		5,061	

** Significant at 1%; * Significant at 5%

Note: Parameter estimates of equations 8 and 9. Specifications include 5-year age dummies.

Table 6: Time Requirements and Utility Parameter Estimates

	Full Sample	No AFDC
	1	2
δ_{WIC}	1.72**	2.68**
	(0.06)	(0.12)
δ_{FSP}	0.29**	0.68**
	(0.03)	(0.21)
σ_{η}	0.166**	0.168**
	(0.004)	(0.001)
σ_{ϵ}	63.608**	44.196**
	(3.658)	(3.629)
σ_{ν}	16.473**	11.856**
	(1.510)	(1.210)
ρ	-0.0734**	-0.0614**
	(0.0154)	(0.0132)
α	0.190**	0.198**
	(0.008)	(0.013)

** Significant at 1%; * Significant at 5%

Time cost measured in hours per week

Table 7: Psychological Cost Coefficient Estimates in Dollars

Variable	Full Sample 1	No AFDC Participants 2
Years of Schooling	19.24**	13.75**
	(1.05)	(0.99)
Kids under age 5	-165.35**	-135.38**
	(14.88)	(13.91)
Urban	20.88*	23.19
	(9.01)	(11.89)
AFDC participant	-230.38**	-
	(36.72)	-
Black	-127.40**	-101.56**
	(12.64)	(17.76)
Hispanic	-57.69	-55.35
	(29.60)	(31.79)
Asian	126.72	145.09
	(271.92)	(319.25)
Native American	-114.90*	-88.30
	(51.52)	(51.76)
South region	44.36**	36.76*
	(7.33)	(16.31)
West region	78.80**	81.65**
	(20.28)	(24.44)
Northeast region	9.12	7.52
	(10.59)	(16.48)
Observations	5,541	5,061

** Significant at 1%; * Significant at 5%

Table 8: FSP and WIC Predictions

Panel A: FSP Participation, Actual and Predicted Percentages

	Predicted Non-Participant	Predicted Participant	Total
Actual Non-Participant	79.65	5.36	85.02
Actual Participant	5.79	9.19	14.98
Total	85.44	14.56	100

Panel B: WIC Participation, Actual and Predicted Percentages

	Predicted Non-Participant	Predicted Participant	Total
Actual Non-Participant	91.58	3.48	95.06
Actual Participant	2.11	2.83	4.94
Total	93.69	6.31	100

Note: calculated from the estimated model using the full sample including AFDC participants

Table 9: Average Predicted Psychological Cost by Income, Wage, and Preference for Leisure

Panel A: By Wage Quintile

Wage Quintile	Low Income	Middle Income	High Income
Lowest	38.97 (.138)	43.64 (.055)	59.78 (.006)
2	101.16 (.092)	87.51 (.089)	110.27 (.017)
3	108.63 (.020)	120.70 (.154)	134.30 (.029)
4	78.45 (.002)	145.08 (.142)	144.63 (.056)
Highest	- (.000)	158.02 (.057)	204.67 (.143)

Panel B: By Peference for Leisure Quintile

Preference for Leisure Quintile	Low Income	Middle Income	High Income
Lowest	26.12 (.016)	123.05 (.094)	193.33 (.090)
2	69.17 (.037)	127.04 (.107)	182.22 (.053)
3	88.46 (.052)	130.55 (.115)	153.32 (.036)
4	85.32 (.067)	104.69 (.093)	152.11 (.038)
Highest	45.71 (.077)	99.16 (.089)	155.16 (.034)

The average predicted psychological cost per week is reported in 1997 dollars and was estimated on the sample which excludes AFDC participants. The fraction of the sample (with sample weights) used in each cell is given in parenthesis.