PRELIMINARY AND INCOMPLETE

Welfare Stigma due to Public Disapproval

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Abstract

This paper decomposes individual-level costs of participating in welfare into time costs and two components of psychological costs to facilitate more informed policy evaluation of food assistance programs. Prior research on welfare participation has traditionally grouped costs associated with participation together, labeling these costs *welfare stigma*, and has estimated the overall contribution of these costs to the decision to participate in welfare. Recent work that has begun to decompose the aggregated utility cost into time costs and psychological costs in a way that is meaningful to policymakers. This paper extends the literature by further decomposing the psychological cost of participation into those costs due to: 1) others (e.g., neighbors) observing that the individual is a welfare participant ("external stigma") and 2) the individual knowing he/she relies on government assistance for basic needs ("internal stigma"). This study separately estimates external stigma from internal stigma and estimates the time costs associated with participation in food stamps and WIC using data from the SIPP. The recent policy change in how food stamps benefits are used in the transaction for food items, i.e. the adoption of the electronic benefit transfer (EBT) system, provides the identification of these two psychological costs. Using the estimates from our structural model , we simulate take-up rates in food stamps and WIC for different potential policy changes.

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1 Introduction

Federally-funded food assistance programs are a central feature of the U.S. welfare system and are designed to decrease food insecurity among low-income households and children. While the scope of these programs is large: one in five Americans participate in one of the fifteen food assistance programs at some point in a given year (Oliveira 2005), a substantial fraction of eligible households do not participate. The empirical regularity of non-participating eligibles in food assistance and other welfare programs suggests that there are costs associated with participation. Because these costs undermine the effectiveness of these programs at reaching their target population, research is needed to understand the nature and sources of these costs in order to inform policymaking.

Past research on welfare participation has recognized the potential role of psychological costs as a deterrent of participation. Starting with the work of Moffitt (1983), the disutility caused by participating in welfare, labeled "welfare stigma," was introduced into models of program participation. While Moffitt (1983) and his later work (Keane and Moffitt 1998) jointly models labor supply and program participation in a structural framework, other studies have taken the approach of estimating the effect of observable characteristics, which the researchers argue are associated with welfare stigma, on the probability of participation using a latent index model (e.g., Blundell, Fry, and Walker 1988; Riphahn 2001). A central theme in this existing literature is that the utility costs of participation have been grouped together in an all-encompassing welfare stigma term. However, policymakers would benefit from knowing what factors contribute to this participation cost.

This paper contributes to the literature by decomposing the costs associated with welfare participation. Recent work by Schanzenbach (2009) and Manchester and Mumford (2009) has increased attention to the policy importance of decomposing the utility cost. These studies have both focused on separating the time and effort required to enroll and maintain eligibility ("time costs") from psychological costs ("stigma") of participation, but differ in

the methdological techniques they apply. Using an experimental approach, Schanzenbach (2009) attempts to quantify the role of time costs by randomizing the degree to which eligible individuals are assisted in the application for food stamps. She finds evidence that time costs are a large impediment: individuals receiving partial assistance (i.e. assistance with filling out the application) were not more likely to subsequently file for benefits than those receiving no assistance (i.e. given blank application). However, the individuals receiving full assistance (i.e. application was filed on individual's behalf) were 18 percentage points more likely to apply for benefits than those who received no assistance. The experiment also attempted to manipulate the level of stigma by randomizing the name of the food assistance program: either using the traditional food stamps name and information sheets or a fictitious program called Golden State Advantage (GSA) with professionally developed marketing materials. She finds that individuals are significantly more likely to request additional information about GSA (25.8%) than food stamps (20.9%). While her approach in innovative, her findings are limited because the time cost aspect of the experiment may also be capturing the role of psychological costs because these individuals could enroll in food stamps without visiting the welfare office. In addition, the difference in the level of interest between GSA and food stamps is likely only capturing part of the psychological cost, i.e. the stigma associated with the program's name, but does not eliminate the individual's reliance on a program for food assistance. Hence, Schansenbach is unable to fully identify the relative size of time and psychological costs.

