Towards An Explanation of The Cash-out Puzzle in the US Food Stamps Program•

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Abstract

Marginal propensity to consume food out of food stamps in the US is higher than that out of cash income. We explain this in terms of differential impact of cash income and in-kind transfers on intra-household division of cash. We develop a Cournot model of a multi-person household where food consumption is a domestic public good. We show that replacement of in-kind transfer by an equivalent increase in household cash income may reduce household expenditure on food. Empirical support is found for the predictions of this model in data from a US cash-out experiment. We question the alternative, stigma-based, explanation.

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Key Words: Food Stamp Program, Cash Transfers, Cash-out Puzzle, Welfare Stigma, Cournot Model, Intra-household Distribution, Engel Curves.

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1. Introduction

The purpose of this paper is to propose an explanation for the so-called "cash-out puzzle", i.e., the larger marginal propensity to consume food with respect to food coupons relative to that with respect to cash income, noted in studies of the Food Stamp Program in the US. We question the welfare stigma based explanation that has been advanced earlier. We base our analysis instead on a standard utility maximization approach with complete information, where no stigma is assumed to be attached to the use of food coupons instead of cash. We depart from the existing literature by explicitly focusing on the decision-making process *within* a multi-person household. We argue that the "cash-out puzzle" may be explained in terms of the differential impact of food stamp and cash income on intra-household distribution of resources within multi-adult households. The theoretical explanation is developed through a non-cooperative game-theoretic model of the intra-household resource allocation mechanism. We find empirical support for this explanation in data from a cash-out experiment carried out in San Diego county in the US in which a randomly selected group of food stamp recipients were given cash benefits instead of coupons.

The Food Stamp Program (FSP) remains one of the largest programs that provide state assistance to the needy in the United States. From its inception, this program has had an important role in reducing hunger and food poverty. Consequently, FSP has attracted a tremendous amount of analysis since the early 1970s[1]. One of the most interesting puzzles brought to light by this research is the large marginal propensity to consume food out of food stamps compared to that out of cash income. The basic theoretical model of the effects of government food subsidy on household expenditure (Southworth (1945)) predicts this outcome only for households which receive, as food stamps, an amount which is greater than their desired monthly expenditure on food. Consequently, the model predicts large overall effects of food stamps on food spending, relative to effects from money income, only if a large proportion of households is constrained (in the above sense). However, empirical studies have universally agreed that large effects of the food stamp program (compared to the effect of other income) coexist with small percentages of constrained households[2]. The large estimated marginal propensity to consume food out of food stamps at the aggregate level, relative to that out of cash income, would therefore seem to contradict conventional economic theory.

In addition to its theoretical interest, this puzzle has important policy implications. The standard model assumes equivalence between cash income and cash transfers from government sources such as welfare payments. Given this equivalence, and given the small proportion of constrained households, standard microeconomic analysis would suggest that a "cash-out" program, i.e., a switch to a program of cash distributions instead of in-kind transfers through coupons, should

[1] For a review of this literature see Fraker (1990).

[2] See, for example, the seventeen studies reviewed in Fraker (1990). Most studies show this group of constrained households to be on the order of ten to fifteen percent.

not make a significant difference to food consumption at the aggregate level. The standard theory also predicts that a 'cash-out' program would lead to welfare gains for constrained individuals. Since food stamps and cash transfers would be equivalent in terms of their impact on an unconstrained recipient's consumption, it follows that a cash-out program would achieve welfare gains. Furthermore, a "cash-out" program may generate significant savings in administrative and monitoring costs. Consequently, there seems to be a strong a priori case for the replacement of FSP by a system of cash transfers.[3] To justify the present coupon based system, it is therefore necessary to show that in-kind transfers influence food consumption in a way that provides significant additional advantages. Clearly, an understanding of the "cash-out" puzzle is crucial to such an exercise.

It is commonly argued that individuals incur some non-pecuniary costs from participation in welfare programs due to social stigma attached to receiving welfare payments. The existence of a lump sum cost of participation due to such stigma has been advanced as an explanation of why many eligible households choose not to participate in welfare programs such as AFDC (renamed Temporary Assistance for Needy Families, TANF) and the Food Stamp program.[4] Levedahl (1995) has proposed a marginal version of this argument as a theoretical explanation of the cash-out puzzle. He assumes a marginal "stigma" associated with food stamps, in that the marginal utility of food bought with food stamps is less than the marginal utility of food purchased with cash, and conjectures that such marginal stigma will explain the cash-out puzzle.

Levedahl's argument suffers from two major weaknesses. First, he does not provide any formal theoretical justification for the claim that marginal stigma is sufficient to explain the cash-out puzzle. Second, he does not provide any independent empirical evidence to justify the assumption of marginal stigma. Yet, these questions would seem to be of considerable importance in developing a correct explanation of the cash-out puzzle.

In this paper, we first examine the status of the marginal stigma hypothesis as a possible explanation for the cash-out puzzle. We develop a theoretical model to examine the robustness of Levedahl's claim and to identify the major restrictions imposed on consumption behavior of individual agents by this hypothesis. We show that the marginal stigma hypothesis predicts that an individual's consumption behavior will exhibit the cash-out puzzle if and only if all non-food items together constitute a normal good.

We then proceed to address the problem from a completely different perspective. Standard micro-economic theory predicts that the marginal propensities to consume food out of cash and coupons will be identical for an unconstrained *individual*. Differences in these marginal propensities for an unconstrained *household* can be considered puzzling at an a priori level only in the context of the prior assumption that a household behaves as a single individual. The existing literature on the

[3] If, however, it is expensive to screen potential beneficiaries of welfare programs, then an adverse selection problem exists in the context of cash welfare transfers. In this case, in-kind transfers may be efficient since they function as a self-selection mechanism. See, for example, Blackorby and Donaldson (1988).

cash-out puzzle typically models the household in this fashion. The broad hypothesis we explore is that this particular *modeling strategy* itself provides the major explanation for the so-called puzzle. Specifically, we hypothesize that, once the household is modeled in a non-unitary fashion by explicitly formulating household decisions as the outcome of the interaction between individual members with possibly different preferences and endowments, the cash-out puzzle will turn out to be compatible with the standard framework of individual decision-making.

The problem then becomes one of developing an alternative, non stigma-based, explanation for the puzzle consistent with a standard utility maximization framework that would predict the variation in food consumption behavior for *multi-adult households*. Large discrepancies for multi-adult households would be consistent with such a model, large discrepancies for individuals would not. The marginal stigma-based explanation however predicts large discrepancies precisely for *individuals*, and, by implication, for single-adult headed households. This conclusion can then be used to distinguish the two competing hypotheses in terms of their empirical implications.

To analyze the impact of cash-out programs on household food consumption, we develop a non-cooperative, game-theoretic model of intra-household resource allocation. Specifically, we propose a Cournot model of a multi-person household where individual food consumption has the property of being a domestic public good. In this model, each agent takes the other agent's spending on food, and availability of food from food stamps, as given, and chooses the optimal allocation of his/her own discretionary cash income between food for own consumption, food for other members' consumption and other goods. No stigma is assumed to attach to purchases using food stamps. The household demand functions are not generated through the maximization of a single utility function, as in the standard case, but through the Nash equilibria of the Cournot game. We assume that all goods are normal goods; further, total cash income of the household is divided between the members in such a way that any increase in such income increases both members' access to cash. We show that, in this model, if one agent chooses not to spend any cash on food under the coupon scheme, then, even if the household is unconstrained, replacement of food coupons by an equivalent increase in household cash income must reduce total household expenditure on food. This happens because the change in the composition of household income effectively alters the intra-household distribution of cash income, providing more cash to the constrained member of the household.

We find empirical confirmation of the prediction of this model in data from 'cash-out' experiments conducted in San Diego county. There is no evidence of a cash-out puzzle for single-adult headed households: the difference in expenditure patterns is completely explained by the multi-adult households. Since single-adult headed households do not seem to exhibit the cash-out puzzle, our empirical results also cast doubt on the marginal stigma-based explanation.

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[4] See, for example, Moffitt (1981, 1983) and Ranney and Kushman (1987).

The paper is organized as follows. In Section 2, we develop a simple model of individual consumption behavior in the presence of marginal stigma welfare stigma, and show that such stigma explains the cash-out puzzle for individual agents if (and only if) all non-food items taken together constitute a normal good. Our alternative theoretical explanation is presented in Section 3. In section 4, we discuss the data from the 'cash-out' experiment mentioned above and present our econometric procedure. Estimates for the marginal propensity to consume food out of food stamps and other income for participants in the food stamp program are presented in Section 5. Section 6 summarizes and concludes the discussion.

2. The 'Stigma' Hypothesis: A Formalization

In this section, we provide a simple formalization of Levedahl's (1995) conjecture that marginal welfare stigma may explain the cash-out puzzle. We develop a model of consumer behavior in the presence of marginal stigma, where the agent consumes food and a composite non-food consumption good. Food may be purchased with cash as well as coupons, and the marginal utility of food purchased with cash is larger than that of food purchased with coupons. We show that marginal stigma, by itself, is not sufficient to predict that an unconstrained agent will reduce his consumption of food when food stamps are converted to cash income. In fact, marginal stigma implies the cash-out puzzle if and only if the composite non-food item is a normal good.

Consider an individual who consumes two goods, food and a composite non-food item. Food is however available from two different sources: cash purchases and purchases through food stamps. Let the agent's preferences be given by the utility function

$$u = u(x,t);$$

where $t = t(f,s)$; x is the amount of the non-food good, f is the amount of food purchased with cash and s is the (exogenously determined) amount of food purchased with coupons.

The function t may be interpreted as a *cash-purchase-equivalence relationship* for food, i.e., given any combination of food purchased with cash and coupons, it provides the corresponding amount of food purchased solely with cash that the agent would consider equivalent. Clearly, therefore, $[t(0,0)=0]$. Furthermore, $[t_f = 1]$, which implies:

$$t(f,s) = f + t(0,s). \tag{2.1}$$

In the standard model, agents consider all methods of payment equivalent; hence, $[t(0,s)=s]$. Marginal stigma from purchases made with stamps may be modeled as the following restriction.

A2.1: $f_s < 1$.

Clearly, the agent would be willing to give up coupons worth one unit of food in exchange for cash worth less than one unit of food (if she could), possibly because of welfare loss from coupon

purchases due to shame (stigma). Note that we can allow the extent of marginal stigma to vary with the amount of coupons.

Let I be the agent's cash income. Then, putting all prices equal to one for notational simplicity, the agent's problem is to maximize utility, subject to the cash budget constraint:

$$x + f = I; \tag{2.2}$$

and the food conversion constraint given by (2.1) above.

Combining the constraints (2.1) and (2.2), we get the overall budget constraints:

$$t + x = Y + \left[t(0,s) - s\right]; \tag{2.3}$$

where $Y = I + s$; and:

$$x \leq Y - s\,. \tag{2.4}$$

We shall assume that the agent is *unconstrained*; i.e. (2.4) is not binding. Utility maximization subject to (2.3) yields the demand for the two composite goods as functions of the total income from all sources, cash as well as coupons, and the amount of food stamps. Let this demand function for the composite non-food consumption good be given by:

$$x = x\left(Y + t(0,s) - s\right). \tag{2.5}$$

An agent's behavior exhibits the cash-out puzzle if a conversion of part or whole of the coupon component in his income to cash income leads to a fall in his total purchase of food. It may therefore be interpreted formally as the following restriction on his demand behavior.

C2.1: x is increasing in s.

First note that A2.1 implies that the function $\left[t(0,s) - s\right]$ is (a) negative for positive values of s, and (b) decreasing in s. Then, the following result follows immediately from (2.5).

Proposition 2.1. A2.1 implies C2.1 for an unconstrained agent if and only if x is increasing in Y.

Thus, the claim that marginal stigma implies the cash-out puzzle for an unconstrained agent is equivalent to the claim that the composite non-food item is a (strongly) normal good. Suppose, for example, the agent's preferences are given by the quasi-linear utility function:

$$u = \ln x + k\left[f + (1 - \mathrm{I})s\right], \text{ where } \mathrm{I} \in (0,1]\ ,\ k > 0.$$

In this case, the income elasticity of the non-food item is zero when the agent is unconstrained. It can be easily checked that the agent's consumption behavior will be exactly as predicted by the traditional Southworth model, even though the utility function satisfies the marginal stigma condition. Thus, contrary to what Levedahl seems to argue, marginal welfare stigma, by itself, is not formally sufficient to explain the cash-out puzzle.

It is easy to see that, if an agent is constrained, then, given marginal stigma, normality of the composite non-food good is sufficient, but not necessary, to generate the cash-out puzzle, i.e., C2.1. On the other hand, for such an agent, if the non-food good is inferior, then marginal stigma does not

necessarily imply C2.1. In the Southworth model, however, C2.1 must necessarily hold for an unconstrained agent, *regardless of the nature of the non-food item.*

The intuition behind these results is simple. The presence of marginal stigma implies that purchase of food through coupons is an inefficient way of acquiring food. Conversion of coupons to cash is therefore equivalent to an increase in the agent's income in terms of its effect on consumption.

Thus, if marginal stigma does in fact exist, we should expect consumption behavior of unconstrained *individuals* to satisfy the following restriction. If the marginal propensity to consume food out of cash income is less than one, then the marginal propensity to consume food out of food stamps should be more than that out of cash income.

