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The Impacts of Cash and In-Kind Transfers on Consumption and Labor Supply

Experimental Evidence from Rural Mexico

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Abstract

The authors use the unique experimental design of the Food Support Program *(Programa Apoyo Alimentario)* to analyze in-kind and cash transfers in the poor rural areas of southern states of Mexico. They compare the impacts of monthly in-kind and cash transfers of equivalent value (mean share 11.5 percent of pre-program consumption) on household welfare as measured by food and total consumption, adult labor supply, and poverty. The results show that approximately two years later the transfer has a large and positive impact on total and food consumption. There are no differences in the size of the effect of transfer in cash versus transfers in-kind on consumption. The transfer, irrespective of type, does not affect overall participation in labor market activities but induces beneficiary households to switch their labor allocation from agricultural to nonagricultural activities. The analysis finds that the program leads to a significant reduction in poverty. Overall, the findings suggest that the Food Support Program intervention is able to relax the binding liquidity constraints faced by poor agricultural households, and thus increases both equity and efficiency.

This paper—a product of the Poverty Reduction Group, Poverty Reduction and Economic Management Network—is part of a larger effort in the department to analyze poverty and monitor and evaluate the effectiveness f poverty reduction programs. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at eskoufias@worldbank.org.

The Impacts of Cash and In-Kind Transfers on Consumption and Labor Supply: Experimental Evidence from Rural Mexico

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1. Introduction

Monetary transfers and transfers in-kind are two widely used instruments of redistribution and social protection in developed and developing countries alike. Naturally, there is a long-standing debate about the relative merits of each alternative form of social assistance (Currie and Gahvari, 2008). Transfers in-kind, such as food transfers or educational vouchers, are widely considered to be more politically palatable as a means of redistributing public funds to poorer households. In-kind food and school-related transfers are also believed to have long-term investment properties (e.g. Blank, 2002). For example, food transfers targeted to poor households with children may lead to better child nutrition and better health of these children in their adult years.[1] Yet, cash transfers are increasingly becoming the preferred mode of redistribution particularly in developing countries. For example, the majority of the recent social assistance programs in Latin America provide conditional income transfers in the form of cash on the grounds that cash transfers are administratively more efficient than in-kind transfers in terms of the cost incurred per unit value of the benefit.[2] Cash transfers, however, may be subject to leakages in the sense that only part of the public assistance (i.e. cash) may be used for the consumption of the commodity subsidized, with the remainder of the benefit being directed towards the consumption of less desirable or less nutritious commodities such as alcohol and tobacco.

Another key factor in this debate is whether the effect size of an in-kind transfer is different from the effect size of a cash transfer. Regarding the impacts on consumption, the

[1] This assumes sufficiently high transaction costs that prohibit the resale of the food items received by the program.

[2] