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WELFARE DESIGN, WOMEN´S EMPOWERMENT AND INCOME POOLING

ABSTRACT

Although there has been a vast literature on the allocation of resources within households showing that indeed as a woman's "power" within the household increases household consumption and time allocation patterns change, these studies have not spoken to the issue of whether welfare policies should explicitly conceive in their design a body of operational rules to enhance the status of women in the family. This paper will shed some light on this issue. We make use of a data set from PROGRESA, Mexico's largest anti-poverty program- to investigate intrahousehold decisions and its relationship to specific welfare design policies that seek the empowerment of women. PROGRESA's rules state that, for all beneficiary households, it is only women who are entitled to receive the cash transfer. We exploit the fact that this benefit provides an exogenous natural bargaining power factor for poor household women. Our results show that ceteris paribus, as the benefit in the hands of the woman increases, more resources are allocated towards girl's and boy's clothing, and less to expenditures on adult male goods, such as male clothing. Parallel, women with more power tend to allocate more resources towards what they may perceive as an improvement of the dietary condition of their household members. As PROGRESA's money transfer increases, expenditures on staple goods, -such as vegetables, tortilla and beans- are substituted by more resources being allocated towards the purchases of high protein goods in the means of eggs, chicken and beef expenditures. We conclude that welfare programs that explicitly incorporate into their design operational rules to enhance the status of women, may indeed affect the bargaining power of women within the household as manifest in household resource allocation decisions.

RESUMEN

La literatura reciente sobre asignación de recursos al interior del hogar ha demostrado que la toma de decisiones sobre consumo y ocio están correlacionadas con el poder de negociación de la mujer en su interior. Estos estudios, sin embargo, no han analizado explícitamente la conveniencia que programas de política social contengan explícitamente reglas de operación en búsqueda de un mejor posicionamiento de la mujer en el seno del hogar. El presente artículo investiga este tema. A través del uso de información socioeconómica y demográfica de PROGRESA, investigamos la relación explícita de las reglas de operación de Oportunidades -- que buscan otorgar mayor poder a la mujer--, con la toma de decisiones de hogares beneficiarios sobre la asignación de sus recursos. PROGRESA establece que es la mujer el único miembro del hogar receptor de la ayuda monetaria provista por el Programa. Por tanto, explotamos este hecho y analizamos la transferencia monetaria como una variable exógena de poder de negociación de la mujer, con su relación en la asignación intrafamiliar de recursos. De acuerdo a nuestros resultados, *ceteris paribus*, un mayor beneficio monetario en las manos de las mujeres, se traduce en una mayor asignación de recursos hacia la compra de ropa para niño y niña, en sustitución de un menor gasto en bienes de adulto, tales como el gasto en ropa de varón., alcohol y tabaco y transporte público. Asimismo, los hogares cuyas mujeres son beneficiarias del Programa, procuran una mayor asignación de recursos hacia lo que pudieran percibirse como una mejora en la condición de dieta alimenticia de los miembros del hogar. En la medida que aumenta la transferencia de PROGRESA en poder de la mujer, mayor es el gasto en alimentos ricos en contenido protéinco (huevo, pollo y gasto en carne), en sustitución de un menor gasto en bienes básicos alimenticios, tales como tortilla y frijoles. Concluimos, que existe evidencia para creer que el diseño de programas sociales con reglas explícitas de operación en búsqueda de un mejor posicionamiento de la mujer al interior del hogar, pudieran en efecto afectar el poder de negociación de al mujer y por tanto cambiar las decisiones de asignación de recursos al interior del mismo.

Introduction

Traditional literature on household models treat households as a single unit. This amounts to assuming either that all household members share the same preferences or that only one member determines the allocations of all. Nevertheless, a body of empirical evidence has emerged in the last few years indicating that the restrictions of this "unitary model" are not supported with household data analysis. (See, Samuelson, 1956, and Becker, 1974, 1981, for discussions of the general issues; Bergstrom 1997, provides a recent review). The empirical analysis suggests, that, *ceteris paribus*, if a woman's "power" within the household increases relative to that of her spouse, household consumption and allocation patterns change.

From an empirical point of view, a difficult problem in the literature has been identifying sources of "power" that vary exogenously. Some studies have examined the effect on allocation decisions of changes in the distribution of income within the household. (See for example, Shultz 1990; Thomas 1990, 1994). Nevertheless, since labor income reflects time allocation decisions, and nonlabor income is also a function of past leisure and saving decisions, they both are not good candidates as sources of "power" that vary exogenously. (See Browning, Bourguignon, Chiappori and Lechene, 1994; Behrman, 1997).

As an alternative to using income, McElroy(1990) discusses the option of selecting "power" variables outside the marriage. Along these lines, some recent literature has analyzed the role of welfare programs as sources of bargaining power within the targeted households. Lundberg, Pollak and Wales(1997) make use of a natural experiment provided by a shift in the UK welfare system in the late 1970s to test the unitary model. Prior to 1977 public transfers for child benefits were paid to the household through the tax system--as a deduction from income tax accrued to the father. In the years to come a new Legislation replaced the deduction with a cash transfer paid to the mother. They show there was a coincident change in the expenditure pattern: relative to men's clothing, expenditures on women's and children's clothing increased. They conclude that the shift in power within the household did affect resource allocation.