3. An Alternative Theoretical Explanation

In the food stamp literature, the assumption that multi-person *households* behave as if they are individual decision-makers is ubiquitous. However, as the recent literature on intra-household decision-making shows, it is actually quite questionable.[5] Intra-household distribution of resources may depend on the composition of total household income. Conversion of in-kind welfare income to cash income may simultaneously lead to a change in the intra-household division of resources. This, in turn, may lead to a multi-person household exhibiting consumption behavior that cannot be explained in terms of the household maximizing as an individual.

We now develop an alternative theoretical explanation of the cash-out puzzle, which does not require the presence of any welfare stigma, along these lines. We formulate our argument by means of a Cournot model of intra-household allocation[6] The predictions about household food consumption behavior generated by this model are consistent with a larger marginal propensity to consume food out of stamp income, as compared to that out of cash income.

Assume a household with two adult members M and F[7]. Each agent k,($k \in \{M, F\}$), consumes some amount of food $\tilde{y}_k$ and a composite private good x_k. Given any agent k, we shall refer to the other agent as agent $-k$. Both agents are altruists, in that both agents derive utility from the other member's consumption of food as well. Thus, agent k's preference ordering is represented by a strictly quasi-concave utility function $U^k(x_k, \tilde{y}_k, \tilde{y}_{-k})$.

Purely for notational simplicity, we shall assume that the prices of all goods are unity. Let n be the value of total welfare benefits paid by the government to the household through cash and coupons, $n > 0$; the cash transfer component being T, $T \in [0, n]$. The total household availability of

[5] See, for example, Alderman et al. (1995) for a survey.

[6] Earlier work in this tradition includes Ulph (1988), Woolley (1988), Lundberg and Pollack (1993), Kanbur (1995) and Dasgupta (1999).

[7] Generalization to a household with more than two members is straightforward.

food from food stamps is therefore $[n-T]$. Given any amount of food stamps $[n-T]$, agent *k* has discretionary control over $\alpha^k(n-T)$ amount of it, $\alpha^k(n-T) \geq 0$. Clearly, $\alpha^M(n-T)+\alpha^F(n-T)=(n-T)$. Note that we shall not require any assumption whatsoever about the nature of intra-household division of control over foodstamps to derive our result.

Each agent *k* has discretionary control over cash $r_k \geq 0, r_k = r^k(I_k, I_{-k}, T)$; where I_k refers to the agent's personal income and *T* is cash welfare payment to the household; $[r_k + r_{-k} = I_k + I_{-k} + T]$. Thus, we allow for the possibility that a member may transfer a part of his personal income to another, and may also have discretionary control over any cash welfare payment.

Each member *k* takes the other agent's spending on food for his/her (i.e., agent –k's) own consumption, $\tilde{y}_{-k}^{-k}$, as well as that on food for agent k's consumption, $\tilde{y}_{-k}^{k}$, as given, and chooses the allocation of his/her own discretionary income (cash as well as stamps) between food for himself/herself, $\tilde{y}_k^k$, food for the other person, $\tilde{y}_k^{-k}$ and the private good, x_k. Thus, food consumption by either agent has the formal characteristic of a domestic public good, and agents play a Cournot game with respect to choice of contributions to these domestic public goods.[8] We assume that a Nash equilibrium exists in this game.[9]

Then, given any amount of total welfare payment, its division between cash and coupons, the division of discretionary control over coupons among agents, and contributions $\tilde{y}_{-k}^{k}, \tilde{y}_{-k}^{-k}$ by the other agent, agent *k*'s optimization problem is that of choosing the optimal levels of $\tilde{y}_k, \tilde{y}_{-k}$ and x_{-k} subject to the budget constraint:

$$[r_k(I_k, I_{-k}, T) + \alpha_k(n-T) + \tilde{y}_{-k}^{k} + \tilde{y}_{-k}^{-k} = \tilde{y}_k + \tilde{y}_{-k} + x_k],$$

and the additional constraints

$$\tilde{y}_k \geq \tilde{y}_{-k}^{k},$$

$$\tilde{y}_{-k} \geq \tilde{y}_{-k}^{-k},$$

and

$$[\tilde{y}_k + \tilde{y}_{-k} \geq \alpha_k(n-T) + \tilde{y}_{-k}^{k} + \tilde{y}_{-k}^{-k}].$$

The last three constraints incorporate the assumption that an agent cannot sell any portion of the food purchased by the other agent or available through food stamps for cash.[10] Let the total cash spent on food purchase by agent k be y_k, clearly, $y_k = \tilde{y}_k^k + \tilde{y}_k^{-k} - \alpha_k(n-T)$.

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[8] The model can be made more realistic by allowing other public goods (e.g. expenditure on children, housing, etc.) as well. This, while complicating the notation, does not however add anything to the argument.

[9] See Bergstrom et al. (1986) for sufficiency conditions to ensure the existence of a Nash equilibrium.

[10] The no resale restriction for stamps is for convenience and can be relaxed to allow partial (but not complete) resale.

Then, the solution to the agent's optimization problem, subject to the first constraint alone, yields the optimal levels of $\tilde{y}_k, \tilde{y}_{-k}$ and x_k as functions of total income from all sources, i.e., of $\left[r_k\left(I_k, I_{-k}, T\right)+\left(n-T\right)+y_{-k}\right]$. Let these unrestricted individual demand functions be given by:

(i) $\tilde{y}_k = \tilde{y}^k\left(r_k\left(I_k, I_{-k}, T\right)+\left(n-T\right)+y_{-k}\right)$,

(ii) $\tilde{y}_{-k} = \tilde{y}^{-k}\left(r_k\left(I_k, I_{-k}, T\right)+\left(n-T\right)+y_{-k}\right)$,

and

(iii) $x_k = h^k\left(r_k\left(I_k, I_{-k}, T\right)+\left(n-T\right)+y_{-k}\right)$.

We impose the following restriction on unrestricted individual demand functions (and thus on individual preferences).

A3.1: For all $k \in \{M, F\}$, $\tilde{y}^k, \tilde{y}^{-k}$ and h^k are increasing in r_k.

A3.1 merely requires that all goods be normal goods in the standard sense.

Now let *y* be the total amount of food purchased by the household,

$$y = \tilde{y}_k + \tilde{y}_{-k} = y_k + y_{-k} + \left(n-T\right).$$

Then, from the demand functions (i) and (ii) above generated by agent k's optimization exercise, we can also derive k's demand for total household purchase of food:

(iv) $y = g^k\left(r_k\left(I_k, I_{-k}, T\right)+\left(n-T\right)+y_{-k}\right)$.

Clearly, A3.1 implies that g^k is increasing in r_k as well.

A3.1, i.e., the assumption that all goods are normal goods, suffices to ensure the uniqueness of the Nash equilibrium.[11] Then, the Nash equilibria yield single-valued household demand functions.

$$x_k^N = \bar{x}^k\left(T, I_k, I_{-k}, n\right)$$

and

$$y^N = y_k^N + y_{-k}^N + \left(n-T\right) = y^N\left(T, I_k, I_{-k}, n\right).$$

Since an agent cannot exchange any portion of the food purchased by the other agent or provided through food stamps for cash, it must be the case that, in any Nash equilibrium,

$$y^N\left(T, I_k, I_{-k}, n\right) = \max\left[g^k\left(r_k\left(T, I_k, I_{-k}\right)+\left(n-T\right)+y_{-k}^N\right), \left(n-T\right)+y_{-k}^N\right] \text{ for all } k \in \{M, F\}. \quad (3.1)$$

Our critical assumption, A3.2, is simply that all adult members of the household receive a share of any increase in cash transfer from the government to the household.

A3.2: For all $k \in \{M, F\}$, r_k is increasing in *T*.

The cash-out puzzle may be formally defined as the following restriction on the household demand function for food generated by the Nash equilibrium.

C3.1: y^N is decreasing in *T*.

[11] See Bergstrom et al. (1986).

Proposition 3.1. Suppose that

$$\left[\left[y^N(0, I_k, I_{-k}, n) > g^k\left(r_k(0, I_k, I_{-k}) + y^N(0, I_k, I_{-k}, n)\right)\right] \text{ and } y^N(0, I_k, I_{-k}, n) > n\right],$$

for some $k \in \{M, F\}$. Then, A3.1 and A3.2 together imply C3.1.

Proof: See the Appendix.

Assume that initially the entire welfare benefit, *n*, was being paid in food coupons. Now consider a change which substitutes some part of the coupon payments by an equivalent cash transfer, while keeping total welfare benefit invariant. Proposition 3.1 implies that, if, under the coupon scheme, (a) a household is unconstrained, and (b) an individual member is constrained, then, given A3.1 and A3.2, any such substitution of coupons by cash will necessarily reduce the total household expenditure on food. The larger the cash component, the larger the reduction in household food expenditure. Thus, Proposition 3.1 implies that such households will necessarily exhibit the cash-out puzzle.

Note that exactly the same result can be established, in exactly the same way, by comparing a coupon scheme with an equivalent increase in non-welfare cash income, rather than in cash welfare payment. Intuitively, this happens because the increase in household cash income (whether through welfare payments or otherwise) makes available a larger amount of cash to the constrained member, allowing that member to increase non-food expenditure. The same conclusion can be generated, in essentially the same way, by modeling the intra-household allocation process as a Stackelberg game.

The model developed in this section is therefore consistent with a larger marginal propensity to consume food out of food stamps for unconstrained multi-adult households. If the proportion of unconstrained multi-adult households with constrained individuals is significant, a switch from coupons to cash would also significantly reduce the consumption of food by cash-receiving households as a group. To seek empirical confirmation for the model, we therefore need to check whether the cash-out puzzle largely arises from consumption behavior of multi-adult households.

It is intuitively plausible that, when households start getting welfare checks instead of food coupons, members may collectively decide, perhaps due to inertia, to make only part of that additional cash available to themselves for discretionary spending, while continuing to earmark the rest for non-discretionary expenditure on food as before, at least initially. This can be captured in our model, at the cost of some increase in notational complexity, by the assumption that a welfare check scheme increases each member's discretionary income by an amount less than that when cash-out takes the form of an increase in household non-welfare cash income. It should be intuitively clear that this version would predict a larger propensity to consume food out of welfare checks than out of income. In general, there is no strong a priori reason to assume that the intra-household distribution of cash

would be independent of the composition of the cash flow with regard to its source. Our framework is thus consistent with differing marginal propensities to consume food for cash from different sources.[12]

It has been conjectured that, while food stamps are not targeted towards women per se, since women are the main food purchasers, the delivery mechanism creates an "entitlement" to such transfers, unlike cash transfers (Alderman et al. (1997) p.278). To the extent this suggestion implies that a significant proportion of cash welfare transfers may be controlled by men, an assumption formalized in A4.2 above, it is intuitively plausible. It is however difficult to see what the notion of "entitlement" implies in this context, unless one also assumes resale possibility for food coupons. Otherwise, since de facto property rights over food coupons can only be exercised through purchase of food, it does not matter, in terms of household *food expenditure*, which member has such property rights (though this may influence its *composition*). Note that in our model, the cash-out puzzle arises independently of any assumption about the intra-household division of control over food stamps. Note also that the conjecture that men control the entire amount of any cash welfare transfer, by itself, does not explain the cash-out puzzle, unless it is additionally assumed that men do not contribute to domestic purchase of food. Indeed, it is intuitively clear, and can be shown formally, that, with identical preferences, women will be sole contributors to household food purchasers only if they earn significantly more than men. If, instead, women earn significantly less, they may not contribute any part of their personal income towards food purchases, choosing to use only the money allocated by men and the available amount of food stamps, even if they are solely responsible for the actual shopping and preparation of food. In that case, if men control the entire amount of any cash welfare transfer, a cash-out will in fact leave household purchase of food invariant.

4. The Data

The large body of empirical literature on the effects of FSP has been limited by the lack of experimental data on which to base conclusions about the program. This led the Food and Consumer Service of the United States Department of Agriculture to undertake a number of experiments in the late 1980s where food stamp participants were given cash instead of the traditional coupons. These experiments were conducted in San Diego county in southern California, in two counties in Alabama, and in Washington.[13] The data set we use is from the cash-out experiment in San Diego county. Despite being a rich source of data, this particular data set has been used very little in the analysis of the food stamp program.

[12] Our model would be decisively refuted if it can be shown that the marginal propensity to consume food out of cash income, whether from welfare payments or otherwise, is *higher* than that out of food stamps.

[13] The 'cash-out' experiments are described in Fraker, Martini, and Ohls (1995) and Carlson (1993). These were the first large-scale experiments replacing food stamps with cash to be conducted in the United States. Previous cash-out experiments were conducted in Puerto Rico (since 1982) and in 1981 in portions of Utah and

For the cash-out experiment, 600 families were selected at random from the food stamp-receiving population and their benefits were converted from coupons to checks. An additional 600 families, who continued to receive benefits in the form of coupons, were selected as a control and comparison group. The families were interviewed twice several months after the cash-out was implemented.[14] Unlike other studies of food stamp participant behavior, the food stamp benefit data is taken from program records and matched with survey participants.[15] For the purpose of what follows, we will refer to food purchased at a store for preparation and eating at home as food expenditure.[16] This one-time survey of participants does not allow us to follow families who have switched from stamps to checks. However, since the participants in the program were selected at random, comparison across the group of households which received checks and that which received stamps may give some preliminary indication of the presence of the cash-out puzzle (Fraker, Martini, and Ohls (1995)).

The check and stamp households resemble each other in most respects (see Appendix Table A.1). Table 1 presents the difference in mean weekly food expenditure between the two groups.[17]

Table 1
Food Expenditure for Stamp and Check Households

	Weekly food expenditure per member of the food consumption unit	Weekly food expenditure per adult male equivalent
Stamp Households	$21.38	$35.49
Check Households	$20.23	$33.14
Difference	-1.15*	-2.34**
(test statistic)	(-1.84)	(-2.18)

Whether we normalize expenditure by adult male equivalent[18] for calorie intake or by the size of the food consumption unit, we see a significant difference in total food expenditure between the

Vermont. Unfortunately, the results from these experiments appear to have limited applicability to the US population as a whole (see Butler, Ohls, and Posner (1985) and Devaney and Fraker (1986)).

[14] The initial interview consisted of detailed explanation of the questionnaire and purpose of the study. The follow-up interview was conducted to verify that all food purchases and consumption data for the survey week were correctly provided. Follow-up was done within one week of completion of the survey in order to ensure participants' ability to recall the necessary information. Observations for which the food data was more than one week old were discarded for the purposes of this study. For regression estimation, additional observations missing age and relationship data were discarded.

[15] While this eliminates problems of misreporting of food stamp benefits, misreporting of other income is still likely to occur in the data.

[16] This somewhat restricted definition matches the purpose of the food stamp program, which is to provide income for families to purchase groceries that they will use for meal preparation at home. It is generally not possible to use food stamps to purchase prepared or take-away food.

[17] For all parameter estimates in the paper, "*" and "**" indicate significance at 90% and 95% level respectively. Numbers in parentheses below coefficient estimates are standard errors, except where otherwise indicated.

two groups of households. Only about 5% of the households in this sample are constrained (in the sense specified above) in their food purchasing behavior, thus we would not expect the measurable difference in food expenditure to be caused by the elimination of the constraint for the check-receiving households.

Another way of verifying the presence of the cash-out puzzle in this data is to consider only those stamp-receiving households that are unconstrained. Table A.2 in the Appendix provides a comparison of the constrained and unconstrained households. The constrained households tend to be much poorer, perhaps indicating that the constraint arises not so much from differences in taste as from a tighter budget constraint. According to the conventional theory, we would expect the marginal propensity to consume food out of food stamps for unconstrained households to be equal to that out of cash income. A difference in these two marginal propensities would provide further evidence of the presence of the cash-out puzzle in this data. In order to investigate this, we need to estimate the Engel curve for food expenditure for unconstrained households.

Many different functional forms have been used to estimate Engel curves for food expenditure. Here, we consider the following three models.

(a) $$fexp_i = \alpha + \beta y_i + \gamma fsb_i + X_i'\delta$$

(b) $$\ln(fexp_i) = \alpha + \beta \ln(y_i + \gamma fsb_i) + X_i'\delta$$

(c) $$\ln(fexp_i) = \alpha + \beta \ln(y_i + fsb_i) + \gamma \frac{fsb_i}{(y_i + fsb_i)} + X_i'\delta$$

where *fexp* is food expenditure, *y* is cash income, *fsb* is stamp benefits and *X* is a vector of household characteristics.[19]

To check for the correct functional form, we first impose the condition that food stamps and coupon benefits have the same effect on food expenditure. (This is equivalent to setting $\gamma = \beta$ in model (a), $\gamma = 1$ in model (b), and $\gamma = 0$ in model (c).) We then estimate the bivariate regression of food expenditure per person on total income per person. We also show the results of including household size as an explanatory variable. These results, presented in Table 2, clearly show the importance of returns to scale in household food purchasing and preparation. For the double-log model, we get a marginal propensity to consume food out of total income of .067, measured at median

[18] We use household size measured in equivalent nutrition units for food energy, an adult equivalent adjusted for guest meals and number of meals eaten at home. The means are similar to those reported by Fraker, Martini, and Ohls (1995) where it appears that they use this particular normalization.

[19] The linear model (a) is the only one of the three which is consistent with utility maximization, however models (b) and (c) have been found to give a better fit for most data. The linear model does not allow for a decreasing share of food expenditure in total expenditure at higher income levels, an empirical regularity observed in nearly all consumer expenditure surveys. Model (b) is used by Moffitt (1989), while Senauer and Young (1986) and Levedahl (1995) employ model (c); both allow the share of food stamps in total income to effect food expenditure. Model (c) provides the greatest degree of flexibility, imposing few restrictions on the relationships between the marginal propensities to consume out of stamps and income and their rates of change. See Levedahl (1995) for a discussion of these and other models.

values of income and food expenditure. This result is similar to the linear model and in line with previous surveys.

Table 2
San Diego Cash-out Experiment: Unconstrained Households

	All unconstrained, stamp households n=487			
Model	**(a)**	**(a)**	**(b) (c)**	**(b) (c)**
TOTINC	.091**	.056**	.369**	.228**
	(.014)	(.014)	(.042)	(.045)
HHSIZE		-1.631**		-.342**
		(.272)		(.049)
constant	14.704**	23.298**	1.403**	2.409**
	(1.022)	(1.74)	(.175)	(.22)
Adj. R^2	.0804	.1421	.1335	.2118

Figure 1 shows nonparametric regression results for the linear and double-log specifications. The graphs show fitted values of the regression function for values of per-person income between the first and 99th percentiles of income. The regression function is calculated using Nadaraya-Watson kernel regression and the bandwidth is chosen by leave-one-out cross-validation which minimizes the sum of squared prediction errors.[20]

[INSERT FIGURE 1 HERE]

Both specifications show some signs of non-linearity. For large values of income, we observe the decreasing marginal propensity to consume (including one range where it appears to be slightly negative.) We did fit a quadratic expenditure system to the data, but are unable to reject that the coefficient on income squared is zero. The double-log specification shows moderate signs of nonlinearity, again particularly at larger values of income. For both specifications, the relationship seems linear for the bulk of the data. In analyzing our estimates we shall keep these figures in mind. Neither nonparametric regression accounts for the full set of explanatory variables considered below.

We now estimate all three models using a full range of explanatory variables to correct for receipt of other food subsidies, household composition, and household characteristics. The variables used in the regressions are listed in the Appendix (Table A.3). Regardless of the choice of model, the cash-out puzzle remains clearly visible in the data. There is a significant difference between the marginal propensities to consume out of cash income and food coupons, even for those households which are unconstrained in their food purchasing behavior. Table 3 presents the results from the regression using a complete matrix of explanatory variables for the linear model. We also show the

[20] Tail values were used in regression calculations but were discarded from graph. See Härdle (1990) for details of nonparametric regression analysis.

results imposing the constraint that the effect of cash income and stamp benefits be equal. This is clearly rejected by an F-test of equality of the coefficients on cash income and stamp benefits.

We scale the food expenditure and income quantities by household size rather than by using an equivalence scale. We then include variables to control for the percentage of household members in different age groups, which presumably have different nutritional needs.[21]

Table 3
San Diego Cash-out Experiment: Estimates for Linear Model

	All unconstrained, stamp households n=487	
Model	**(a) with g = b**	**(a)**
TOTINC	.0597**	
	(.0137)	
Y		.0576**
		(.0137)
FSB		.3505**
		(.1344)
HHSIZE	-1.6473**	-1.3878**
	(.2876)	(.3103)
BREAK	.311	.2317
	(.6755)	(.6738)
LUNCH	.7334**	.7669**
	(.2669)	(.2663)
WIC	-.7831**	-.7407**
	(.3554)	(.3545)
ASGUEST	-1.1562**	-1.1457**
	(.189)	(.1884)
BYGUEST	.9746**	.9742**
	(.1297)	(.1292)
FEM	-.7214	-.3033
	(1.0768)	(1.0897)
AFDC	-3.8865**	-3.3620**
	(1.5674)	(1.5798)
HH011	2.5651	1.4438
	(2.9888)	(3.0214)
HH1217	5.1069	3.919
	(3.5259)	(3.5543)
HH51p	.4666	.2936
	(3.1826)	(3.1712)
constant	26.0675**	22.8013**
	(2.301)	(2.74)
Adj. R-squared	.2831	.2887

Dependent variable is per-person food expenditure[22]

[21] The primary reason we choose to follow this approach is that it is not at all clear what type of equivalent scale should be used for total household food expenditure. In much of the food stamp literature, the adult male equivalent for calories is used to weight total food expenditure. We feel that this is inappropriate, since providing for energy needs is only one small part of overall food expenditure, and allowing age proportions to directly affect total food expenditure is a more reasonable modeling assumption.

[22] The first column imposes the restriction that cash income and food stamps have the same effect on food expenditure.

Table 4 presents results from regressions using the double-log models (b) and (c). Again, the marginal propensities to consume out of stamps and income are found to be significantly different. The results from the two models are quite similar.

Table 4
San Diego Cash-out Experiment: Estimates for Double-log Models

	Unconstrained stamp households n=487	
Model	**(b)**	**(c)**
TOTINC		.359**
		(.0594)
β in model (b)	.36**	
	(.06)	
γ in model (b)	6.554**	
	(2.444)	
PROP		.877**
		(.26)
ln (HHSIZE)	-.353**	-.36**
	(.064)	(.063)
BREAK	.002	.002
	(.002)	(.002)
LUNCH	.004*	.004*
	(.002)	(.002)
WIC	-.006**	-.005**
	(.003)	(.003)
ASGUEST	-.048**	-.048**
	(.008)	(.008)
BYGUEST	.036**	.035**
	(.006)	(.006)
FEM	-.079	-.09*
	(.052)	(.051)
AFDC	-.092	-.07
	(.073)	(.075)
HH011	.326**	.367**
	(.143)	(.138)
HH1217	.499**	.529**
	(.165)	(.161)
HH51p	.006	-.016
	(.142)	(.143)
constant	1.665**	1.72**
	(.352)	(.334)
Adj. R-squared	.3392	.3390
MPC out of income	.065**	.075**
	(.016)	(.013)
MPC out of stamps	.426**	.336**
	(.131)	(.081)
MPC out of stamps - MPC out of income	.361**	.262**
	(.132)	(.078)

Standard errors for the nonlinear model are calculated via bootstrap.

Using the same data, Levedahl (1995) estimates model (c) with a slightly different specification. Qualitatively, his results are similar to those shown here, though our results show slightly larger marginal propensities to consume from coupons and cash income.

In sum: in line with other studies, we find that marginal propensities to consume out of cash income and food stamps are significantly different for unconstrained households in our data set. Thus, the cash-out puzzle seems to be robustly present in our data set. Furthermore, the nonparametric regressions seem to lend support to both the linear or double-log relationships for the bulk of the data.

5. Results

The major prediction of the model developed in Section 3 is that multi-adult and single-adult headed unconstrained households may have different consumption patterns. Multi-adult households may exhibit larger marginal propensity to consume food out of coupons as compared to that out of cash. However, single-adult households *should not* exhibit the cash-out puzzle. The marginal stigma-based explanation formalized in Section 2 however predicts that, if non-food items taken together constitute a normal good, then single-adult households *should* exhibit the cash-out puzzle. This difference then provides a way of empirically evaluating the two competing hypotheses. We therefore estimate separate Engel curves for multi-adult and single-adult households using models (a) and (c) and the specification developed in Section 4. The results are presented in Table 5.

Full regression results are provided in the appendix in Tables A.4 and A.5. These results come from estimating separate regressions for the two subsets of data. Using interactive dummy variables and imposing identical response coefficients for the household characteristic variables leads to quantitatively similar results.

The regression results support our hypothesis for both the linear and the double-log specifications. Thus, regardless of specification used, the regression results unambiguously confirm the main prediction of the model presented in section 3, and run counter to the prediction generated from the stigma-based explanation. Though all non-food items taken together constitute a normal good, there is no evidence of a cash-out puzzle for single-adult headed households. The difference in expenditure patterns in the aggregate is completely explained by the consumption behavior of multi-adult households.

Table 5
San Diego Cash-out Experiment: Multi-adult and single-adult headed households compared

	All stamp households	Multi-adult households	Single-adult households
Linear Model			
MPC(Y)	.0576**	.0825*	.0208
	(.0137)	(.0184)	(.0208)
MPC(FSB)	.3505**	.6239**	.0255
	(.1344)	(.237)	(.1763)
MPC(FSB) - MPC(Y)	.293**	.5414**	.0047
	(.135)	(.237)	(.176)
Double-log Model			
MPC(Y)	.0746**	.1131**	.0106
	(.0134)	(.0187)	(.0201)
MPC(FSB)	.336**	.4996**	.007
	(.0806)	(.1125)	(.1209)
MPC(FSB) - MPC(Y)	.2617**	.3934**	-.0036
	(.0775)	(.1108)	(.1141)

6. Conclusion

As many other papers have demonstrated, there appears to be a large discrepancy between the marginal propensity to purchase food out of cash income and that out of food stamps. In this paper, we have first examined the formal basis of the claim that marginal welfare stigma explains this puzzling empirical regularity. We have developed a model to show that this claim is formally correct for an individual decision-maker if and only if all non-food items taken together constitute a normal good. We have then advanced the alternative hypothesis that the "cash-out puzzle" should be explained instead in terms of the differential impact of food stamp and cash income on intra-household distribution of resources within multi-adult households. We have developed this hypothesis formally through a Cournot model of the intra-household resource allocation mechanism where total household food availability has the formal characteristic of a domestic public good. In this model, even if the household is unconstrained in its food expenditure, a replacement of food stamps by an equivalent increase in the cash income of the household may reduce total household expenditure on food. This happens because, when an individual member is constrained, increase in household cash income provides more cash to the constrained member. The model predicts that only multi-adult unconstrained households may exhibit larger marginal propensity to consume food out of coupons as compared to that out of cash.

