Investments, time preferences and public transfers paid to women

Luis Rubalcava
Spectron Desarrollo and CIDE

Graciela Teruel
UIA

Duncan Thomas
Duke University

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ABSTRACT:

The literature suggests men and women may have different preferences. This paper exploits a random assignment social experiment in which women in treatment households were given a large public cash transfer (PROGRESA) and women in control households were given nothing. In an effort to disentangle the effect of additional income in the household from the effect of changing the distribution of income within the household, the impact of PROGRESA income on savings and investments decisions is compared with all other income sources. Additional money in the hands of women is spent on small livestock (which are traditionally managed and cared for by women), improved nutrition and on child goods (particularly clothing). Among single headed households, PROGRESA income is not treated differently from other income. Direct evidence on inter-temporal preferences gathered in the Mexican Family Live Survey indicates that women are more patient than males when thinking about the future. Taken together, the results suggest that PROGRESA income results in a shift in the balance of power within households and women allocated more resources towards investments in the future.

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1. Introduction

Research suggests that men and women do not share the same preferences. First, in carefully controlled experimental settings, women have been shown to be more altruistic and more risk averse than men. (Eckel and Grossman, 1998; Andreoni and Vesterlund, 2001; See, Eckel and Grossman 2006a, 2006b for reviews). However, the populations in most of these studies are college students and the generality of the evidence has not been established. Second, non-experimental evidence, based on population surveys, suggests that in some contexts women allocate resources under their control towards goods they or their children consume (such as clothing, see Lundberg, Pollak and Wales, 1997) and also to investments that improve child health and well-being (Thomas, 1990; Duflo 2000, for example). This paper addresses two shortcomings in this literature. First, legitimate concerns have been raised regarding the extent to which this evidence is contaminated by unobserved heterogeneity that is correlated with the distribution of resources within households.[1] Second, we draw on direct measures of preferences of men and women to corroborate evidence on household resources allocations.

To address the first concern, we exploit variation in the distribution of resources within households induced by a social experiment in which assignment to the treatment group is random and women in the treatment households are given income. PROGRESA, one of the most ambitious anti-poverty programs in the world, provides cash transfers to poor rural households in

[1] Thomas (1990) compares non-labor income of males and females; women with relatively more non-labor income may be different from other women in other dimensions including, for example, time preferences which are related to saving and investment decisions. Lundberg, Pollak and Wales (1997) exploit a natural experiment in the United Kingdom in which Child Benefit was paid to women rather than men. Rubalcava and Thomas (2000) note that Aid to Families with Dependent Children, which was paid only to single women with children, provided a safety net for a lower-income woman with children in the event of separation from her partner. Variation in benefit levels across states and over time provides natural variation in the woman's bargaining power even while she is married.AHotchkiss (2004) argues the evidence can be explained by a time effect and notes similar budget re-allocations among couples who did not receive the benefit, presumably because of changes in relative prices co-incident with the change in the way Benefit was paid. Duflo (2000) exploits a different natural experiment in which older adults were given pensions in South Africa. She finds children are healthier in households with older women. Edmonds, Mammen and Miller (2005) demonstrate that household composition responds to receipt of the pension and that young children are more likely to co-reside with older women who are eligible for the pension. Behrman

Mexico and these transfers are paid to women. The payment is large: on average, beneficiary households receive payments that are around one-quarter pre-treatment household income.

The program was implemented in phases and designed so that it could be subjected to rigorous evaluation. Specifically, over 24,000 households that were eligible to receive PROGRESA were surveyed every six months from the beginning of the evaluation. Households living in two thirds of the study communities were randomly assigned to receive the benefits immediately and the rest were assigned to a control group which would receive the benefits three years later. (See Parker, Rubalcava and Teruel, 2008 for a complete description of the Program). Comparisons are made between the behavior of households in the treatment communities with the behavior of households in control communities that did not receive the benefits. Since total income rose substantially in households that received the benefit, it is important to fully control total resources if we are to pin down the impact of giving money to women. The empirical strategy is described in detail below. We measure the impact of PROGRESA benefits on allocation decisions holding total resources fixed and focus on households headed by couples.

The evidence suggests that PROGRESA income is allocated towards investments in the future. Specifically, resources are allocated towards child goods and towards investment in small livestock which, in the study societies, are traditionally cared for by (and under the control of) women. The results are robust to focusing on variation in the timing of PROGRESA payments within treatment households and also to controlling expected future benefits. This suggests that it is actual income in the hands of women that affects within household resource allocation decisions. If the evidence reflects the impact of unobserved heterogeneity in the communities that received the treatment, or the effect of other dimensions of the program, PROGRESA income should have the same impact on single-headed households who received the benefits. It does not.

Pollak and Taubman (1986) and Behrman and Rosenzweig (2004) provide evidence on within family resource

Among those households, PROGRESA income has the same impact on spending and savings decisions as other sources of income. We conclude the results for couple households are unlikely to be driven by unobserved heterogeneity.

An implication of this evidence is that receipt of PROGRESA income increased the bargaining position of women within the household and that women have longer time horizons than men when planning resource allocations. We investigate the latter hypothesis drawing on direct measures of inter-temporal preferences collected from a different sample of rural households in the Mexican Family Life Survey (MxFLS). These measures indicate that women are more patient than men. This is the first instance in which evidence on the relationship between control over resources and their allocation within households has been directly linked to specific domains of preferences.

We conclude that among poor rural Mexicans, women have longer planning horizons and so resources under their control, including PROGRESA income, is likely to be spent on investments in children and in small scale livestock. The latter, at least, typically remain under the control of women over time which will likely contribute to further enhancing their relative bargaining position within the household.

The next section describes the design of the PROGRESA program. The model motivating our research precedes a description of the data. Issues that are confronted in the empirical implementation are discussed and followed by results of data from the PROGRESA study. The final sub-section presents evidence on inter-temporal preferences from MxFLS.

2. The PROGRESA program

PROGRESA, the centerpiece of the Mexican government's anti-poverty strategy, is a

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allocations under different assumptions. See Behrman (1997) for an excellent review of the literature.

conditional income transfer program that began in 1997 in rural areas and was subsequently expanded into urban areas when it was renamed OPORTUNIDADES.[2] The program covers nearly 5 million families which is almost a quarter of the Mexican population. Arguably the most ambitious conditional income transfer program in the world, PROGRESA serves as a model for similar programs throughout Latin America and the Caribbean.

The average eligible household is given an income transfer of around 30 pesos per person per month.[3] This is a very large transfer which amounts to over 28 per cent of average monthly *per capita* expenditure of these households. The value of the transfer depends on whether household members age 22 and younger attend school[4] and whether all household members attend the local public health clinic.[5]

Key for this study is that all benefits are paid directly to women, typically the mothers of age-eligible children, who pick up the payment at the local post office. The design was motivated by a belief among the program architects that giving income to women would be more effective in increasing investment in the next generation and reducing poverty than giving income to men. This paper subjects that belief to empirical scrutiny by examining the impact of the income transfer on household resource allocations.

PROGRESA is means tested with a two stage targeting mechanism. First, communities that are deemed poor (based on socio-economic characteristics) are selected. Second, the ENCASEH, a census of all households in the community is conducted and a household is eligible

[2] In this paper, we will refer to PROGRESA rather than OPORTUNIDADES since we use data from rural households.

[3] One peso was worth US$0.11 in 1997.

[4] The grant is increased by 70 pesos for each child who attends the third grade of primary school. The amount is increased with grade completion. For example, it is increased by 225 pesos and 255 pesos for males and females in the third grade of secondary school, respectively. If a child misses more than 3 school days in a month (for unjustified reasons) the household does not receive the grant that month.

[5] Basic, preventive health care services are provided by the public sector for all household members. Benefits are only paid if household members attend health clinics on a schedule spelled out by the program. In addition, households are given 145 pesos per month for food in addition to nutrition supplements, which are principally targeted to children between the ages of four months and two years, and pregnant and lactating women. The school

for PROGRESA if it falls below a multi-dimensional poverty cut-off (as measured by a combination of income, demographic characteristics, educational attainment of household members, the presence of disabled individuals in the household, housing characteristics, and the ownership of durable goods, animals and land).[6]

The list of eligible households is announced at a meeting in the community to build consensus that the selection mechanism is fair. In practice, this last step rarely results in substantial changes to the list of eligible families. Eligibility is fixed after the initial assignment.

3. Theoretical foundation

In order to motivate the empirical strategy, we lay out a simple model of household behavior which provides a set of testable hypotheses regarding the effect of PROGRESA income on household resource allocations. We then proceed to discuss our empirical strategy and the assumptions that are needed in order to interpret the results.

Begin with a model of household behavior in which the well-being of all household members in any period t, W_t,, depends on the utility of each member, m = 1, ..., M. In turn, each individual's utility, U_{mt}, depends on the commodity consumption of all household members, x_{gmt}, g=1, ..., G, where g indexes goods and let x_{0mt} denote consumption of leisure of each individual at time t. We allow tastes, and therefore utility, to be affected by individual and household specific characteristics. Let μ_t, denote those that are observed, such as household demographic structure and socio-economic status and let ε_t, represent all unobserved characteristics, such as tastes for work, consumption, altruism and inter-temporal preferences. Each individual's sub-utility function is given by $U_{mt}(x_t, \mu_t, \varepsilon_t)$ which is assumed to be quasi-concave, non-decreasing and strictly increasing in at least one argument. The household welfare function, W, aggregates these individual sub-utility

attendance of children and family health visits are verified through school and clinic records.

functions:

$$W_t = W_t [U_{1t}(x_t, \mu_t, \varepsilon_t), \ldots U_{Mt}(x_t, \mu_t, \varepsilon_t), \lambda_{mt}(\pi, \xi)] \quad [1]$$

where the weights, λ_{mt}, can be interpreted as "distribution factors" (Browning, Bourguignon, Chiappori and Lechene, 1994, also called "extra environmental parameters" by McElroy, 1990) which have no direct effect on an individual's utility but affect decision-making within the household. Intuitively, λ_{mt} indicates member m's bargaining power within the household at time t and depends on past, present and future individual, household and environmental characteristics. These include observed characteristics, π, such as age, education, income and wealth of each household member as well as prices, interest rates, marriage market opportunities, customs, laws and institutions that affect marriage and divorce at the community or society level. The distribution factors may also depend on unobserved characteristics, ξ, such as attitudes towards risk, altruism, trust and inter-temporal preferences. Note that π and ξ, which may vary across individuals and over time for a particular individual, will, in general, include factors that affect each individual's utility as well as resources available to that person and to the household. The model is quite general and includes not only resource allocations that are Pareto efficient (Chiappori, 1988) but also non-co-operative outcomes including models in which household members have separate spheres of interest (Lundberg and Pollak, 1993, Duflo and Udry, 2004).

The household welfare function [1] is maximized subject to the inter-temporal household budget constraint:

$$\sum_m A_{mt} + A_{0t} = \sum_m (1+r_{mt})A_{mt-1} + (1+r_{0t})A_{0t-1} + [\sum_m \tau_{mt} + p_{0mt}(T-x_{0mt}) - p_t x_t] \quad [2]$$

In period t, household assets are given by the sum of the assets of each member, A_{mt}, and jointly owned assets, A_{0t}. They are equal to assets in the prior period, the return on those assets, r, plus savings which is given by income less expenditure. Income comprises transfer income plus

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

earnings. Transfer income, τ , is net income from private transfers (with non co-resident family members, for example) plus public transfers (which, includes PROGRESA). Earnings of member m are the product of the wage, p_{0mt}, and the amount of time spent working which is the total amount of time, T, less the amount of time spent not working, x_{0mt}. All prices, p_t, other than wages, are assumed to be taken as given by household members. The return on assets, r, is allowed to be individual idiosyncratic which would arise, for example, if market opportunities differ for men and women because of restrictions on behaviors.

Unitary model of the household

The simplest model of the household, which is widely used in the social science literature, assumes all household members behave as if it were a single decision-making unit. This will arise if the distribution factors, λ_{mt}, are fixed over time. It may also arise if one household member, a *dictator*, makes all allocation decisions in which case the distribution factors, λ_{mt}, are zero for all but that member and the aggregator function W(.) reduces to that member's sub-utility function. An observational equivalent assumption is that all sub-utility functions in [1], are identical. Under any of these assumptions, the household may be treated as if it were a single unit so that there is no place for dissension within the household and, therefore, for any individual to assert his or her power in decision-making. While this model is clearly a simplification, it has proved to be extremely powerful as an organizing principle in the theoretical and empirical literature on household and family decision-making.

In this model, decisions about spending on goods and services, savings[7] and time allocation in any period depend on *total* household income, $\sum y_{mt}$, (which includes the return on assets, transfers and earnings), household characteristics, μ , such as permanent wealth and socio-demographic composition, prices, p, and factors such as tastes which are not measured in the

[7] To keep notation simple, savings is treated as spending on investment goods or assets.

PROGRESA data, ε:

$$x_{gt} = x_{gt}\left(\sum_0^M y_{mt}, \mu, p_t, \varepsilon_{gt}\right) \quad [3]$$

In a life cycle model with no liquidity constraints and no uncertainty, current spending will not depend on current income. That model has been widely rejected in the literature and so the restriction is not imposed here. For our purposes, the key point in this model is that saving and spending patterns are not influenced by who within the household receives the income or owns the assets. If [3] is a good approximation of demand functions for poor households in rural Mexico, then it will matter not a wit whether PROGRESA income is paid to the mother, to the father or anyone else. That hypothesis will be tested below. Prior to laying out our testing strategy, it is useful to spell out a class of models in which resources of individuals do affect household choices in order to demonstrate that this test has power against reasonable alternatives.

Individualistic models of the household

The most primitive model of behavior treats the individual as the primary element in decision-making with the household simply serving as a structure, like a club or group, in which decisions are aggregated. There is a wide class of individualistic models in the literature. A simple, quite general model assumes that allocations decisions are the outcome of some repeated game that can be approximated as achieving a co-operative equilibrium and that allocations are Pareto efficient. This is an intuitively appealing assumption when thinking about the behavior of household members who share much in common and are likely to be altruistic towards one another. (Chiappori, 1988, 1992, 1993; Browning and Chiappori, 2000, 1998; Bourguignon, Browning and Chiappori, 2006,1992; for a fuller discussion.) Other models involve non co-operative equilibria and highlight the role of spheres of interest in bargaining or separate purses of husbands and wives. (See Manser and Brown, 1980; McElroy and Horney, 1981; Lundberg and Pollak, 1993; Duflo and

Udry, 2004.)

Presumably the reason that individuals form a household is because it produces goods and services for its members which they would not be able to consume if they were not organized in the household. These may be the benefits associated with altruism and caring, with returns to scale in the production of goods and services like meals or housing or externalities that households provide. The benefits may also be manifest in resolving co-ordination and information asymmetries. In both the co-operative and non co-operative formulations of the model, what the household produces and who benefits from that production depends on the power a member wields in asserting their preferences over others. There are many ways in which power may be manifest and it may depend on such factors as the options one might have if one left the household. Denoting the power of each household member by the vector of weights, λ_{gt}, then spending and savings decisions on any good g in any period are given by:

$$x_{gt} = x_{gt}(\lambda_{gt}, \sum_0^M y_{mt}, \quad \mu, \quad p_t, \quad \varepsilon_{gt}) \qquad [4]$$

Apart from the weighting factors, λ, the demand functions in this individualistic model, [4], are identical to those under the assumptions of the *unitary* model, [3].