Manchester and Mumford (2009) provides a different approach to separately estimating time costs from psychological costs to allow for a comparison of these two costs. They extend the work of Moffitt (1983) and Keane and Moffitt (1998) by jointly modeling labor supply and participation in multiple programs, namely WIC and food stamps, to separately estimate time costs from psychological costs. For identification, they assume that the psychological cost associated with participation does not increase with the number of programs in which the individual participates, while time costs are assumed to program-specific and thus accrue

according to the set of programs in which the individual participates. Using a simulated estimation method, they find that, psychological costs are substantially higher than time costs associated with participation: they estimate that, on average, psychological costs are approximately five times the size of times costs. However, one limitation is whether the estimates can be interpretted as psychological costs and time costs instead of a "fixed" and "marginal" cost of participation, which may be more appropriate based on the structure they impose to achieve identification.

Besides the limitations discussed previously, the recent work on cost decomposition assumes that psychological costs are essentially one aggregate factor when it is likely a more complex barrier to participation. The goal of this current paper is to extend the decomposition of the utility costs of participation in welfare by identifying how much of the psychological cost incurred from participation is due to knowing that other people observe you as a program participant ("external stigma") versus how much is due to knowing you have to rely on government assistance for basic needs ("internal stigma"). Recent research in sociology has sought to understand the sources and determinants of welfare stigma. Stuber and Schlesinger (2006) find evidence for two types of stigma, which they call "self-identity" stigma and "treatment" stigma, a distinction that is analogous to that made in this paper between internal and external stigma. Yaniv (1997) makes a similar distinction, labeling the two types as "self-inflicted" and "peer-inflicted" stigma. Surveys in the sociology and public health literature show that participants in welfare programs report negative treatment by neighbors and peers and that negative stereotypes are transmitted through "stigma symbols," such as food stamps coupons; this is captured by external stigma in our model (Rosier and Corasaro 1993; Barr 2000; and Stuber and Schlesinger 2006). Internal stigma represents the lower self-esteem and self-efficacy because the participant knows she is relying on government assistance even if others cannot readily observe her usage. Therefore, while the concept of internal versus external stigma is not unique to this analysis, we will be the first to quantify the relative importance of these two sources of psychological costs.

Similar to Manchester and Mumford (2009), we jointly model labor supply and participation in two welfare programs, food stamps and WIC, and add structure to the nature of the psychological costs and time costs in order to achieve identification. We are able to separately estimate the two types of psychological costs due to the recent introduction of electronic benefit transfer (EBT) system for food stamps, a change that essentially eliminated the ability of others to observe participation. Hence, we assume that EBT eliminated external psychological costs for food stamps, but not for WIC. This source of identification marks an improvement on that used by Manchester and Mumford (2009) because it is based on a policy change with a clear impact on the psycholigcal aspect of participation. We apply our model to data on program participation and labor supply contained in two waves of the Survey of Income and Program Participation (SIPP). By pooling data from prior to and following the EBT adoption, we are able to decompose the psychological costs as well as estimate time costs. Using the results from our model, we simulate how the introduction of EBT system affected take-up rates in food stamps as well as consider how implementation of a similar system for WIC would affect take-up rates.

The rest of the paper is organized as follows. The next section describes the adoption of the EBT system for food stamps and reviews prior results on its effect on program participation. The economic model of welfare program participation and labor supply is outlined in Section 3. Section 5 gives the econometric and functional form specification and the method of estimation. Section 4 describes the benefits and eligibility rules of the two welfare programs used in this study, food stamps and WIC, as well as the data used for the analysis. Preliminary results are presented in Section 6.

2 Program Information and EBT Adoption

We restrict our analysis to participation in two U.S. food assistance programs, the food stamp program (FSP) and Special Supplemental Nutrition Program for Women, Infants,

and Children (WIC). Of the $46 billion spent on the USDA food assistance programs in 2004, two of the largest programs are FSP and WIC with expenditures for these programs totaling nearly $27 and $5 billion respectively.[1] These food and nutrition welfare programs are federally financed and approximately uniform in terms of benefits and income limits across states. Both have been in existence since the early 1970s and together comprise over two-thirds of the annual federal expenditures on food assistance programs (Oliveria 2005).

Historically, FSP distributed coupons that could be used to purchase any food item at participating stores, excluding alcohol, tobacco, and prepared foods. In 1993 Maryland instituted an EBT system to modernize the process. A mandate was passed in 1996, which required all states to adopt the EBT system by 2002. In fact, the adoption of EBT was slow; by 2000, only twenty states had initiated the transition. Manchester and Mumford (2009) analyzes participation in WIC and FSP in the fall of 1997, which is well before the widespread adoption of EBT. As of August 2003, 95 percent of FSP benefits were issued through EBT (FNS 2003) and California completed its conversion by the fall of 2004. This paper uses participation in 1997 to mark the pre-EBT era and participation in 2004 as the post-EBT era

The transition from coupons to an electronic system allows program participation to be concealed from the general public because recipients pay for groceries by swiping an EBT card, similar to a debit or credit card. This change facilitates our identification of external psychological costs. Being able to distinguish what fraction of the psychological costs could be removed by making welfare program use less observable to others conveys important information to policymakers. For example, if a large portion of psychological costs of participation is due to public disapproval activated through others observing an individual using welfare, then making usage concealable, such as by implementing an EBT system for other programs, will likely increase welfare participation. Similarly, reforms that

[1]WIC has the third largest expenditures; the National School Lunch program is second largest, totally $7.6 billion in 2004 (Oliveira 2005).

increase the visibility of usage would reduce welfare participation rates. By quantifying the size of external psychological costs, the costs and benefits to potential welfare reforms can be effectively evaluated.

Past research on how EBT affected FSP participation is mixed: some studies find that EBT increased participation (Kornfield 2002; Kabbani and Wilder 2003; Ratcliffe, McKernan, and Finegold 2008), while others find no effect (McKernan and Ratcliffe 2003; Ziliak, Gunderson, and Figlio 2003). The most comprehensive study of was conducted by Ratcliffe et al. (2008) and provides a detailed analysis of how state FSP and TANF policies affected FSP participation rates among different sub-populations. They find that EBT increased participation by 2.3 percentage points among two-adult households, but not among the other groups studied (i.e. no increase among all households, households with kids, female-headed households with kids, and able-bodied adults without dependents). The mixed results regarding the effect of EBT on participation suggests that internal psychological costs are a substantial barrier to participation for many individuals.

3 Model

To estimate internal from external psychological costs, we need to add structure to the nature of the psychological costs and time costs in order to achieve identification. Manchester and Mumford (2009) assumes that total psychological costs (internal plus external) do not increase with the number of programs in which the individual participates, while time costs are specific to the program and thus accrue according to the specific programs in which the individual participates. For this study, we maintain that time costs are program specific, however, we adopt a different assumption in order to decompose the psychological costs. We assume that internal psychological costs do not increase in the number of programs, but that individuals experience external psychological cost only if participation is observable to the public. We assume that the implementation of an EBT system eliminates external psy-

chological costs because it makes participation unobservable to the general public.[2] Hence, participants in WIC experience both external and internal psychological costs, while FSP participants only incur internal psychological costs. We allow for the introduction of the EBT system (and other changes in FSP in terms of program implementations between the pre-EBT and post-EBT era) to affect the time cost associated with participation in FSP, however, we must assume that the time costs associated with WIC have remained constant over this time period.

These assumptions required for identification are incorporated into a simple structural model of labor supply. The structural model developed in this paper allows for a more accurate characterization of eligibility for these welfare programs. 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. 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 earn more than the eligibility cutoff and thus preclude welfare participation. Another benefit of using a structural model approach is that once parameter estimates are obtained, outcomes can be simulated by for changes in the underlying variables and parameters, such as changes in time costs and/or changes in pscyhological costs.

The model builds on the work of Moffitt (1983), Keane and Moffitt (1998), and Manchester and Mumford (2009) by explicitly including utility costs of welfare participation in a model of labor supply and program participation. Psychological costs enter the model as a flat utility costs instead of a variable cost (Moffitt 1983) and participants incur a psychological cost from participating in any number of programs as well as additional program-specific

[2]This assumption implies that any psychological costs incurred at program offices when applying or recertifying benefits is absorbed into either the internal psychological costs or the time cost depending on whether participants encounter negative experiences at both offices or just FSP offices.

costs that increase in the number of programs (Keane and Moffitt 1998; Manchester and Mumford 2009). As in Manchester and Mumford, our model allows psychological costs to be person-specific, which is consistent with findings in the sociology literature that stigma depends on an individual's life history and social network (Rogers-Dillon 1995).

We use a static model of labor supply and welfare program participation in a utility maximizing framework. The individual jointly decides how many hours to work in the labor market and whether or not to participate in welfare (one program or multiple programs). Individual i's utility is given by

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

where L_i is leisure, C_i is consumption, and Φ_i^j is the total psychological disutility from welfare program participation and j denotes the era (pre- or post-EBT). Because there is no household production, leisure is all time not spent doing market work or fulfilling participation requirements:

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

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.

There is no borrowing or saving in this model, so consumption is the sum of after-tax income (labor and non-labor) and welfare benefits:

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

The wage is given by w_i, hours of work is given by H_i, and non-labor income is given by N_i. For those individuals for whom we do not observe a wage, one is imputed using a Heckman procedure. The tax function, τ_i, depends on i's family characteristics, particularly

the number and age of dependents. It maps income (labor and non-labor) into federal 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. 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 benefits levels.

Individuals incur internal psychological utility costs from welfare program participation if they participate in any welfare program due to reduced self-esteem and self-efficacy; this cost does not increase in the number of programs. By participating in programs in which participation is observable to the general public, individuals also incur an external psychological utility cost due to the embarrassment of being cast with negative stereotypes. These internal and external costs are given by ϕ_i^I and ϕ_i^E respectively. Equations 4 and 5 shows the psychological cost structure in the pre- and post-EBT era for FSP:

$$\Phi_i^{\text{pre-EBT}} = \begin{cases} \phi_i^I + \phi_i^E & \text{if } P_{1i} = 1 \text{ or } P_{2i} = 1 \\ 0 & \text{if } P_{1i} = 0 \text{ and } P_{2i} = 0 \end{cases} \tag{4}$$

$$\Phi_i^{\text{post-EBT}} = \begin{cases} \phi_i^I + \phi_i^E & \text{if } P_{1i} = 1 \\ \phi_i^I & \text{if } P_{1i} = 0 \text{ and } P_{2i} = 1 \\ 0 & \text{if } P_{1i} = 0 \text{ and } P_{2i} = 0 \end{cases} \tag{5}$$

where $P_{1i} = 1$ represents participation in WIC and $P_{2i} = 1$ represents participation in FSP. Hence, individuals who participation in only food stamps after the adoption of the EBT system do not bear the external psychological cost ϕ_i^E.

The level of welfare benefits that an individual would receive if she were to participate in program k is given by B_{ki}. The function b_k maps household characteristics and income

into welfare benefits:

$$B_{ki} = b_k \left(w_i H_i, N_i, \text{household characteristics}_i \right). \tag{6}$$

Participation in welfare program k is subject to eligibility constraints on income, assets, and household characteristics. The individual selects welfare participation and hours to maximize (1) with respect to C_i and L_i, subject to the constraints for each of the four possible program participation combinations.

4 Data

The data used in this study is two samples of female household heads from the Survey of Income and Program Participation (SIPP). 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). In addition, while Bitler et al. (2003) find that SIPP underreports participation in WIC, they find that undercoverage is largely random across observables. The pre-EBT sample is from 1997 (taken from the 1996 SIPP) and the post-EBT sample is from 2004 (from the 2004 SIPP). 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. Within our sample, determining who is the head of household is usually straightforward because we have eliminated households with multiple working adults. 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 benefit (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.

From the two samples, we have 5,541 women in the pre-EBT era (i.e. 1997) and 7,358 in the post-EBT era (i.e. 2004). We estimate our model on these pooled cross-sections taken from two different SIPP panels. For both years, 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. Family composition is defined as of September and income and wage information is collected from July through October for each year.

4.1 Benefit Calculation and Eligibility Requirements

The eligibility requirements and benefit formula used in this paper closely approximate the national eligibility standards for both programs. 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.[3] 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.[4] Similar to Keane and Moffitt (2002), we select an asset cutoff above the actual FSP level of $2000 (or $3000 for families with an elderly individual) because in practice, recipients often "spend down" their assets or hide them in order to meet the asset threshold. While we use the same asset test level to determine eligibility in 1997 and 2004, satisfaction of the income

[3]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.

[4]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.

eligibility test uses year-specific poverty thresholds.

In this paper, FSP benefits, B_{1i}, are given by:

$$B_{1i} = \bar{B}_{1i} - 0.3\,(0.8\,w_i\,H_i + N_i - 125 \text{ children}_i) \tag{7}$$

where children_i is the number of children under age five in the household. The maximum benefit level, $\bar{B}_{1i}$, 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 TANF).

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.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 (Currie 2003).[5]

For eligible families, WIC benefits do not decrease with income. Benefits depend on the age and number of children, as well as on whether or not the woman is pregnant.

$$B_{2i} = \begin{cases} 0 & \text{if } i \text{ has no children} < \text{age 5 and is not pregnant} \\ \bar{B}_{2i} & \text{if } \; w_i H_i + N_i \leq 1.85(\text{poverty}_i) \text{ and } \{\text{children} < \text{age 5 or is pregnant}\} \end{cases} \tag{8}$$

where $\bar{B}_{2i}$ 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

[5]Women and children with low-income are classified as being nutritionally at risk.

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 6.3 shows the value to the family by age of child for each year. 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.

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. About one quarter of the women in the sample do not participate in the labor market and thus do not have an observable wage. We predict a wage for these women using a Heckman selection procedure with non-wage income and presence of a child under age 5 used excluded from the wage equation.[6] The results for both years are available upon request.

5 Estimation

This section outlines the empirical specification of the above model and the estimation procedures. The internal psychological cost incured by an individual from participating in either or both welfare programs is given by

$$\phi_i^I = X_i^I \alpha + \gamma d_{2004} + \epsilon_i^I \tag{9}$$

where X_i^I is a vector of observed characteristics for individual i and η_i is an error term that accounts for heterogeneity in internal psychological costs across individuals. The year 2004

[6]Keane and Moffitt (1998) also predict wages outside of their primary estimation apparatus.

dummy is meant to provide a channel to capture any aggregate change in welfare program take-up rates. The external psychological cost incured by an individual from participating in WIC is given by

$$\phi_i^E = X_i^E \beta + \epsilon_i \tag{10}$$

where X_i^E are observable characteristics and ϵ_i accounts for individual heterogeneity in external psychological costs. The two error terms each have zero mean and are jointly normally distributed with a correlation of ρ. While not necessary for identification, we do allow for X_i^I and X_i^E to contain different elements. However, finding valid exclusion restrictions is challenging because both types of psychological costs are one's personal reaction to a situation and thus both costs depend on an individual's characteristics that are observable to the public as well as those that are unobservable (e.g., educational attainment should be contained in both X_i^I and X_i^E even though it is not readily observable to the public).

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

$$\gamma_i = \mu + \nu_i. \tag{11}$$

where μ is the population mean and ν_i is a mean-zero error term that accounts for heterogeneity in preference for leisure, such that higher values of ν_i correspond to higher preference for leisure.

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

$$U = \left[\gamma_i \left(L_i\right)^\alpha + \left(1-\gamma_i\right)\left(C_i\right)^\alpha\right]^{\frac{1}{\alpha}} - \Phi_i^j. \tag{12}$$

In this specification, the parameter α dictates the degree of substitutability between leisure and consumption.[7] The CES utility function (or the Cobb-Douglas special case) is commonly

[7]If $\alpha = 1$, then consumption and leisure are perfect substitutes; as $\lim_{\alpha \to -\infty}$, leisure and consumption are complements.

used in structural work. However, it does imply a constant budget share for leisure and consumption regardless of income level.

The individual's budget set is non-convex and intractable because we use actual tax functions, FSP benefit functions, and WIC eligibility cutoffs. This makes it difficult to derive a closed-form labor supply function or to use stepwise-linear techniques. Instead, we propose to use a discrete approach where hours of work is compartmentalized into 4 discrete bins. The bin is denoted by h_i.[8] This treatment of hours of work implies a log-likelihood function given by:

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

where θ represents the vector of parameters and $k \in \{1,2,3,4\}$ represents the hours of work choices $\{0, 20, 40, 60\}$.

Because they are difficult to derive in this framework, the probabilities and conditional wage densities in the log-likelihood equation above are computed using simulated methods. A large number of draws (D total draws) for the error terms in the internal psychological cost, external psychological cost, and preference for leisure equations are taken. The simulated probability $\Pr_S\left[h_i, P_{1i}, P_{2i}\right]$ is given by:

$$\Pr\nolimits_S\left[h_i, P_{1i}, P_{2i}\right] = \frac{1}{D}\sum_{d=1}^{D} \mathbb{1}\left(h_{id}=h_i, P_{1id}=P_{1i}, P_{2id}=P_{2i}\right) \tag{13}$$

[8]The bin values are: {0, 20, 40, 60}, which correspond to h_i = {1,2,3,4}. Observed hours are assigned to each bin by creating a range between bins that spans half the distance to the next bin. This procedure is quite common in estimating structural models, for example, Keane and Moffitt (1998) consider 3 hours choices: 0, 20, 40.

where d indicates a simulation draw for η and ϵ. The log-likelihood is evaluated given a vector of parameter values, θ, and then a simplex method is used to update θ in order to improve the log-likelihood value. A simplex method is used rather than standard quasi-Newton or conjugate gradient methods because the non-convexity of the budget set makes these standard methods less reliable than simplex methods. The simulated log-likelihood parameter estimates are asymptotically unbiased as the number of simulation draws grows large. The standard errors are computed as the inverse of the outer-product of the simulated scores.

6 Preliminary Results

6.1 Validating Assumptions on Psychological Costs

The model presented in Section 3 provides insight as to how welfare program participation should have been effected by the EBT policy change. Following the model, individuals not participating in any welfare program would face a cost of $\phi^I + \phi^E + \delta_2$ if they decided to participate in FSP before the EBT change. After the EBT change, they would face a cost of $\phi^I + \delta_3$. If $\phi^E + \delta_2 > \delta_3$ then we would expect FSP participation to rise. However, the EBT change implies a clear prediction for WIC participation conditional on FSP participation. For individuals who are already FSP participants, participation in WIC would impose a cost of δ_1 before the EBT change. After the EBT change, they would face a cost of $\phi^E + \delta_1$ (See Table 1 for a summary of these marginal participation costs). So, conditional on FSP participation, WIC participation should have declined in the post-EBT adoption relative to the pre-EBT era.

We can test this explicitly using a differences-in-differences regression analysis using the

following equation:

$$Pr(P_{1,i} = 1) = X_i\beta + \gamma_1 d2004_i + \gamma_2 P_{2,i} + \gamma_3 d2004 \times P_{2,i} + \epsilon_i \tag{14}$$

where $P_{1,i}$ is participation in WIC and $P_{2,i}$ is a dummy for participation in FSP, and $d2004_i$ is a dummy variable that equals 1 for women in 2004 sample and equals 0 for the 1997 sampel. The parameter of interest is γ_3 because this tells how the propensity to participate in WIC conditional on participating in FSP differs in year 2004 relative to 1997.

We estimate this equation only on individuals who meet the demographic and income requirements for WIC. The estimates are reported in Table 6 and indicate that conditional on being a FSP participant, the decline in WIC participation between 1997 and 2004 is significantly different than zero. This result is robust to the inclusion of demographic characteristics, schooling, and family earnings. Therefore, the data are consistent with the assumptions we impose on the structure of psychological costs pre- and post-EBT.

6.2 Model Results

We apply the procedure outlined in Section 5 to compute preliminary results for the parameter estimates from the model developed in Section 3. Table 7 shows the parameter estimate in utility units for internal and external psychological costs. Both types of psychological costs increase substantially with educational attainment, are higher for those living in a urban area, and are non-linear in age. Hispanics have higher internal psychological costs relative to whites, but lower external psychological costs. Women who identify themselves as black have lower external and internal psychological costs. We also find that internal psychological costs are lower in states with higher TANF take-up rates, but that external psychological costs are increasing in the take-up rate.