We have found empirical confirmation of this prediction in data from cash-out experiments conducted in San Diego county. There seems to be no evidence of a cash-out puzzle for single-adult

headed households, the difference in expenditure patterns is completely explained by the multi-adult households. Our empirical results thus cast doubt on the appropriateness of the marginal stigma hypothesis as an explanation for the cash-out puzzle.

The basic issue we have raised in this paper is whether the cash-out puzzle is largely a phenomenon confined to households with multiple decision-makers. We have provided some grounds, theoretical as well as empirical, as to why this may indeed be the case. Our analysis essentially highlights the need for systematic empirical exploration of this question. The initial results indicate that exploring the relationship between the composition of household income and intra-household distribution of access to resources may provide a convincing explanation of the cash-out puzzle.

In this paper we have only considered the effect of stigma on total food expenditure. There may be other marginal stigma effects which do not cause any changes in such expenditure. There is some evidence (Beecroft, et. al., 1994) that benefit recipients make more trips to the store when they receive checks or electronic debit cards instead of food stamps. This may, perhaps, be interpreted as evidence of stigma. More frequent trips to the store may mean that recipients are buying more perishable food such as fruits and vegetables which may provide better nutritive value. It is not clear, however, what effect this should be expected to have on food expenditure. One interesting extension of this paper would be to consider differences in nutrition elasticities for cash and benefit income.

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APPENDIX

Proof of Proposition 3.1:

First compare the household expenditure on food when $T = 0$ to that under any arbitrary combination of cash transfers and food stamps such that $T \in (0, n]$. Denote the Nash equilibrium variables under the full coupon scheme and the mixed scheme by the corresponding superscripts *S*, *T* respectively. We shall first show that, given A3.1 and A3.2, for any mixed scheme such that $T \in (0, n]$,

$$\left[y_{-k}^{S} > 0 \text{ implies } y_{-k}^{T} > 0\right]. \tag{X1}$$

Suppose not. Then, since r_{-k} is increasing in T by A3.2, we must have

$$x_{-k}^{T} > x_{-k}^{S}. \tag{X2}$$

Since the private good is a normal good and since, $\left[y_{-k}^{S} > 0, y_{k}^{S} = 0\right]$, (X2) yields

$$\left[r_{-k}(T) - T + y_{k}^{T}\right] > r_{-k}(0); \tag{X3}$$

dropping the non-welfare income variables for notational simplicity.

As r_k is increasing in T by A3.2, (X3) implies

$$y_{k}^{T} > y_{k}^{S}. \tag{X4}$$

(X4) and normality of the public good together yield

$$\left[r_{k}(T) - T + y_{-k}^{T}\right] > \left[r_{k}(0) + y_{-k}^{S}\right]. \tag{X5}$$

Since r_{-k} is increasing in T by A3.2, (X5) in turn implies

$$y_{-k}^{T} > y_{-k}^{S} > 0.$$

This contradiction establishes (X1).

Now consider the general case of household expenditures on food under any two combinations of cash transfers and food stamps such that the cash transfer components are *q* and *t*; $q > t$ and $t, q \in [0, n]$. Denote the Nash equilibrium variables under the two schemes by the corresponding superscripts *q*, *t* respectively. We shall show that

$$y^{q} < y^{t}. \tag{X6}$$

Suppose not. Then, we must have

either $\left[g^{k}\left(r_{k}(q) + (n-q) + y_{-k}^{q}\right) \geq y^{t}\right]$ or $\left[y_{-k}^{q} \geq y^{t} - (n-q)\right]$ (or both).

Since food is a normal good by A3.1, it follows from (3.1) that, in the first case,

$$y_{-k}^{q} > \left[r_{k}(t) - r_{k}(q) + (q-t) + y_{-k}^{t}\right]. \tag{X7}$$

In the second case,

$$y^q_{-k} \geq y^t_{-k} + (q - t). \tag{X8}$$

In either case, it follows from (X7) (since r_{-k} is increasing in T by A3.2) and (X8) that

$$y^q_{-k} > y^t_{-k}. \tag{X9}$$

From (X9) we get

$$y^q_{-k} > 0. \tag{X10}$$

Now, it also follows from (X7) and (since r_k is increasing in T by A3.2) from (X8) that, in either case,

$$x^q_{-k} < x^t_{-k}. \tag{X11}$$

Since both private and public goods are normal goods, (X10) and (X11) together imply that

$$g^{-k,q} < g^{-k,t}. \tag{X12}$$

Now, (X1) implies

$$g^{-k,t} = y^t. \tag{X13}$$

It follows from (3.1) and (X13) that $\left[y^t \leq y^q\right]$ implies $\left[y^q_{-k} = 0\right]$; which violates (X10) above. This contradiction establishes Proposition 3.1. ◊

Table A.1
Comparison of Stamp and Check Households

	Received Stamps	Received Checks
Sample size	510	467
Monthly cash income	$891	$907
Monthly food stamp benefit	$116	$117
Benefits as proportion of income	13.7%	13.9%
Monthly food expenditure	$310	$284
HH with AFDC benefits	90.2%	88.2%
Average amount	$654	$661
HH with WIC vouchers	11.8%	13.7%
Average amount	$60	$52
HH with school breakfast	19.2%	20.1%
Average amount	$30	$32
HH with school lunch sub	50.0%	50.5%
Average amount	$56	$58
Weekly average number of meals eaten as guest per household member	2.36	2.26
Weekly average number of meals eaten by guest per household member	3.66	2.92
Information on Household Head		
% employed	13.1%	13.5%
% Hispanic	32.9%	32.8%
% Black	22.4%	18.2%
Married	22.4%	24.2%
Widowed	2.9%	3.6%
Divorced	19.4%	19.5%
Legally separated	17.8%	14.1%
Completed high school	58.8%	56.5%
Own home/pay mortgage	1.0%	1.3%
Household Information		
Average size	3.9	3.6
Percentage of households with:		
children	95.1%	93.1%
one adult	59.0%	60.4%
female head	76.1%	76.4%
single parent with kids	56.3%	57.0%
Percentage of households with:		
child from age 0 - 11	85.7%	84.4%
child from age 12 - 17	30.8%	30.8%
member over 51	13.1%	11.6%
Average number of children for households with children	2.5	2.3