In a more recent study, Rubalcava and Thomas (2000) explore the notion of "power" within the household by assuming that variations in the generosity of AFDC potential benefits affect the fallback positions of married women. Their results suggest that AFDC impacts the bargaining position of women with young children, and women in lower income households relative to their partners and that this, in turn affects the way time and money is allocated in the home.

While these results sink one more nail in the coffin of the unitary model of the household, they do not speak to the issue of whether welfare policies should explicitly conceive in their design a body of operational rules to enhance the status of women in the family.

This paper analyzes the effect of PROGRESA, the Mexican antipoverty program, on intrahousehold allocations. The Program explicitly incorporates operational rules that seek to empower the status of women in beneficiary targeted households. PROGRESA is made up of three components: educational grants to facilitate and encourage school attendance at elementary and high school levels; provision of basic health care services as well as health orientational talks; and monetary transfers and nutrition supplements to enhance the nutritional status of women and children in targeted households. According to PROGRESA's welfare design, beneficiary households are only entitled to receive the program's benefits if they comply with three basic rules: their children should always be enrolled at school, household members should periodically attend to the health clinics, and the monetary transfer should always and only be collected by the household's female head. It is this rule that we use in this paper to test the household unitary model via the Program's bargaining power effect.

We use PROGRESA's administrative records of the amount of money transfer that beneficiary households *de facto* received at every period in time, to merge it to PROGRESA's unique large scale household survey to look at the effect of the monetary benefit on changes in household expenditure patterns. In order to avoid the contamination of PROGRESA's two other components into our analysis (health talks and education enrollment), careful treatment is put in our empirical estimation. First, we exploit the heterogeneity of the cash transfers and separate the bargaining power effect from PROGRESA's health technology effect by stepwise stratifying our data from all-household analysis to treatment-&-control households and finally to only-treatment households. Second, the effect of PROGRESA's school enrollment condition is swept out by further analyzing the impact of the monetary transfer on households with children that *always* attended school, both prior and during the Program's implementation. Third, since PROGRESA's cash benefit is a function of the household composition, we control for detailed household demographics into our regression analysis. Finally, we include community and seasonal fixed effects in all our models, to control for any spurious unobserved heterogeneity related to PROGRESA's spillover differential effects at the community basis.

Our results show that PROGRESA's monetary benefit does affect the allocation of resources within the household. *Ceteris paribus*, as the benefit in the hands of the woman increases, more resources are allocated towards girl's and boy's clothing, and less to expenditures on adult male goods, such as male clothing. Our results also suggest that women with more power tend to allocate more resources towards what they may perceive as an improvement of the dietary condition of their household members. As PROGRESA's money transfer increases, expenditures on staple goods, -such as vegetables, tortilla and beans- are substituted by more resources being allocated towards the purchases of high protein goods in the means of eggs, chicken and beef expenditures. Finally, *holding child schooling enrollment constant*, we also find that PROGRESA's income in the hands of women

additionally contributes to augment the quality of household investments in child human capital: more resources are allocated towards purchases of schooling supplies, school festivities and school transportation. All results are robust independent on the sample criteria used to purge for possible contamination of unobserved heterogeneity.

We conclude that welfare programs that explicitly incorporate into their design operational rules to enhance the status of women, may indeed affect the bargaining power of women within the household as manifest in household resource allocation decisions.

The paper is organized in the following way: a description of the PROGRESA Program and the data is presented next. The model underlying our tests is presented after that. The following contains the results which is followed by a concluding section.

2. DATA

The data we use comes directly from the evaluation of Mexico's largest anti-poverty program, OPORTUNIDADES, previously known as PROGRESA. This program started its coverage in 1997; by the end of 2001 it covered more than 3.14 million households in more than 68 thousand communities. Originally PROGRESA operated only in rural communities; however, starting September 2001, its coverage increased to include small urban areas.[1]

The Program is the country's primary anti-poverty effort, whose main objective is to build and strengthen the capacities of those living in very poor condition, under the idea that poverty levels can be reduced more effectively in the long run if educational levels of children are increased. This would translate into higher productivity and elevated incomes when adults. One particularity of the program is that the transfers were given only to the women, generally the mother of the household.

An integral component of the PROGRESA program is the provision of cash transfers to poor households with the objective of subsidizing their investment in childrens' human capital. As stated above, this means-tested transfer to poor households is mainly composed of three elements: first, support for schooling attendance of children in elementary and the first three years of high school (through educational grants); second, support for enhancing basic health care and improving the nutritional status of all members of the family (it includes medical check-ups and health related talks); and third, monetary transfers and nutrition supplements to improve the food consumption and nutritional status of household

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[1] Small urban area is defined as those with less than 50,000 inhabitants but larger than 2,500.

members.[2]   Beyond a standard monthly amount for food consumption, the amount of total transfers varies depending on the gender and number of school age children in the household.[3]   Households must fulfill certain requirements to continue in the Program, such as visiting the health clinic for the cash food assistance, and sending their children to school for the scholarships.[4]

On average the transfer represents a significant share of average household income. Quantities range from a minimum of 105 pesos per month (September, 1998) for households with no children, to 630 pesos for households with 5 or more children.[5] On average, beneficiary households are scheduled to receive 275 pesos per month in food and scholarship cash transfers, which represents 29 percent of their average per capita income (and 40 percent of the median) according to data from ENCASEH97.

The government implemented this Program in several phases in which different communities were slowly incorporated. An important part of this Program was the planning and development of an impact evaluation. This evaluation was planned as a social experiment in which some communities were randomly assigned into treatment while others into control groups. A huge effort was made by the Government to collect important information before the program was implemented; but more importantly follow-up data was also gathered to assess the size of the effects. The follow-up data was longitudinal.

In this paper we use data from the evaluation of the PROGRESA rural program only. Following, we explain how this data is structured and how beneficiary households were selected. A subset of 505 communities distributed in 7 states were chosen in 1997 to form part of the evaluation. Using aggregate infrastructure and economic information at the village level, these communities were first randomly allocated into treatment and control groups.[6] A census (ENCASEH) was applied to households in all communities selected as part of the PROGRESA evaluation program. This household survey contained questions on labor and non-labor income, dwelling characteristics, household demographics, schooling attendance, and asset ownership. In addition to the household questionnaire, community level data on basic infrastructure and prices was also collected.

Approximately 25,500 households were interviewed. Within each community, households could be differentiated as eligible (if poor) or non eligible

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[2] A nutritional supplement (*Papilla*) is directly given to households with children in lactating age and pregnant women. This support is the only part of the transfer given in in-kind.
[3] The school grants vary both by grade attended and by sex. This differentiation was intended to reflect the opportunity cost of their time—those in secondary schools receive considerably more. Girls are given slightly higher amounts relative to boys due to the fact that they tend to drop out more.
[4] Another part of the program, although less stressed since it is less important, is support given directly to schools and health clinics to improve their infrastructure and services provided.
[5] One Peso broadly corresponded to 0.11 US dollars in 1997.
[6] See Behrman and Todd, 1999, for a description of this allocation.

(if non poor) based on a set of household attributes that include income, education and dwelling characteristics. Beneficiary households were targeted based on information from this census.[7] A baseline household survey (ENCEL) was carried out in March, 1998, prior to the commencement of the Program in these communities. Follow-up surveys were carried out approximately every six months until the year 2000. A module on household expenditure was included in the October, 1998, May 1999 and November, 1999 ENCEL surveys. Standard socio demographic modules were also included in all waves; however these surveys are larger and contain new information on transfers, migrants, sources of income, household decision making, health status, labor market indicators and a detailed list of expenditures. An attempt was made to survey all households, poor and non poor, in both treatment and control communities in each ENCEL. Our unit of analysis is the household.

PROGRESA staff had initially selected which households in the evaluation sample were eligible to participate in the Program following the collection of the ENCASEH census in late 1997. The targeting procedure resulted in the following original distribution of the beneficiaries, seen in Table 1.

Poor (or beneficiary) control households, though eligible for subsidies, were kept out of the program for the purpose of impact evaluation until following the November, 1999 ENCEL.

In the analysis we restrict the sample to all households in which there was a couple. We use the ENCEL surveys collected in October 1998, May and November 1999. The corresponding sample sizes are 12,359, 13,048, 11,534 respectively.

In this paper we use information of the actual amount of transfer received by the beneficiaries as opposed to only using an indicator variable representing whether the family was in or out of the program or as opposed to using the amount of benefits imputed from eligibility criteria. The information we use comes directly from the administrative records and was provided by PROGRESA staff. Benefit amounts shown in table 2 might appear to be small at first sight. However, although families in the program were to receive an amount approximate to 30 percent of their income, some payments were not actually delivered on time due to operational problems. Due to the differences observed between what households actually got and what they were supposed to receive and due to the fact that the program had just begun an thus it is unlikely that they could have had knowledge of transfer amounts, we believe it is more accurate to use what households actually got as our exogenous power variable.

The outcomes we will focus in this paper are the shares of expenditures of different goods. We are able to make use of the detailed list of food expenditures to select the following categories of goods: staples (beans and tortillas), cereals, fruits, vegetables and meats among the most important. We also use other shares of

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[7] See Skoufias, Davis, and Behrman, 1999, for a description and evaluation of the targeting mechanism.

expenditures of adult, such as clothing, separated by gender. We do the same for boys and girls expenditures.

The questions related to expenditures refer to different time periods, so we convert them to monthly flows.

Descriptive statistics of these and other socio demographic variables of the selected sample of households, divided into treatment and control villages, can be found in Table 2. Households in both treatment and control villages devote close to 70 percent of their total expenditures to food, which reinforces how poor these poor households are if we follow Engel's law. It can be seen that treatment households spend more on their children education and on girl's and boy's clothing relative to the controls. These patterns will also be observed in our empirical analysis.

3. MODEL

We define a standard model of household behavior in which household welfare in any period, W, depends on the utility of each member, m = 1, ..., M. In turn, each individual's utility function, U_m, depends on the commodity consumption of all household members, x_{gm}, g=1, ..., G, where g indexes goods and consumption of leisure of each individual is denoted x_{0m}. Individual and household specific characteristics may affect tastes and therefore utility. Let μ denote those that are observable and let ε represent all unobservable characteristics, such as tastes for work, for consumption and for investing in children. Each individual's sub-utility function is given by $U_m(x; \mu, \varepsilon)$ which is assumed to be quasi-concave, non-decreasing and strictly increasing in at least one argument. The household welfare function aggregates these individual sub-utility functions:

$$W = W[U_1(x; \mu, \varepsilon), ... U_M(x; \mu, \varepsilon)] \quad [1]$$

which is maximized subject to the household budget constraint:

$$p x = \Sigma_m [p_{0m}(T-x_{0m}) + y_m] + y_0 \quad [2]$$

Prices, p, of all elements of the vector X are assumed to be parametric apart from p_{0m}, the price of time (wage) of individual m. The income of member m is the value of earned income $p_{0m}(T-x_{0m})$ plus non-labor income, y_m, and y_0 is all income that is held jointly by household members.

Unitary model of the household

The simplest (and most common) economic model of the household implicitly assumes that all household members have exactly the same preferences, so the sub-utility functions, U in [1], are identical. An alternative assumption that has been suggested is that there is one member, a *dictator*, who makes all allocation decisions.

Under this assumption, the aggregator function W(.) in [1] assigns a zero weight to all but that member's utility function. For our purposes, the two assumptions are observationally equivalent as they both imply that the household may be treated as if it were a single unit. That is, the notion of power within the household has no place in this model and demand depends only on prices, total household income, $\Sigma_{=0}\, y_m$, and household characteristics, , such as demographic composition:

$$x_g = x_g \left(\Sigma_{=0}\, y_m, \mu, p, , v_g \right) \qquad [3.1]$$

Individualistic models of the household

An alternative class of models that have gained currency in the literature in recent years treats the individual as the primary element in household decision-making. Although there are several variants of these models, their implications are, for our purposes, similar.

For example, following Chiappori (1988, 1992, 1993), if we were to assume that resources are allocated within the household *(Pareto) efficiently*, there exists some λ so that the household optimization program is

$$\text{Max } \Sigma\, \lambda^m\, U^m \left(x_{gm}, ..., x_{gM}; \mu, \varepsilon \right) \qquad [4]$$

subject to the budget constraint [2] where household consumption of good g is $\Sigma_m x_{gm}$ (Chiappori, 1992).[8] The household may be treated as if it were a single unit maximizing a weighted sum of all individual felicity functions, U^m, where the weights, λ, sum to unity. The reduced form demand functions depend on household income, Σy_m, observable household characteristics, μ, prices, p, *and* the vector of weights, λ:

$$x_g = x_g \left(\Sigma y_m, \mu, p, \lambda, \xi_g \right) \qquad [3.2]$$

where ξ represents unobserved heterogeneity in tastes. Apart from the weighting factors, λ, the demand functions in the individualistic model, [3.2], are identical to those under the assumptions of the *unitary* model, [3.1]. Presumably the weighting factors are a measure of the importance of each member's preferences with regard to the household's allocation choices.

It is helpful at this point to provide additional intuition about the weights, λ, by slightly re-interpreting the *individualistic* model in terms of a model of income pooling (Chiappori, 1992). If allocations are Pareto efficient, then the optimization program can be rewritten as a two stage process. In the first stage, the household may be treated as if all members pool their income and then re-allocate it among

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[8]For simplicity, we assume all consumption is private. This may not be unreasonable in the context of our empirical results below which are based on food expenditures and the allocation of time to the labor market.

themselves according to some sharing rule. Thereupon, in the second stage, each household member maximizes his (her) own utility given his (her) income share. The income sharing rule is clearly related to the weights, λ. The rule also has a very nice intuitive interpretation as an indicator of relative bargaining power of household members: the more powerful the individual, the bigger that person's share of the pie in the first stage.

Since the work by McElroy and Horney (1980) and Manser and Brown (1980), a large number of bargaining-type models of household allocations have been suggested in the literature.[9] In their simplest form, these models suggest that each individual spends the income over which he or she has control without reference to other members and then looks at the equilibrium (if any exists); a slightly more sophisticated approach might be to repeat this process until achieving an equilibrium. This suggests that household allocation decisions are the outcome of a bargaining process in which members seek to allocate resources towards goods they especially care about. In the absence of asymmetric information, all outcomes of co-operative bargaining decision rules will be Pareto efficient and so those models yield demand functions which are a special case of [3.2] above. Even in the presence of asymmetric information and also permitting non co-operative behavior, the intuition underlying the models remains fairly simple.

Essentially, each household member has some fall-back position (level of utility) and will exit the household if her (his) welfare falls below this "threat point" level. If the sum of utilities associated with these fall-back positions is less than total household welfare, then the household will dissolve. Any utility over and above the sum of the individuals' threat points is shared among household members presumably in accordance with their bargaining strength. To fix ideas, assume a co-operative Nash equilibrium (McElroy and Horney, 1980). The M household members involved in decision-making choose allocations of resources to maximize the product of the differences between the utility each achieves, U, and the threat point or reservation utility level, V, which is the utility the individual would achieve outside the household:

$$\prod_{=1} U (x; \mu, \varepsilon) - V_m (p;)$$

Reservation utility depends on prices and those characteristics, λ, which affect one's ability to assert one's preferences in the bargaining game.

Clearly these characteristics will also enter the demand functions and so, in terms of the functions [3.2], the weights, λ, will depend on . This is because the weights reflect the relative importance of a member's utility in the household optimization program [4] or, put another way, the weights influence the share of the income pie that a household member controls. They are, therefore, a measure of *power* within the household and will also depend on prices, household characteristics

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[9] See, for example, Bjorn and Vuong (1984, 1985), Lundberg and Pollak (1993), Ulph (1988).

and the distribution of income within the household. Making this explicit, we rewrite the demand function:

$$x_g = x_g \left(\Sigma y_m, \mu, p, \lambda(, y_0, y_1, \dots y_m, \mu, p), \xi_g \right) \qquad [3.3]$$

Substituting for the weights yields:

$$x_g = x_g \left(\Sigma y_m, \mu, p, y_0, y_1, \dots y_m, , \xi_g \right) \qquad [3.4]$$

Comparing [3.4] with demand under the unitary model, [3.1] suggests a simple test of the unitary model against a wide class of alternatives: if the unitary model is correct, measures of power, should have no impact on household resource allocations. However, if power matters in household decision making, then any exogenous distributional factor outside the marriage domain that favors the bargaining position of a specific household member, will shift the household demands in [3.4] in his/her favor. McElroy (1990) suggests, these factors might include an individual's labor market opportunities, re-marriage market opportunities, social and family support as well as the resources that the individual would control if the household were to dissolve.

It is in this context PROGRESA's cash transfers, in the hands of women, will be treated as a power factor in a parametric regression model to test the pooling hypothesis on expenditure demands of couple household's who benefit from the Program. In particular, we rewrite the model [3.4] in linear form

$$\omega_{igct} = \beta_0 + \beta_1 \, Prog\_Inc_{igct} + X_{igcsy} + \xi_c + \xi_t + \xi_{igct} \qquad [5]$$

where ω_{igcs} is the budget allocation for a specific good basket of household i who may belong to PROGRESA's treatment group ($g = T$) or be part of the Program's evaluation control group ($g = C$), living in community c at time t. PROGRESA's cash transfer (Prog_Inc) varies overtime and across households, and X describes all other household observable characteristics.

First, we control for total household expenditures to isolate PROGRESAS's benefit income effect. Second, since PROGRESA cash transfer is a function of the household gender and age composition, and budget allocations also vary in their intensity between children and adults, we further include detailed demographic controls in the covariates, X, to avoid contamination of PROGRESA's bargaining power effect. These include: household total size; number of males and females between 0 to 5, 6 to 11, 12 to-25, 26 to 45 and over 45 years of age. We also include controls for the age and level of education of the head and spouse. We assume unobservables in the model comprise three elements. First, it is well known that budget shares are likely to vary with relative prices, climate and quantity and quality of infrastructure across communities. Initially, the nature of PROGRESA's randomized experiment at the community level would allow us to treat these unobservables as pure random noise into our model. However, since the implementation of the Program comes with an explicit mandate of strengthening the community public services and since unobserved externalities such as changes in

relative prices in targeted villages can also be created, we include village fixed effects (ξ_c) into the model. In addition, time fixed effects are assumed in the structure of the error term (ξ_t), to cope for any spurious correlation between changes in the household budget shares due to seasonal effects, and the amount of the cash transfer that increases over time mainly due to an overall delay in the implementation of the Program in treatment communities. ξ_{igct} is assumed a white noise random component.

We start our empirical analysis by estimating eq. [5] using our unrestricted household sample[10] and focus on the significance of *Prog_transfer* to test the unitary model. This approach, however, is not sufficiently clean since non-eligible households, with more resources at hand who receive zero transfers are likely to bias our bargaining power estimate upwards or downwards, depending on whether the budget share under investigation corresponds to a luxury or an inferior good, respectively. Therefore, we exploit the quasi-random experiment of our data, and restrict our analysis to treatment and control poor (eligible) households who broadly share similar characteristics.[11]

However, even within the poor sample there exist differences between those households in the treatment and control areas, not only because they are receiving a cash transfer, but also because beneficiaries also receive health talks, attend health clinics, and in some cases receive nutritional supplements. For example, assume that by attending a health clinic, a beneficiary woman is persuaded to improve her family's dietary condition. If at the same time her bargaining power is increased as a result of the cash transfer, then this will allow her shift more resources to procuring a better diet which will cause us to overestimate the transfer effect on high protein food shares. We therefore restrict our sample further, by only considering those in treatment areas, which are poor. If we assume that all treatment households within a village receive the same talks and have equal access to clinic visits, then the PROGRESA effect will be different only through the amounts of the cash transfers received. We believe, in this case, this is the cleanest way of testing for the Program's influence of bargaining power on household allocations.

The regression results are presented in the next section. The empirical specification of eq. [5] is a simple generalization of the Working-Leser form (allowing a flexible form for the effect of household income), and the variance-covariance estimates are based on the infinitesimal jacknife allowing within community and year correlations in errors (Huber, 1967).

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[10] That is, that one that includes all couple households.

[11] Behrman and Todd (2000) show that the randomization worked effectively in most community level variables, although they find few significant differences at the treatment and control household level.

4. RESULTS

Following Lundberg, Pollak and Wales (1997) and Browning, Bourguignon, Chiappori and Lechene (1994), we begin with goods that can plausibly be assigned to specific demographic sub-groups with the family. Many studies treat adult clothing, alcohol and tobacco as "adult goods" (Deaton, Ruiz-Castillo and Thomas, 1988); we will also examine spending on child clothes and education which we interpret as "child goods."

Estimates of the Engel Curve [5], are presented for all households in the first column of Table 3. We report the effect of PROGRESA income on the share of the budget spent on each good in the table. The effects of all other controls, which are listed at the foot of the table, are suppressed. Since the empirical model controls total household expenditure, the effect of PROGRESA income can be interpreted as the differential effect of income from PROGRESA on the budget allocation, relative to income from any other source. To wit, it is a measure of the effect of an increase in the share of household resources that come from PROGRESA on the budget share. If PROGRESA income is treated like any other income, the coefficient estimates will be zero. The specification of the Engel curve in terms of budget shares has two advantages. First, it is difficult to capture income non-linearities in Engel curves; the share specification permits all covariates to interact with total household resources in a parsimonious way. Second, from an interpretation point of view, this specification highlights the way in which PROGRESA income is distributed across goods.

Holding household resources constant, as the share of income from PROGRESA rises, treatment households spend a smaller fraction of their income on adult male clothing relative to control households. The share of income from PROGRESA is not related to spending on female clothing, but the share of the budget spent on child clothing increases significantly as PROGRESA income increases. The impact of PROGRESA income is the same on clothing of boys and girls.

It is possible that the estimated PROGRESA income effects are capturing some form of nonlinearity in the Engel curve. To test whether this is the case, the sample in the second column of Table 3 is restricted to treatment and control households, all of whom have low income. Comparing the first and second columns, we see the estimated effects of PROGRESA income are very similar indicating that the spline in household resources captures non-linearities in the effect of resources on clothing shares. In the third column, attention is restricted to only treatment households in order to determine whether the results are contaminated by behavioral changes associated with other, non-income components of the PROGRESA intervention. Since those components of the program are identical for all treated households, the differences among the households is the fraction of total household resources that are from PROGRESA. The estimated effects of an increase in PROGRESA income are very similar across the three specifications.

This suggests that identification of the effect of PROGRESA income in these models is driven by the marginal peso of income in the hands of women, relative to income from any other sources within the household. We conclude, therefore, that PROGRESA income is not treated the same as other resources in the household and interpret the change in resources allocation within the household as indicative of a change in the bargaining power of women, relative to men.

Thus, as the share of household income from PROGRESA rises, the share of the budget allocated to adult male clothing declines and the share spent on boys' and girls' clothing rises indicating a shift away from male consumption goods towards child consumption goods. A very similar shift has been documented for the United Kingdom by Lundberg, Pollak and Wales (1997) who examine changes in spending of households when child benefit is paid to women instead of men.

In Mexico, the increase in the share spent on (the sum of) boys' and girls' clothing is over 15 times larger than the decrease on adult male clothing and, since budget shares must add up, there are other goods for which shares decline as PROGRESA income rises. Alcohol and tobacco, which are consumed by adults – and mostly by males—would seem to be good candidates. While the share of spending on these goods does decline as PROGRESA income rises, the effects are not significant. Transport spending is likely to be an adult good in rural Mexico where transportation is used largely to travel to towns. The share of the budget spent on transport declines significantly as the share of household resources from PROGRESA rises.

The share of the budget spent on food also declines as PROGRESA income rises. This effect is not significant when all households are included in the analysis but is better determined and significant when the analysis only on poor households and on those households who receive some PROGRESA income. In this case, the fact that the Lower shares associated with greater PROGRESA income are due primarily to reduce shares on staples (tortilla and beans) and vegetables; these declines are off-set by an increase in the share of the budget allocated to meat. The evidence suggests that there as PROGRESA income rises, there is a switch towards a higher quality diet. Part of the PROGRESA intervention involves nutrition education which may be the proximate determinant of this change in household spending on food. However, since the result emerges even when the analysis is restricted to only those households that receive the nutrition education (and some PROGRESA income) and since the effect operates through the differential effect of PROGRESA income, relative to all other income, it seems unlikely that this change can be attributed to the nutrition education component of the intervention.

The final row of the table reports the relationship between the share of income from PROGRESA and the share of the budget spent on education. It is positive and significant for all households, for all poor households and for all households who receive some PROGRESA income. Since the size of income benefits depend on school attendance by children in treatment houses, it is plausible

that these effects reflect reverse causality: spending on education rises in order to keep children in school and receive the benefit.

To explore this more deeply, Table 4 reports the same regressions after stratifying the sample into three groups. The first group restricts households to those that have all age eligible children in the household attending elementary or high school at the time of the baseline. The share of the budget on education is higher as the share of resources from PROGRESA income rises. This is also true if attention is restricted to households with all age-eligible children are in high school (columns 5 and 6). Thus, while it is impossible to rule out reverse causality –in conjunction with forward looking behavior on the part of treatment households, the evidence suggests that PROGRESA income is directed towards spending on education.

5. CONCLUSIONS

PROGRESA is an ambitious project. Women in the poorest households in Mexico receive a very large income transfer and encouraged to invest in the human capital of their children. The design of the program – in conjunction with the longitudinal household survey data collected as part of the evaluation of the program—provide a unique opportunity to measure the effect of a large, exogenous increase in resources attributed to women relative to the effect of other resources in the household which avoiding the complexities associated with modeling labor supply.

Holding total household resources constant, an increase in the income from PROGRESA can be interpreted as an increase in the share of total household resources that are attributed to the woman who receives the PROGRESA income. We have interpreted this exogenous shift in the attribution of income within the household as indicative of an increase in the bargaining power of the woman relative to other household members.

Estimation of the effect of this income on spending indicates that as the share of household resources from PROGRESA increases, the share of the budget spent on child clothing, education and higher quality diet increase. The share of the budget spent on adult clothing, transport and staples declines. We conclude that there has been a shift in the balance of power within PROGRESA households which has resulted in greater investment in the human capital of the next generation. The results suggest that the impact of the income transfers to households have been greater than they would have otherwise been if the income had been given to a male in the household. It is important to note, however, that these results are only suggestive and our interpretation relies on several assumptions. If PROGRESA were designed so that income was given to women in some treatment households and to men in others, it would be possible to provide a definitive answer to the important question of whether the allocation of income within the household affects human capital outcomes.

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Table 1.   Distribution of households, by program and sample selection, 1997.
(percentages in parenthesis)

Non beneficiary (Non Poor)	7019 (61) (47)	4539 (39) (49)	11558 (100) (48)
Beneficiary (Poor)	7837 (63) (53)	4682 (37) (51)	12519 (100) (52)
Total	14856 (62) (100)	9221 (38) (100)	24077

Source: Own estimation using ENCASEH 1997

Table 2.   **Descriptive means of Couple-Households in PROGRESA Sample**

	NON BENEFICIARIES	BENEFICIARIES		
		Controls	Treatments	Difference
HHhold Characteristics				
Household size	4.91	6.16	6.14	0.02
	(0.016)	(0.022)	(0.017)	(0.028)
Number of adult males	2.52	3.08	3.13	-0.05
	(0.009)	(0.015)	(0.011)	(0.019)
Number of adult females	2.39	3.07	3.01	0.06
	(0.009)	(0.015)	(0.011)	(0.019)
Head's years of education	4.21	3.97	4.13	-0.02
	(0.022)	(0.026)	(0.021)	(0.034)
Spouse's years of education	4.35	4.18	4.14	0.04
	(0.022)	(0.027)	(0.020)	(0.034)
Age of head	51.79	42.75	42.47	0.28
	(0.103)	(0.133)	(0.102)	(0.167)
Age of spouse	47.17	38.05	38.19	-0.14
	(0.099)	(0.120)	(0.094)	(0.153)
Total expenditures	812.81	653.71	730.35	-76.64
	(4.064)	(4.726)	(3.782)	(6.103)
PROGRESA Monetary Transfers				
Monthly Received Total Transfers	0.00	0.00	181.44	
			(1.288)	
Monthly Potencial Total Transfers	0.00	0.00	278.93	
			(1.770)	
HHhold Expenditures Shares				
Food	497.39	440.84	495.61	-54.76
	(2.711)	(3.418)	(2.698)	(4.375)
Vegetables	97.75	59.00	70.10	-11.09
	(0.657)	(0.954)	(0.817)	(1.292)
Fruit	5.34	3.36	5.33	-1.97
	(0.166)	(0.158)	(0.213)	(0.301)
Meat	98.25	77.07	97.86	-20.79
	(0.805)	(1.040)	(0.950)	(1.467)
Education	19.98	14.27	15.86	-1.59
	(0.584)	(0.627)	(0.525)	(0.835)
Boy Clothing	10.68	12.72	18.29	-5.56
	(0.184)	(0.248)	(0.246)	(0.372)
Girl Clothing	10.35	11.83	16.81	-4.98
	(0.188)	(0.231)	(0.249)	(0.368)
Adult Male Clothing	16.30	9.40	11.90	-2.50
	(0.276)	(0.221)	(0.223)	(0.336)
Adult Female Clothing	14.85	8.79	10.32	-1.52
	(0.252)	(0.291)	(0.189)	(0.333)
Tobacco & Alcohol	4.96	4.60	3.49	1.11
	(0.249)	(0.335)	(0.208)	(0.373)
Obs.	22114	10450	17411	

Expenditure Shares x 100
Standard error in (parenthesis)
Note: Potencial total transfers following PROGRESA eligibility rules according to hhold demographics.
     Household head's defined as male head.
Source: *ENCASEH* and *ENCEL* surveys.

TABLE 3: Effect of Progresa Monetary Transfer on Household Budget Shares by different Program targeted Samples.