In order to express the psychological cost parameter estimates in dollar terms, the level of additional consumption that would be needed to exactly offset the change in utility implied by

each psychological cost parameter is calculated. This conversion to 2004 dollars is performed for both utility specifications at the mean value for all variables. The standard errors are converted from utility terms into dollars using this same method.

Table 7 also shows the preliminary estimate of the time requirements for WIC and FSP. We find that receiving benefits and maintaining eligibility for FSP requires 0.74 hours a week, before the EBT change and 0.25 hours a week after the EBT change.

6.3 Simulation Results

What do these results imply about the recent policy initiatives in the USDA food assistance programs? The first policy worth considering is the potential adoption of an 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.[9] The second is the recent change in the name of FSP. Beginning October 2008, the federal Food Stamp Program received a new name: Supplemental Nutrition Assistance Program (SNAP), to reflect recent changes in the program that promote nutrition and healthy eating among low income individuals.

We use the estimated model to simulate what would have happened in three scenarios reported in Table 8. Scenario (1) simulates the model with no EBT change to either program. The finding is that both the FSP take-up rate and the number of women eligible for the FSP is simulated to be much lower. Average hours of work for women in the sample would have increased by only 6 percent and WIC participation changes very little. Scenario (2) simulates the model under the alternative specification of WIC and FSP having both adopted the EBT cards. Under this scenario, WIC take-up rates increase dramatically, but WIC eligibility does not increase. This is likely due to eligibility being primarily constrained by exogenous characteristics, particularly children. Scenario (3) simulates the model assuming that WIC adopted EBT and FSP did not. The results closely match those of scenario (1) for the FSP

[9]Source: http://www.fns.usda.gov/wic/EBT/wicebtstatus.htm.

and scenario (2) for the WIC program.

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Tables

Table 1: Marginal Cost of Welfare Program Participation

Marginal cost of participating in FSP?

	1997	2004
Non Participant	$\phi^I + \phi^E + \delta_2$	$\phi^I + \delta_3$
WIC Participant	δ_2	δ_3

Marginal cost of participating in WIC?

	1997	2004
Non Participant	$\phi^I + \phi^E + \delta_1$	$\phi^I + \phi^E + \delta_1$
FSP Participant	δ_1	$\phi^E + \delta_1$

Table 2: Value of WIC Benefits

	Monthly Value of Food Items	
Family Member	1997	2004
Infant: 0 to 3 months	$97.66	$114.94
Infant: 4 to 12 months	$105.41	$124.06
Child: 1 to 5 years	$31.26	$36.79
Mother: Pregnant	$33.59	$39.53

Sources: Food items from www.fns.usda.wic/benefitsandservices/foodpkgtable.htm. Price information: www.giantfood.com. Prices deflated to 1997 and 2004 dollars using CPI-U: www.bls.gov/cpi.

Table 3: Descriptive Statistics for 1997 Sample (*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 4: Descriptive Statistics for 2004 Sample (*Weighted*)

Demographic Characteristics	Mean	St. Deviation	Minimum	Maximum
Age	41.9	12.4	18	64
White	63.0%	-	0	1
Black	21.5%	-	0	1
Hispanic	10.6%	-	0	1
Asian or Native Amer.	2.3	-	0	1
Years of Schooling	13.9	2.4	0	20
Master's Degree or higher	9.4%	-	0	1
Bachelor's Degree	16.4%	-	0	1
Associate's Degree	20.2%	-	0	1
Some College	20.9	-	0	1
High School Graduate	24.5	-	0	1
High School Dropout	4.7%	-	0	1
Junior High Dropout	4.0%	-	0	1
Live in Urban Area	83.0%	-	0	1
South	34.1%	-	0	1
Family Size	1.9	1.2	1	10
Any Children in Family (*under age 18*)	36.2%	-	0	1
Number of Children (*under age 18*)	0.7	1.1	0	8
Child under age 5 (*WIC eligible*)	10.0%	0.301	0	1
Teen in Family	15.3%	-	0	1
Elderly Dependent	3.2%	-	0	1