Table A.2
Comparison of Stamp Households: Constrained and Unconstrained

	All Stamp HH	Constrained	Unconstrained
Sample size	510	23	487
Monthly cash income	$891	$700	$900
Monthly food stamp benefit	$116	$141	$115
Benefits as proportion of income	13.7%	21.3%	13.3%
Monthly food expenditure	$310	$109	$320
HH with AFDC benefits	90.2%	78.3%	90.8%
Average amount	$654	$654	$654
HH with WIC vouchers	11.8%	17.4%	11.5%
Average amount	$60	$67	$60
HH with school breakfast	19.2%	17.4%	19.3%
Average amount	$30	$44	$30
HH with school lunch sub	50.0%	34.8%	50.7%
Average amount	$56	$78	$55
Weekly average number of meals eaten as guest per household member	2.36	3.38	2.32
Weekly average number of meals eaten by guest per household member	3.66	3.39	3.68
Information on Household Head			
% employed	13.1%	4.3%	13.6%
% Hispanic	32.9%	34.8%	32.9%
% Black	22.4%	8.7%	23.0%
Married	22.4%	21.7%	22.4%
Widowed	2.9%	4.3%	2.9%
Divorced	19.4%	17.4%	19.5%
Legally separated	17.8%	30.4%	17.2%
Completed high school	58.8%	60.9%	58.7%
Own home/pay mortgage	1.0%	0.0%	1.0%
Household Information			
Average size	3.9	3.5	3.9
Percentage of households with:			
children	95.1%	78.3%	95.9%
one adult	59.0%	69.6%	58.5%
female head	76.1%	78.3%	76.0%
single parent with kids	56.3%	56.5%	56.3%
Percentage of households with:			
child from age 0 - 11	85.7%	69.6%	86.4%
child from age 12 - 17	30.8%	30.4%	30.8%
member over 51	13.1%	4.3%	13.6%
Average number of children for households with children	2.5	2.7	2.4

Table A.3: Variable definitions

Variable	Definition
FEXP	Expenditure on food prepared and eaten at home per household member
Y	Cash income per household member
FSB	Food stamp benefit per household member
TOTINC	Cash and benefit income per household member
PROP	Proportion of food stamp benefits in total cash and benefit income
HHSIZE	Household size
LNHHSIZE	Log of household size
BREAK	Breakfast subsidy per household member
LUNCH	Lunch subsidy per household member
WIC	In-kind food commodity donations per household member
ASGUEST	Weekly meals eaten as guest per household member
BYGUEST	Weekly meals eaten by guests in the household per household member
FEM	=1 if female head
AFDC	=1 if family receives AFDC payments
HH011	Fraction of household between 0 and 11 years old
HH1217	Fraction of household between 12 and 17 years old
HH51p	Fraction of household over 50 years old

Other variables which proved to be insignificant for every subsample analyzed and for all three models included wage, education, home ownership and race dummies, gift food and home produced food. None of these were included in the regressions shown here.

Table A.4
San Diego Cash-out Experiment: Comparing Multi-adult and Single-adult Unconstrained Stamp Households: Estimates for Linear Model

Dependent variable is per-person food expenditure

	All unconstrained households (n=487)	**Single-adult households n=285**	**Multi-adult households n=202**
	(1)	(2)	(3)
Y	.0576**	.0208	.0825*
	(.0137)	(.0208)	(.0184)
FSB	.3505**	.0255	.6239**
	(.1344)	(.1763)	(.237)
HHSIZE	-1.3878**	-1.9641**	-.5567
	(.3103)	(.6808)	(.4861)
BREAK	.2317	.034	.9087
	(.6738)	(.8565)	(1.0951)
LUNCH	.7669**	.6482**	1.0908**
	(.2663)	(.3238)	(.4759)
WIC	-.7407**	-.7944*	-.7339
	(.3545)	(.4193)	(.6745)
ASGUEST	-1.1457**	-1.2625**	-.9293**
	(.1884)	(.2339)	(.3239)
BYGUEST	.9742**	1.1906**	.6993**
	(.1292)	(.1793)	(.1863)
FEM	-.3033	-1.4166	-.1807
	(1.0897)	(2.914)	(1.4132)
AFDC	-3.3620**	-4.2835	-3.6302*
	(1.5798)	(2.6969)	(1.9382)
HH011	1.4438	-2.03	.3804
	(3.0214)	(4.8477)	(5.6099)
HH1217	3.919	1.0673	1.3551
	(3.5543)	(5.4707)	(6.843)
HH51p	.2936	.0651	1.9742
	(3.1712)	(4.172)	(5.2765)
constant	22.8013**	34.1375**	15.0516**
	(2.74)	(4.9679)	(3.6375)
Adj. R^2	.2887	.2890	.2411

Table A.5
San Diego Cash-out Experiment: Comparing Multi-adult and Single-adult Unconstrained Households
Estimates for Double Logarithmic Model

Dependent variable is log of per-person food expenditure

	Unconstrained households n=487	**Single-adult headed households n=285**	**Multiple-adult headed households n=202**
ln (Y)	.359**	.0342	.5425**
	(.0594)	(.0909)	(.0816)
PROP	.8772**	-.0122	1.3345**
	(.2597)	(.3823)	(.376)
ln (HHSIZE)	-.3597**	-.408**	-.3321**
	(.0632)	(.1142)	(.1449)
ln (BREAK)	.0018	.0017	.0008
	(.0023)	(.003)	(.0035)
ln (LUNCH)	.0036*	.0032	-.0044
	(.0019)	(.0023)	(.0034)
ln (WIC)	-.0054**	-.0049	-.0042
	(.0027)	(.0036)	(.0043)
ASGUEST	-.0478**	-.0539**	-.0383**
	(.0082)	(.0092)	(.0161)
BYGUEST	-.0353**	-.0413**	-.0279**
	(.0059)	(.0075)	(.0094)
FEMHEAD	-.0903*	-.0983	-.0586
	(.0508)	(.1219)	(.0683)
AFDC	-.0696	-.1528	-.0584
	(.075)	(.1249)	(.1003)
HH011	.3669**	.1771	.5312*
	(.1381)	(.2345)	(.3017)
HH1217	.5292**	.4005	.652*
	(.1611)	(.2619)	(.3567)
HH51p	-.0156	-.0149	.0362
	(.1428)	(.1733)	(.2663)
constant	1.7199**	3.4554**	.7871*
	(.3337)	(.5147)	(.4721)
Adj. R-squared	.3390	.2863	.3319