	All Hholds. (1)	Treatment & Controls (2)	Treatment (3)	R^2
1. Food	-0.0085 [0.0090]	-0.0646 [0.0108]***	-0.0791 [0.0114]***	0.250
2. Vegetables	-0.0055 [0.0030]*	-0.0173 [0.0039]***	-0.0193 [0.0043]***	0.122
3.Fruits	0.0009 [0.0008]	-0.0011 [0.0010]	-.0018 [0.001]*	0.104
4. Tortilla & Beans	-0.0166 [0.0068]**	-0.0277 [0.0085]***	-0.0329 [0.0090]***	0.158
5. Meat	0.025 [0.0050]***	0.0214 [0.0066]***	0.0171 [0.0071]**	0.147
6. Alcohol & Tobacco	-0.0021 [0.0013]	-0.0023 [0.0017]	-0.0025 [0.0018]	0.038
7. Boy Clothing	0.0296 [0.0018]***	0.0298 [0.0022]***	0.0314 [0.0024]***	0.200
8. Girl Clothing	0.0289 [0.0020]***	0.0312 [0.0024]***	0.0334 [0.0026]***	0.198
9. Adult Male Clothing	-0.006 [0.0014]***	-0.0039 [0.0016]**	-0.0044 [0.0018]**	0.108
10. Adult Female Clothing	-0.0033 [0.0014]	0.001 [0.0015]	0.0014 [0.0017]	0.110
11. Education	0.0159 [0.0038]***	0.0283 [0.0047]***	0.0342 [0.0049]***	0.116
12. Transport	-0.0148 [0.0037]***	-0.015 [0.0044]***	-0.0159 [0.0046]***	0.109
Num of obs.	31771	22917	14437	

Notes: Models include household expenditure (specified as spline), household composition (household size in logs and number of males and females between 0-5. 6-11, 12-25, 26-45 and 45+ years of age; educacion and age of head and spouse; whether public services at home (water and electricity); and indicator variable if the dwelling is made of wall blocks and concrete ceilings; xommunity fixed effects and seasonal (time) fixed efects. [standard errors] bellow coefficients.

TABLE 4: Effect of Progresa monetary transfer on household budget shares restricted to households with children always attending school by different levels of school levels before and after the Program's Implementation

	Hholds w/t children always attending Elementary or High School		Hholds w/t children always attending Elementary		Hholds w/t children always attending High School	
	Treatment & Controls (1)	Treatments (2)	Treatment & Controls (3)	Treatments (4)	Treatment & Controls (5)	Treatments (6)
1. Food	-0.0595 [0.0158]***	-0.0807 [0.0162]***	-0.0631 [0.0154]***	-0.0832 [0.0159]***	-0.0731 [0.0121]***	-0.0877 [0.0125]***
2. Vegetables	-0.01.9 [0.0049]***	-0.0204 [0.0054]***	-0.0211 [0.0049]***	-0.0224 [0.0057]***	-0.0171 [0.0042]***	-0.0187 [0.0045]***
3. Fruits	-0.0021 [0.0014]	-0.0023 [0.0015]	-0.0024 [0.0013]*	-0.0026 [0.0015]*	-0.0021 [0.0011]*	-0.0021 [0.0012]*
4. Tortilla & Beans	-0.0293 [0.0118]**	-0.0390 [0.0123]***	-0.0292 [0.0118]**	-0.0383 [0.0123]***	-0.0353 [0.0094]***	-0.0424 [0.0098]***
5. Meat	0.0253 [0.0083]***	0.0173 [0.0090]*	0.0204 [0.0080]**	0.0138 [0.0086]	0.0214 [0.0071]***	0.0176 [0.0076]**
6. Alcohol & Tobacco	-0.0011 [0.0022]	-0.0025 [0.0026]	-0.0014 [0.0022]	-0.0027 [0.0025]	-0.0011 [0.0019]	-0.0013 [0.0020]
7. Boy clothing	0.0255 [0.0031]***	0.0275 [0.0034]***	0.0255 [0.0031]***	0.0274 [0.0034]***	0.0271 [0.0025]***	0.0289 [0.0027]***

8. Girl clothing	0.0269 [0.0035]***	0.0318 [0.0037]***	0.0295 [0.0034]***	0.0313 [0.0037]***	0.0302 [0.0028]***	0.0325 [0.0030]***
9. Adult Male clothing	-0.0006 [0.0021]	-0.0014 [0.0024]	-0.0007 [0.0021]	-0.0016 [0.0023]	-0.0017 [0.0018]	-0.0023 [0.0020]
10. Adult Female clothing	0.0016 [0.0020]	0.0020 [0.0024]	0.0014 [0.0020]	0.0016 [0.0023]	0.0025 [0.0017]	0.0031 [0.0019]
11. Education	0.0189 [0.0066]***	0.0274 [0.0070]***	0.0200 [0.0064]***	0.0277 [0.0068]***	0.0269 [0.0052]***	0.0322 [0.0055]***
12. Transport	-0.0095 [0.0066]	-0.0088 [0.0070]	-0.0077 [0.0064]	-0.0072 [0.0068]	-0.0100 [0.0052]*	-0.0119 [0.0056]*
Num. of obs.	10118	6682	10702	7008	15482	9819

Notes: See Table 1. School level attendance defined by child's age category at current enrollment: elementary level for children between 6 to 12 years old; high school level for children between 13 to 16 years of age; and elementary or high school level for children between 6 to 16 years of age.