The weights play a central role in the model and reflect the relative importance of each member's power in affecting household allocation decisions. If allocations are Pareto efficient, then the weights will not vary across goods which places restrictions on how power affects resource allocations. In general, the weights will likely respond to changes in the relative power of household members induced, for example, by programs that are targeted towards one group of people rather than another. PROGRESA is designed to be such a program.

In general, estimation of [4] is complicated for at least two reasons. First, in studies based on observational data, it is not clear how to measure changes in power. We exploit the fact that

communities are randomly assigned to a treatment or control group in the PROGRESA evaluation and only households in treatment communities receive PROGRESA income. Since this income is paid to women, resources in the hands of women in the treatment group will have increased whereas resources will not have changed in the control group. Since total household income will also be higher in treatment households, it is possible that we will assign a "power" effect to what is, in fact, an income effect. As explained in detail below, we address this issue by relying on a comparison of the marginal effect on spending patterns of PROGRESA income with the marginal effect of other household income.

A second complex issue in this literature revolves around the fact that the majority of studies proxy power with the distribution of earnings within the household. That distribution reflects current (and previous) decisions about work and savings and those decisions are likely to be related to unobserved characteristics of household members that also affect resource allocations. For example, if a woman wishes to invest more in her children, she may seek out earnings opportunities and spend disproportionately more of those resources on her children. She may also invest more of her time and energy in her children and those investments would, in general, be captured by ε_{gt} in [4]. In that case, the distribution of earnings and unobserved characteristics in the regression will be correlated and estimates of the effects of individual earnings will be biased. A key advantage of examining the behavior of households who receive PROGRESA benefits is that income is paid to households based on their socio-economic and demographic characteristics at the time of enrollment into the program. The benefit does not respond to changes in (non-PROGRESA) household income or labor supply of household members that might occur after program enrollment. Conditional on all observed and unobserved characteristics at the time of enrollment, the receipt of PROGRESA income can, therefore, be treated as an exogenous shift in the distribution of control over resources

within the household[8].

The next section describes the PROGRESA data. We then present our empirical strategy and explain how the experimental design of PROGRESA is exploited to test the predictions of the unitary model.

4. Data

An important dimension of the design of PROGRESA for the purposes of this study is the fact that the government was committed to conducting a comprehensive evaluation of the impact of the program. In 1997, 506 communities in 7 states[9] were selected for the rural evaluation sample and around 63 percent of the communities were assigned to receive PROGRESA benefits in May 1998 (treatment communities) while the rest were designated to be phased into PROGRESA three years later towards the end of 2000 (control communities). In 1998, program officials announced to all treatment households that the benefits would be paid for at least three years. Control households were not notified about the program. (In fact, as households in control communities became aware of the program, pressure to include them in the program mounted. The communities started receiving benefits in early 2000.)

Using data from a census of over 24,000 households conducted in late 1997 in all the PROGRESA evaluation sample communities, communities were matched in terms of propensity scores based on levels of infrastructure and economic status. Two communities in each triple were randomly assigned to the treatment group, the third was assigned to the control group (Behrman and Todd, 1999). Panel A of Table 1 reports the distribution of households in the baseline census.

[8] It is possible that households respond to the program by changing labor supply (or time allocation), transfers in or out of the household or shifting type of work, crop choice or technology choice. Under the null that the unitary model is correct, these choices are made at the household level and will not reflect the preferences of individuals within the household. To the extent that such behavioral responses do not change after the initiation of benefit payments, they are addressed in the empirical analyses below.

[9] These seven states were among the first states to receive PROGRESA benefits.

Slightly over 50% were eligible for PROGRESA (which we shall call "poor" for short-hand) and about two-thirds of the households were in treatment communities.

Panel B of Table 1 summarizes the demographic characteristics of all households headed by a couple.[10] The upper section compares those eligible for the PROGRESA benefit (column 1) with those who were not eligible (column 2). Households eligible for the PROGRESA benefit are, by design, poor. Relative to other households, they are earlier in the life course, have more members and the head has less education. The lower section of the table compares treatment with control households among those eligible for the benefit. Since communities were randomly assigned to the treatment, there should be no differences in socio-demographic characteristics of the two groups. None is significant.

After the baseline, follow-up surveys of all treatment and control households were conducted about every six months until 2000. Detailed expenditure, income and asset data were collected from each household in the follow-up surveys in March 1998, October 1998, May 1999 and November 1999 (*ENCEL*).[11] Table 2 summarizes data drawn from these three surveys for treatment households (column 1), control households (column 2) and the difference (column 3). (Unfortunately, no expenditure, income or asset data was collected in the baseline census.)[12]

Household per capita expenditure is reported in the first row of the table. On average, treatment households spend about 15 pesos per person per month more than control households. In part, this reflects that treatment households received the PROGRESA benefit. However, the fact that

[10] The majority of the analyses reported below are restricted to households headed by a couple in every wave of the surveys. Since 95% of the households are headed by a couple in every wave, this is not an important restriction. Moreover, dissolution rates are the same for treatment and control households. Results for single headed households provide useful checks on the assumptions and are also reported below.

[11] Note that in effect there are two baseline surveys, which can be used as part of the evaluation, the ENCASEH and the ENCEL March 1998 survey. Neither survey collected information on household expenditures and household animal ownership. This study relies therefore, on post program household resource allocation data.

[12] Since no attempt was made to follow movers, attrition is potentially a concern for the interpretation of the results. While one-third of households left the sample during the study period, the key for our purposes is whether attrition differs depending on treatment/control status. For couple households, it is not and this is true even after controlling household characteristics and the PROGRESA eligibility criteria. See Teruel and Rubalcava (2006) for a general

in our sample, the average PROGRESA benefit is slightly over 30 pesos *per capita* per month, clearly suggests that treatment households must be saving part of the benefit into the future. This is reflected in the second row of Panel A of the table which indicates that income exceeds expenditure in both control and treatment households with treatments reporting savings of over 13 pesos *per capita* per month more than controls.

Few rural Mexican households have any financial savings but many own some livestock, which provide a key mechanism through which households may save.[13] The surveys record the number of livestock owned by the household in each of several categories. The remainder of Panel A demonstrates that treatment households own significantly more cows and more horses and donkeys and particularly more chickens and turkeys. We estimate that these differences account for about 70 per cent of the difference in reported saving of treatment households relative to controls, cumulated over the eighteen months since the inception of the PROGRESA.[14]

Livestock are particularly interesting in the context of our research question given the ethnographic literature which has shown that in rural Mexico, as in many low income societies, "women are more involved in small-scale subsistence livestock-rearing [such as poultry and pigs] and men are more likely to be involved in large scale, cash-generating production" such as cattle, horses and donkeys (von Keyserlink, 1999).[15] Moreover, poultry are often consumed by household members and so these investments are likely to contribute to improving the nutritional status of household members in the future.

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discussion of attrition in these data.

[13] See, for example, Arriaga-Jordán, and Pearson (1996) who note that "livestock is a major source of savings" as well as a source of future income through output (eggs, meat and milk), by-products (manure, foraging) and services (draught power).

[14] In the November 1998 wave of the evaluation survey, households reported the quantity and value of livestock categories. For this calculation, livestock have been evaluated using the unit values for each category averaged over the entire sample. The number of livestock is used in the analyses below because no information on values is recorded in the other rounds of the survey.

[15] Arizpe and Botey (1986) comment that **"**Some duties are considered exclusively feminine…taking care of poultry and, sometimes, pigs" whereas men are responsible for feeding and grazing cattle and horses.

As Panel B indicates, treatments consume more nutrients and higher quality nutrients. Specifically, relative to controls, on average, individuals in treated households consume almost 100 calories more per day and the calories they consume are of higher quality (as measured by protein per calorie).[16] As displayed in Panel C, the higher quality diets of treatments is also reflected in higher *per capita* spending on food (since food shares are the same and treatments have higher *per capita* spending overall). Moreover, relative to controls, treatment households allocate more of the budget towards meat and vegetables, and to a less extent, fruit with less being allocated to tortillas and beans.

Finally, Panel D of the table reports the average share of the budget spent on investments on children. The evidence shows that treatment households allocate more resources to their children, possibly as another way to save for the future. The PROGRESA benefit is higher if age eligible household members attend school and, if schooling incurs costs, then higher spending may simply reflect the additional costs of schooling. Treatment households allocate essentially the same fraction of the budget to schooling as controls. This translates into higher spending on schooling by treatment households. The difference, however, is small (about 0.25 pesos per month *per capita*) and it is only marginally significant. The lion's share of additional expenditure among treatment households on children is spent on their clothing. Treatment households allocate significantly more of their budget to children's clothing and these differences amount to about 2.5 pesos per month. [17]

In sum, the average treatment effects in Table 2 suggest that treatment households allocating PROGRESA income to investments that are likely to improve the well-being of household members in the future. These include investing in livestock, more spending on children and higher quality diets. Since the benefit was paid to women, it is tempting to interpret

[16] Nutrient intakes are computed by converting quantities of food consumed into calories and protein using standardized food tables for Mexico, (Perez and Marvan, 2001).

[17] The budget shares in the table are not exhaustive. Conditional on total household resources, PROGRESA income has no effect on the shares on several commodity sub-groups, including health, personal care, household goods and

these effects as indicative of the impact of empowering women. That interpretation would be premature. As is clear in [4] above, the PROGRESA benefit has an income effect (because total resources available to the household are increased) and may also affect the distribution of power, λ, within the household. Both of these are reflected in the estimated average treatment effect. We turn next to a regression framework in an effort to separate these effects.

5. Regression results

A naïve interpretation of [4] suggests that controlling total household resources, differences in allocations by treatment and control households may be interpreted as a rejection of the unitary model since the differences indicate that PROGRESA income affects demand by shifting the distribution of power, λ, within the household over and above the income effect. However, PROGRESA provides beneficiaries with a package of support that includes not only income but also incentives for children to attend school, incentives for all household members to attend health clinics and a modest food supplement. These additional components of the PROGRESA intervention likely influence the production of human capital and may, therefore, directly affect allocation decisions within treated households. For example, nutrition counseling is provided at health clinics which may result in households shifting resources to improved nutrition. By only using information on participation in the program, it is not possible to separate the impact of the income transfer on spending and saving decisions from the direct effects due to these additional components of PROGRESA.

We therefore follow a different approach and examine the *marginal* effect of PROGRESA income on allocations, controlling total household resources (including PROGRESA income). If the marginal effect is zero, then PROGRESA income has the same impact as any other income and the

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semi-durables.

unitary model is not rejected. If the marginal effect is not zero, we interpret it as the impact of an exogenous increase in the share of resources under the control of women, relative to men, which operates through λ in [4]. Relative to a comparison of the average spending of treatment and control households, this is a substantially more subtle test of the effect of changing the distribution of resources within the household than the average treatment effects in Table 2. The interpretation is more complicated if the receipt of PROGRESA income affects other sources of income. We have explored the issue and find no evidence of differences in labor earnings or net private transfers between treatment and control households in our sample during the study period.[18]

Results from estimates of model [4] are reported in Table 3 which presents the impact of income received from PROGRESA, after controlling total household resources.[19] .It is key that this estimate does not simply reflect non-linearities in the effect of income on allocations: thus, the regressions control *per capita* household expenditure with a flexible spline (with two knots at 25 and 75 percentiles of *per capita* household expenditure). The models also include detailed socio-demographic controls, μ, for two reasons. First, the size of the PROGRESA cash transfer depends on the age and gender composition of the household and, second, individual needs -- and therefore spending patterns -- vary with age and gender. The models also control age and education of the head and spouse. Spending and investments into the future will also vary with community-specific characteristics such as prices (including wages), levels and quality of infrastructure, ecology of the area and the climate. Moreover, communities may differ in the effectiveness of implementing the program as well as labor demand (which affects the opportunity costs of young adults attending school). To the extent that these effects are fixed during the study period, and have a linear and

[18] On average, monthly household earnings *per capita* is 202 pesos in treatment households and 200 in controls. The difference is 1.9 pesos and its standard error is 1.7 pesos. Of course, this does not rule out responses in labor supply and productivity of individuals within the household that exactly compensate for one another and leave household earnings unchanged. Net private transfers are slightly below 1 peso *per capita* per month in treatment households and slightly above 1 peso *per capita* in control households. The difference (0.05 pesos) has a standard error of 0.2.

[19] Information on receipt of PROGRESA income is drawn from administrative records which details the amount of

additive impact on resource allocations, they are swept out by the inclusion of a community fixed effect in the model. Variation across seasons and over time is captured by survey round fixed effects. All standard errors are based on the infinitesimal jackknife and allow correlations among unobservables at the household level. They are robust to arbitrary forms of heteroskedasticity.

We investigate whether, controlling total household resources, PROGRESA income is related to investments in livestock, diet and spending on children. Panel A of Table 3 reports the marginal effect of PROGRESA income on the probability the household owns any animal in each category (the extensive margin) and on the number owned (intensive margin).[20] All households headed by a couple are included in the models in the first column. Holding total household resources constant, as PROGRESA income increases so does the probability of owning small livestock (chicken, turkeys and pigs), as does the number of these small animals that are owned. There is no effect on other animals.

In case this reflects a non-linear impact of income across its distribution, attention is restricted to poor households in the second column. The marginal effect of PROGRESA income remains significant for chickens, turkeys and pigs. The third column includes only those poor households who received PROGRESA income during the study period. In this case, it is variation in the timing of the payment that identifies the impact of income paid to women and since that variation primarily reflects problems in the administration of payments, it is largely random. (Variation due to demographic characteristics of the household is absorbed by the detailed demographic controls in the regression).[21] The estimated effect of PROGRESA income remains significant for pigs and poultry and is significantly larger for pigs.

Although PROGRESA benefits are very generous, take-up of the program is not universal.

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income paid to each household every month.

[20] Linear probability estimates are reported for the extensive margin and fixed effects negative binomial estimates for the intensive margin. (Restricting the latter models to assuming the process is distributed as a poisson is rejected.)

[21] These are the logarithm of household size, the number of males age 0-5, 6-11, 12-25, 26-45 and >45 and the

About 10 *per cent* of eligible households in treatment communities do not receive any PROGRESA income during the study period.[22] The key characteristic that distinguishes eligibles who participate from those who do not is the presence (and number) of young children (age 0 to 5). Young children are required to attend health clinics far more frequently than older children – every month among those ages under 24 months. Moreover, education benefits are paid only for children who have passed the first three grades of primary school. This suggests that households with young children are more likely to view the program as providing insufficient benefits to be worth the costs of participation. However, it is possible that participation is correlated with pre-program "power" (or control over resources within the household) which would contaminate our interpretation of the results. Excluding households with one or more children age 5 or under, participation in the program increases to 97 per cent of eligibles and socio-demographic characteristics are not significant predictors of participation.[23] By excluding treatment households with young children from the sample, we can side-step potential contamination because of the participation decision. When the sample is thus restricted, the effect of PROGRESA income on poultry and pigs does not change.[24]

Eligible households that did not participate in PROGRESA were also more likely to refuse to participate in the second and third round of interviews. Restricting attention to the balanced panel of households who were interviewed in all three follow-up surveys, program participation rates are 98 *per cent* and take-up is not correlated with any of the socio-demographic characteristics in the

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number of females in each by the oldest age group.

[22] This cannot be attributed to recall error since PROGRESA income data is drawn from administrative records of actual payments.

[23] The participation regressions include age and gender specific numbers of household members, education and age of the head and spouse. For the sample used in column 3, the F statistic for joint significance of the demographic characteristics is 11.89 (p-value=0.00), and the t statistic on the number of young children is 5.76. Excluding households with young children, from the sample, the F statistic is no longer significant (F=1.1, p value=0.37) and no covariate is individually significant.

[24] The estimated marginal effects of PROGRESA income are not significantly different from those in column 3 for all outcomes in the table.

models. This provides an alternative sample for assessing the robustness of our results to potential contamination due to non-participation. The results, reported in column 4, are very similar to those for the sample of all treatment households. The estimated effect of PROGRESA income remains significant and large for poultry and, especially, pigs. Thus, part of the PROGRESA income is apparently invested and, since small livestock are typically the domain of women in rural Mexico, the investment instruments appear to be those that are under the control of women. This is suggestive that the impact of PROGRESA benefits on household resources and on women's power within the household may be long-lived. Moreover, pigs and poultry are often consumed by household members and so these investments are likely to also contribute to improving the nutritional status of household members in the future.

It would be natural to examine the effect of PROGRESA income on child anthropometry. Although such data were collected for a sub-sample of children, the data are not publicly available. They have been used by Behrman and Hoddinot (2000) who examine the impact of participation in PROGRESA on nutritional status. They report that in treatment communities, child growth is higher and the incidence of stunting among children age 12 to 36 is lower.[25] Instead, we examine nutrient intake, in Panel B. Controlling total household resources, PROGRESA income is associated with a decline in calories *per capita*, particularly among poor households, as well as an increase in diet quality as indicated by protein per calorie. The effects are significant across all samples in the table. Panel C of the table focuses on the share of the budget spent on food.[26] PROGRESA income has a

[25] The PROGRESA intervention involves nutrition education which may be the proximate determinant of the shift towards a higher quality diet. Since the result persists in the analyses that are restricted to only PROGRESA households, all of whom receive both the nutrition education and income, and since the effect operates through the differential effect of PROGRESA income, relative to all other income, it seems unlikely that the effect can be attributed to the nutrition education component of the intervention alone.

[26] The specification of the Engel curves in terms of budget shares has several advantages. First, it is key for our tests that non-linearities in the demand function are captured: the share specification performs well in this respect and amounts to demand curves in which all covariates are interacted with total household resources. Second, expenditure distributions are asymmetric (which suggests using logs) and include zeros (which makes logs unattractive); the distributions of shares are close to symmetric and the inclusion of zeroes poses no problems in estimation. Third, the specification highlights how PROGRESA income is shared among goods.

negative effect on the share of the budget spent on food which is significant when the sample is restricted to poor households. This reflects reduced budget shares allocated to staples (tortilla and beans) as well as vegetables and an offsetting increase in the share of the budget spent on meat and, thereby, improvements in diet quality.[27]

Panel D reports the effect of PROGRESA income on budget shares spent on goods that directly benefit children: education and child clothing.[28] As reported by Attanasio and Lechene (2002), holding resources constant, as PROGRESA income increases so does the share of the budget spent on girls' and boys' clothing. We also find a significant and positive effect of PROGRESA income on education. However, PROGRESA resulted in higher secondary school enrollment rates which could explain the higher budget shares on education and children clothing. (Schultz, 2004; Skoufias and Parker, 2001). To assess whether this explains the marginal effect of PROGRESA, attention is restricted to those households in which all age-eligible children were enrolled in school at baseline (before the program started) and in all waves of the survey. Results are in column 5 with the balanced panel estimates in column 4 providing the appropriate comparison. About one-quarter and one-tenth of the marginal effect of PROGRESA income on education and on children's clothing, respectively, can be explained by additional enrollment.[29] The marginal effect of PROGRESA income is positive, significant and does not differ significantly by gender. Moreover the estimated effects are very similar across samples indicating the regressions do a good job of capturing non-linearities in the effects of income (columns 2 and 3) and that elevated spending on

[27] Since total expenditure is higher among treatment households, a higher meat share implies higher spending on meat as PROGRESA income rises. In contrast, *per capita* expenditure on food, staples and vegetables is not related to PROGRESA income.

[28] The budget shares are not exhaustive; the marginal effect of PROGRESA income on shares of other commodity sub-groups such as health, personal care, household semi-durables, entertainment are not significantly different from zero.

[29] Since treatment households who responded to the program rules by enrolling children in school are excluded from this sub-sample, the effect of PROGRESA income should decline. Nonetheless, even within the restricted sub-sample, education spending is significantly higher as PROGRESA income rises. This may be because these households are forward looking and wish to maximize the income they will receive from PROGRESA by increasing the chances their children will be enrolled in school throughout elementary school and the first three years of

child clothing is not because the children are attending school (columns 4 and 5).

Assessment of robustness of results

The regression evidence in Table 3 indicates that receipt of PROGRESA income is associated with shifting resources to investment in small livestock, improved nutrition (more protein per calorie of intake) and in favor of child goods (child clothing and possibly education). This is true in the entire sample and in samples that are restricted to only poor households, to households that received the PROGRESA benefit and to households whose age-eligible children were always in school during the study period.

However, in order to interpret the evidence as indicative of how resources under the control of women might be spent, and a rejection of the unitary model, it is important to assess whether alternative interpretations are consistent with the data. These issues are explored in Table 4. The sample is restricted to treatment households and the estimates for that sample (Table 3, column 3) are repeated in Column A of Table 4.

A key assumption underlying the testing strategy is that the source of income has no impact on how it is invested and PROGRESA income is distinguished from other sources of income because PROGRESA benefits are placed in the hands of women. An alternative approach would contrast the effect of women's earnings and men's earnings on investment decisions. Very few women in the sample report any income other than PROGRESA. Only 7% of females in couple households report any income, and the vast majority of those women report only labor earnings. How a husband and wife allocate their time is properly treated as an integral part of the decision process underlying resource allocation within the household and so comparisons of the effects of male and female earnings on investment patterns are difficult to interpret. The decision to invest more in small livestock may well be a consequence of PROGRESA shifting the household

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secondary school.

members' opportunity cost towards more home-rearing activities and less to time (of women) devoted to market labor, and not because of women having different preferences that other household members. In recognizing that time allocation is an integral part of the household decision making, studies have used income from non-labor sources. Putting aside the strong assumptions needed to interpret those models, less than 1% of women in this sample report any non-labor income and so this is not a practical approach with these data. Thus, treating PROGRESA income as equal to female non-labor income is not an unreasonable approximation in our context. Clearly a key advantage of PROGRESA income in this study is that it can legitimately be treated as an exogenous increase in income which is placed in the hands of women in the (randomly assigned) treatment communities.

Nevertheless, PROGRESA income may differ from other income sources because it is a government transfer and not subject to, say, the vagaries of the weather as would be the case for income from agriculture, for example. More generally, how income is invested may differ depending on the predictability of the income. To address this question, the three follow-up surveys are exploited to calculate the household-specific variance of PROGRESA income and also of total household income. They are included with PROGRESA income in Column B of Table 4.

The positive effects of PROGRESA income on the probability of owning pigs as well as the number of pigs and poultry owned are robust to the inclusion of variances and the variance of the benefit also has a positive effect on these investments (suggesting that savings may come out of transitory income). The inclusion of income variances in the model increases the positive effect of PROGRESA income on the quality of nutrient intake linked to an increase in meat spending (although higher variances in benefits do depress meat shares and increase shares on vegetables), but has little impact on the estimated effects of PROGRESA income on other foods and on child clothing. Education shares rise as the variance of the PROGRESA benefits rise: this likely reflects

reverse causality since a higher variance in benefits implies a response to the incentives in the program (by changing attendance at schools or health clinics). Conditional on that variance, the level of PROGRESA continues to be positively associated with education shares suggesting the effect is not entirely due to reverse causality. We conclude that the rejection of the unitary model is not driven by differences in the variances of income PROGRESA relative to other income.

The analyses thus far have relied on actual payments of benefits to households (from administrative records). These amounts differ from expected payments based on the program rules because of errors in administration and delays in payments. It is possible that households use expected payments when making allocation decisions in which case actual payments will be an error-ridden proxy of the relevant construct; if the reverse is true, expected payments will be noisy proxies.

Estimates of the effects of the expected benefit, reported in Column C of Table 4, are smaller (in absolute value) than the effects of the actual benefit (column A of the table). This suggests that decisions are based on income received rather than expected income. To probe this further, we estimated the model, $Actual_i=\alpha_0+\beta_0\ Expected_i+\varepsilon_I$ and its reverse, $Expected_i=\alpha_1+\beta_1\ Actual_i+u_i$. If the two measures are identical, then β will be 1 and α will be 0 whereas deviations from those values indicate that the independent variable is measured with (classical) error. Since β_0=.45 and α_0=0.1 while β_1=1.1 and α_1=0.07, it appears that expected payments are error ridden proxies for actual payments.

Models that include both expected and actual benefits are reported in Column D of Table 4. The effects of actual benefits are very similar to those in column A (and none of the differences is significant). Expected benefits have a significant impact only on the number of poultry owned, food shares, education and child clothing. In all cases, these effects are smaller than the impact of actual benefits. All the evidence points to household decisions being based on the benefits at the time they

are paid to the women and not on the potential income from the program. If households are able to borrow against future PROGRESA income, and there is no uncertainty about whether PROGRESA benefits will be paid, expected benefits should impact decision-making. The evidence is suggestive that PROGRESA beneficiaries either face binding liquidity constraints or are uncertain about payments or both.

Probing more deeply, it is possible to exploit the longitudinal dimension of the data and include a household fixed effect which will sweep out all characteristics of households that do not change during the eighteen month study period. This includes household permanent income (and the expected PROGRESA benefit as long as that expectation is fixed) along with any behavioral response to the initiation of the program (such as a change in time allocation of household members, inter-household transfers or a change in choice of crop or technology). The fixed effect will also absorb household-specific differences in measurement error of household resources and PROGRESA benefits. Results are reported in Column E of Table 4. The estimates measure the effect of changes in PROGRESA benefit on household resource allocations. In the absence of liquidity constraints, the effects should be zero. While the effects are smaller than those in column A1, they are not zero. PROGRESA income continues to increase the number of small livestock (poultry and pigs) that are owned, reduce calories per capita, improve diet quality and increase the share of the budget spent on meat, as well as child clothing. The evidence indicates that additional income in the hands of women results in shifting resources towards investments small livestock, nutrition and children.

However, the possibility remains that the results presented thus far have nothing to do with giving money to women, but are, instead, related to some other dimension of the program. For example, one of the messages of PROGRESA is that parents should invest in a better diet and in their children. Participation in the program may affect the returns to saving and investing in children

or participation may directly affect behaviors related to those choices. These effects should be apparent not just for couples but for single-headed households. Column F of the table presents results for households headed by single females (in F1) and single males (in F2). The evidence is unambiguous: PROGRESA income has no impact on any of the budget allocations or on investments in livestock among single-headed households. Controlling total household resources, the marginal effects of PROGRESA are both substantively very small and not significantly different from zero. We conclude that the results regarding the impact of giving PROGRESA income to women in couple households cannot be attributed to unobserved heterogeneity that is associated with the PROGRESA program.

In sum, the evidence indicates that PROGRESA payments to women are directed towards investments that are likely to remain under their control. Under the assumption that women are more patient than men, then the evidence can be interpreted as indicating that the PROGRESA payment is associated with an increase in the woman's power within the household and she has a greater say in resource allocations within the household. The PROGRESA survey does not contain direct evidence on preferences of individuals and so we turn to data from the Mexican Family Life Survey (MxFLS).

6. Direct evidence on inter-temporal preferences

MxFLS is a broad-purpose, nationally representative, longitudinal survey of individuals, households and their families (Rubalcava and Teruel, 2006) which collects extensive information on socio-economic and demographic characteristics of respondents, including participation in public programs. The baseline, conducted in 2002, interviewed respondents in over 8,400 households and more than 90% of those respondents were re-interviewed in the second wave in 2005.

Key for this research is that in the second wave of MxFLS, every household member age 15 and older completed a module that seeks to elicit inter-temporal preferences. The respondent is asked to consider a hypothetical situation in which he/she wins the lottery and can be paid now or paid a larger sum in the future. The first battery of questions asks about payment now relative to one month in the future. The second battery asks about payment now relative to three years hence. In each battery, the respondent is given a series of binary choices of payment now or a higher payment later with increasing implied interest rates. The frequency distribution of choices for the longer-term battery is displayed in Panel 1 of Table 5 for females (column A), males (column B) and the difference between females and males (column C). Slightly over half respondents are impatient in the sense that they always preferred to be paid now relative to later. About 10% are patient (they prefer $12,000 in 3 years to $10,000 now). Females are generally more patient than males.

The evidence is summarized in a regression framework in the second panel of the table which reports estimates from an ordered probit regression in which the dependent variable ranges between [1] (most impatient) and [5] (most patient) as in Panel 1. Robust standard errors, which allow for clustering at the household level, are reported below regression coefficients. We report the difference between females and males for the longer-term (row 1) and shorter-term (row 2) choices. The regression results indicate that females are significantly more patient than males. This is true when the regressions include no controls (column A), when the estimates are adjusted for age and education (column B) and also adjusting for household composition and resources (column C). About one-quarter of the sample respondents live in PROGRESA beneficiary households. In order to parallel the evidence based on the PROGRESA data, analysis is restricted to adults living in beneficiary households in the final column. In these households females are significantly more patient than males and the difference is slightly larger than in other rural

households. The direct measures provide unambiguous evidence that there is heterogeneity in preferences between males and females with the latter being significantly more patient when it comes to financial decisions.[30]

7. Conclusions

PROGRESA benefits, which were paid to women, increased total household income by around one-quarter among those rural Mexicans who received the benefit. The impact of additional income in the hands of women is examined by exploiting the fact that otherwise identical communities were randomly assigned to be treatments, in which eligible households received the benefit at the beginning of the study period, or to control communities, in which eligible households would receive after the study period.

In households that are headed by couples, relative to other household income, PROGRESA income is spent on small livestock, higher quality of nutrient intake and child clothing. In households headed by single females or single males, PROGRESA income is treated no differently from any other income. Qualitative evidence from interviews conducted with PROGRESA households indicates that PROGRESA income was perceived as being under the control of women. "Now we don't demand, every moment, '*give me for shoes, give me for that'*. Now we take the money from PROGRESA and we buy from that money. Now we don't bother them [their husbands] so much" (Adato, et. al. 2000).

Moreover, direct evidence on preferences indicates that women in rural Mexico are more

[30] The hypothetical questions follow the protocols used in behavioral economics incentivized tasks albeit with a coarser grid. A small sub-sample of respondents completed incentivized tasks with real stakes and similar patterns emerge for both the incentivized tasks and hypothetical questions. In both cases, females are more patient than males and younger respondents are more impatient than older respondents. Preliminary evidence suggests that the hypothetical questions and incentivized tasks provide a consistent picture of characteristics that are correlated with preferences in the rural Mexican population. Note that hypothetical questions have some advantages: contamination due to credibility of future payments, liquidity constraints and the budget constraint of the experiment are not relevant See Eckel et al, 2006, for more detail.

patient than men. Taken together, the evidence suggests that PROGRESA benefits increase the power of women who are better able to assert their preferences and allocate more resources within households towards investments. These investments include small livestock (over which they have some control) and their children. This is an important result. First, it suggests that empowering women is likely to be associated with elevated levels of savings and investments which will, in turn, likely contribute to future growth. Second, the results suggest one mechanism for the empirical finding that mothers allocate more resources to their children than fathers: women are inclined to invest more in the future, their children.

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TABLE 1: Distribution of households and sample characteristics

PANEL A Distribution of households in 1997 baseline

(Row percentages in parentheses)

# of households	Treatments	Controls	Total
Not eligible (Not Poor)	7,003 (61%)	4,531 (39%)	11,534 (48%)
Eligible (Poor)	7,830 (63%)	4,678 (37%)	12,508 (52%)
Total	14,833 (62%)	9,209 (38%)	24,042

PANEL B: Characteristics of households headed by a couple

All households headed by a couple

	Eligible	Not eligible
Head's Years of Schooling	2.87 (0.06)	3.06 (0.06)
Age of Head	41.83 (0.20)	50.80 (0.29)
Household Size	6.00 (0.04)	4.77 (0.05)
# of HHs	10,694	8,806

Eligible households headed by a couple

	Treatments	Controls	Difference
Head's Years of Schooling	2.91 (0.08)	2.81 (0.10)	0.10 (0.13)
Age of Head	41.73 (0.24)	42.00 (0.35)	-0.27 (0.42)
Household Size	5.99 (0.05)	6.05 (0.06)	-0.06 (0.07)
# of HHs	6,683	4,011	10,694

Notes: Source: 1997 baseline survey (ENCASEH). Robust standard errors in parentheses.

TABLE 2: Savings, ownership of livestock, nutrient intake and budget shares

	Treatments	Controls	Difference
A. Expenditure, savings and livestock			
1. HH expenditure *per capita* (monthly)	133.39	118.23	15.16
	(0.77)	(0.93)	(1.21)
2. HH income - expenditure *per capita* (monthly)	157.88	144.49	13.38
	(14.89)	(19.31)	(24.38)
3. # of chickens & turkeys	4.45	4.10	0.36
	(0.05)	(0.06)	(0.08)
4. # of pigs	0.79	0.80	-0.02
	(0.01)	(0.02)	(0.02)
5. # of cows	0.44	0.34	0.10
	(0.02)	(0.02)	(0.03)
6. # of horses & donkeys	0.46	0.39	0.07
	(0.01)	(0.01)	(0.01)
B. Nutrient intake			
7. Calories *per capita*	1807	1714	94
	(11.54)	(14.10)	(18.22)
8. Protein per calorie (g/Kcal)	2.39	2.32	0.06
	(0.05)	(0.10)	(0.10)
C. Budget shares on food			
9. Food	66.69	66.68	0.01
	(0.19)	(0.24)	(0.31)
10. Vegetables	9.57	8.97	0.59
	(0.06)	(0.07)	(0.09)
11. Fruits	0.56	0.41	0.16
	(0.01)	(0.02)	(0.02)
12. Tortillas & beans	15.31	17.79	-2.48
	(0.11)	(0.17)	(0.20)
13. Meat	12.19	10.56	1.64
	(0.09)	(0.11)	(0.14)
D. Other budget shares			
14. Education	1.58	1.55	0.02
	(0.04)	(0.05)	(0.06)
15. Boys' clothing	2.15	1.62	0.54
	(0.03)	(0.03)	(0.04)
16. Girls' clothing	1.97	1.46	0.50
	(0.03)	(0.03)	(0.04)
# of Obs.	14,413	8,469	

Source: ENCEL Oct 98, May 99 and Nov 99.
Robust standard errors in parentheses.

TABLE 3: PROGRESA income, ownership of livestock, nutrient intake and budget shares

Marginal effect of PROGRESA income (in $000 pesos) after controlling total household resources.

Dependent variable	All HHs (incls non poor)	Treatment & Control HHs	Treatment HHs only	Treatment HHs In all waves	Treatment HHs Always in school
	(1)	(2)	(3)	(4)	(5)
A. Livestock ownership					
Linear Probability Model (Probability of having)					
1. Chickens & Turkeys	10.33	6.97	7.16	9.43	6.97
	(2.65)	(3.03)	(3.11)	(3.42)	(4.64)
2. Pigs	11.78	14.68	15.70	17.30	10.92
	(2.55)	(3.04)	(3.30)	(3.61)	(4.76)
3.Cows	1.58	1.57	1.15	0.29	-0.21
	(1.90)	(2.06)	(2.13)	(2.42)	(2.98)
4. Horses & Donkeys	2.04	2.44	2.24	2.21	0.90
	(2.30)	(2.58)	(2.63)	(2.91)	(3.73)
Negative Binomial Model (Number of)					
5. Chickens & Turkeys	0.45	0.43	0.34	0.38	0.31
	(0.05)	(0.05)	(0.06)	(0.07)	(0.09)
6. Pigs	0.38	0.41	0.43	0.49	0.37
	(0.07)	(0.08)	(0.09)	(0.09)	(0.12)
7.Cows	0.07	0.19	0.16	0.05	-0.03
	(0.10)	(0.13)	(0.14)	(0.16)	(0.22)
8. Horses & Donkeys	0.09	0.07	0.11	0.12	0.15
	(0.07)	(0.09)	(0.10)	(0.11)	(0.15)
B. Nutrient intake					
9. ln(*per cap* calories)	-0.06	-0.14	-0.14	-0.15	-0.10
	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)
10. Protein per calorie	0.15	0.16	0.16	0.18	0.14
	(0.03)	(0.03)	(0.03	(0.04)	(0.05)
C. Budget shares on food					
11. Food	-1.07	-6.53	-8.01	-8.63	-8.21
	(0.75)	(0.89)	(0.95)	(1.04)	(1.38)
12. Vegetables	-0.60	-1.77	-1.95	-1.74	-2.09
	(0.27)	(0.35)	(0.39)	(0.43)	(0.55)
13. Fruits	0.08	-0.13	-0.20	-0.24	-0.24
	(0.08)	(0.09)	(0.10)	(0.10)	(0.13)
14. Tortilla & Beans	-1.74	-2.78	-3.32	-3.37	-3.97
	(0.58)	(0.72)	(0.77)	(0.84)	(1.14)
15. Meat	2.50	2.14	1.71	1.53	1.76
	(0.48)	(0.59)	(0.64)	(0.72)	(0.92)
D. Other budget shares					
16. Education	1.59	2.84	3.43	3.64	2.75
	(0.32)	(0.35)	(0.37)	(0.42)	(0.62)
17. Boys' Clothing	2.98	2.99	3.15	3.05	2.78
	(0.16)	(0.20)	(0.22)	(0.23)	(0.33)
18. Girls' Clothing	2.90	3.13	3.36	3.50	3.22
	(0.19)	(0.23)	(0.25)	(0.28)	(0.34)
# of Obs.	31,732	22,882	14,413	11,426	6,677

Notes: Column (1) includes all couples in the evaluation sample including eligible and not eligible. Column (2) restricts attention to eligible households and includes both treatments and controls. Column (3) includes only treatment households. Column (4) includes treatments who were interviewed in all three waves of the evaluation survey. Column (5) restricts attention to treatment households in all waves of the survey and all of whose children were always in school in all waves. Following controls are included in each regression but not reported: logarithm of *per capita* household expenditure (in spline with knots at 25 and at 75 percentile), logarithm of household size and number of males and females between 0-5, 6-11, 12-25, 26-45 and 45 + years of age with older females excluded; education and age of head and spouse; indicators for whether household has indoor water, electricity, concrete walls, concrete roof; community fixed effects; and survey wave fixed effects (to capture time and season effects). Robust standard errors with clustering at the household level reported below regression coefficients.

TABLE 4: Marginal effect of PROGRESA income (in $000s pesos) on ownership of livestock, nutrient intake and budget shares
Specification tests and evaluation of alternative interpretations

Column	A	B			C	D		E	F	
	Treatment HHs	Level and variance of benefit			Expected	Actual and expected benefit		HH F.E.	HH head is	HH head is
	Prog inc	Prog inc	Var(Prog)	Var(HH inc)	E(Prog inc)	Prog inc	E(Prog inc)	Prog inc	Single female	Single male
	(A1)	(B1)	(B2)	(B3)	(C1)	(D1)	(D2)	(E1)	(F1)	(F2)
A. Livestock ownership										
Linear Probability Model (Probability of having)										
1.Chickens	10.33	4.45	0.81	0.04	3.05	6.99	2.72	-0.21	0.01	0.03
& turkeys	(2.65)	(3.58)	(0.57)	(0.12)	(2.61)	(3.11)	(2.62)	(5.76)	(0.02)	(0.04)
2. Pigs	11.78	12.43	1.00	0.17	2.82	15.54	2.09	4.54	-0.01	0.04
	(2.55)	(3.66)	(0.58)	(0.13)	(2.33)	(3.30)	(2.35)	(5.85)	(0.02)	(0.04)
Negative Binomial Model (Number of)										
3. Chickens	0.45	0.25	0.03	-0.001	0.16	0.33	0.13	0.33	0.0000	0.0000
& turkeys	(0.05)	(0.07)	(0.01)	(0.008)	(0.06)	(0.06)	(0.06)	(0.08)	(0.00002)	(0.001)
4. Pigs	0.38	0.31	0.04	0.02	0.09	0.42	0.06	0.30	0.0000	0.002
	(0.07)	(0.10)	(0.02)	(0.006)	(0.08)	(0.09)	(0.08)	(0.11)	(0.001)	(0.002)
B. Nutrient intake										
5. ln (*per cap*	-0.14	-0.19	0.02	0.001	0.03	-0.15	0.05	-0.20	0.0001	0.0002
calories	(0.03)	(0.04)	(0.005)	(0.002)	(0.03)	(0.03)	(0.03)	(0.07)	(0.0002)	(0.0004)
6. Protein	0.16	0.23	-0.02	-0.003	-0.01	0.17	-0.03	0.21	0.0003	0.0001
per calorie	(0.04)	(0.04)	(0.01)	(0.002)	(0.03)	(0.04)	(0.03)	(0.08)	(0.0002)	(0.001)
C. Budget shares on food										
7. Food	-8.01	-7.56	-0.16	0.14	-4.55	-6.99	-3.00	-0.65	0.002	-0.02
	(0.95)	(1.13)	(0.18)	(0.04)	(0.77)	(0.99)	(0.80)	(1.99)	(0.008)	(0.03)
8. Vegetables	-1.95	-3.25	0.33	-0.01	-1.02	-1.75	-0.63	-0.55	-0.004	-0.01
	(0.39)	(0.50)	(0.08)	(0.02)	(0.32)	(0.40)	(0.33)	(0.88)	(0.003)	(0.01)
9. Fruits	-0.20	-0.17	-0.01	0.00	-0.11	-0.17	-0.07	-0.24	0.0004	-0.004
	(0.10)	(0.13)	(0.02)	(0.0002)	(0.07)	(0.11)	(0.08)	(0.21)	(0.001)	(0.004)
10.Tortilla	-3.32	-3.69	0.10	0.22	-1.29	-3.13	-0.60	-2.44	0.0001	0.01
& beans	(0.77)	(0.96)	(0.15)	(0.06)	(0.63)	(0.80)	(0.65)	(1.74)	(0.008)	(0.02)
11. Meat	1.71	3.24	-0.44	-0.04	-0.15	1.91	-0.58	2.28	0.006	-0.01
	(0.64)	(0.74)	(0.11)	(0.03)	(0.51)	(0.65)	(0.52)	(1.31)	(0.01)	(0.02)
D. Other budget shares										
12 Education	3.43	2.14	0.38	0.00	2.46	2.80	1.84	0.22	-0.001	-0.01
	(0.37)	(0.45)	(0.08)	(0.01)	(0.29)	(0.38)	(0.30)	(0.80)	(0.002)	(0.02)
13. Boy's	3.15	2.9	0.07	-0.04	1.48	2.86	0.85	1.11	0.001	0.01
clothing	(0.22)	(0.26)	(0.04)	(0.01)	(0.17)	(0.23)	(0.18)	(0.43)	(0.002)	(0.01)
14. Girl's	3.36	3.19	0.05	-0.01	1.42	3.11	0.73	2.11	0.001	0.01
clothing	(0.25)	(0.29)	(0.04)	(0.01)	(0.17)	(0.26)	(0.18)	(0.48)	(0.002)	(0.01)

Notes: Column (A1) repeats Table 3 column 3 for reference. Panel B shows marginal effect of PROGRESA benefit in $000s pesos, (B1) after controlling the variance of the benefit (B2) and the variance of total household income (B3). Panel C reports effect of expected PROGRESA benefit (C1). Panel D reports effect of PROGRESA benefit (D1) controlling for expected benefit (D2). Panel E reports effect of PROGRESA benefit after controlling HH fixed effect. Panel F reports effect of PROGRESA benefit for 2 different samples: households headed by a single female (F1), and households headed by single male (F2); sample sizes are 658 and 244 respectively. See notes to Table 3.

TABLE 5:Inter-temporal preferences of adult males and females in rural Mexico
Results from hypothetical questions asked in the Second Wave of the Mexican Family Life Survey

PANEL 1: Distribution of choices of hypothetical payment now or in 3 years time By gender of respondent

*Win **$10,000** pesos in the lottery* and collect:	*(A) Females*	*(B) Males*	*(C) Diff.*
[1]. $10,000 today (Most impatient)	0.52 (0.01)**	0.53 (0.01)**	-0.01 (0.01)
[2]. $40,000 in three years	0.12 (0.01)**	0.17 (0.01)**	-0.04 (0.01)**
[3]. $20,000 in three years	0.12 (0.01)**	0.12 (0.01)**	0 (0.01)
[4]. $15,000 in three years	0.11 (0.01)**	0.09 (0.01)**	0.02 (0.01)*
[5]. $12,000 in three years (Most patient)	0.13 (0.01)**	0.09 (0.01)**	0.04 (0.01)**
# of respondents.		5,230	

Fraction choose each option and (std err)

PANEL 2: Ordered probit estimates of differences in time preferences of females relative to males (three-year and one-month lottery)

	(A) Unconditional	*(B) Controlling Age & Schooling*	*(C) (2) plus control HH composition & resources*	*(D) Progresa Beneficiaries.*
Longer-term (3 years vs now)	0.11 (0.03)**	0.10 (0.03)**	0.10 (0.03)**	0.13 (0.05)**
Shorter-term (1 month vs now)	0.12 (0.03)**	0.11 (0.03)**	0.10 (0.03)**	0.13 (0.05)**
# of Obs.	5,230	5,230	5,230	2,315

Notes: Regression in column (A) includes no additional controls. Column (B) controls the respondent's age and schooling. Column (C) also controls household composition (logarithm of household size and number of males and females between 0-5, 6-11, 12-25, 26-45 and 45 + years of age) and the logarithm of per capita household expenditure (specified as spline with two knots at 25 percentile and at 75 percentile). Column (D) repeats the model in column (C) restricting the sample to individuals living in households reporting to receive PROGRESA. Robust standard errors which allow for clustering at the household level reported below regression coefficients.