Labor Force Participation and Income	Mean	St. Error	Minimum	Maximum
Non-Labor Income (*weekly*)	$165	$312	$0	$7,779
Positive Non-Labor Income	81.4%	-	0	1
Liquid Assets	$288	$944	$0	$8,100
Positive Hours	72.0%	-	0	1
Weekly Hours of Work	28.4	20.7	0	127

Table 5: Welfare Participation and Benefits by Year

Program Participation in 1997	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 in 1997	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
State Take-up Rate in AFDC (1996)*	34.4%	8.3%	13.0%	63.0%

Program Participation in 2004	Mean	St. Dev.	Min	Max
WIC	5.8%	-	0	1
FSP	17.1%	-	0	1
WIC and FSP	3.8%	-	0	1
WIC (with a Child under age 5)	46.7%	-	0	1

Monthly Benefit in 2004	Mean	St. Dev.	Min	Max
Maximum FSP Benefits	$239	$127	$141	$1,167
Value of WIC Benefits (Child < 5 years old)	$44	$17	$37	$161
State Take-up Rate in TANF (2003)*	13.9%	0.064	1.0%	45.0%

*Caseload as a fraction of individuals in poverty by state in 1996 and 2003 respectively. Computed using Census and Department of Health and Human Services data. Note: Wyoming has the 13% participation rate in 2003.

Table 6: Differences-in-Differences Estimate for WIC Participation

WIC participation	(1)	(2)	(3)
Intercept	0.2824**	0.0662**	0.3567
	(0.0262)	(0.1491)	(0.1626)
FSP Participation	0.3067**	0.2923**	0.2534
	(0.0360)	(0.0362)	(0.0378)
Year 2004	0.1438**	0.1606**	0.1635
	(0.0383)	(0.0391)	(0.0392)
FSP ×Year 2004	-0.1235**	-0.1288**	-0.1127*
	(0.0512)	(0.0509)	(0.0508)
Under 30		0.0729	0.0648
		(0.0459)	(0.0459)
Age 30-39		0.2089	0.2247
		(0.0922)	(0.0918)
Age 40-49		0.1541	0.1968
		(0.1514)	(0.1509)
Age 50-59		-0.0535	-0.0264
		(0.1701)	(0.1695)
Hispanic		0.1141*	0.0571
		(0.0496)	(0.0511)
Black		0.0444	0.0528
		(0.0278)	(0.0277)
Asian		-0.2343	-0.2553
		(0.1830)	(0.1819)
Schooling			-0.0232**
			(0.0056)
Income ($1,000s)			-0.0078
			(0.0049)
R^2	0.0710	0.0863	0.0995
N = 1450 Sample of those eligible for WIC			

Note: Sample is restricted to households that satsify the demographic and income eligibility requirements of WIC. ** p-value < 0.01, * p-value < 0.05

Table 7: Psychological Parameters Preliminary Estimates (Utils)

	Internal	External
Constant	-178.88	-208.14
under30	26.71	74.94
age30-39	79.87	83.26
age40-49	-82.09	46.10
age50-59	110.32	-162.61
schooling	43.51	24.48
metro	23.31	34.69
teen	-31.17	-17.43
south	85.83	88.95
hispanic	218.17	-614.57
black	-152.99	-277.94
other	13.17	13.43
staterate	-220.81	339.48
year2004	-112.36	

Time Cost

	Time Cost
WIC	0.70
1997 FSP	0.74
2004 FSP	0.25

Table 8: 2004 Program Take-Up Rate Simulations

	WIC no EBT FSP EBT	(1) WIC no EBT FSP no EBT	(2) WIC EBT FSP EBT	(3) WIC EBT FSP no EBT
FSP Take-Up Rate	1.000	0.740	0.995	0.724
FSP Eligibility	1.000	0.871	1.023	0.868
WIC Take-Up Rate	1.000	1.004	1.207	1.195
WIC Eligibility	1.000	0.995	1.000	0.998
Hours of Work	1.000	1.060	1.000	1.063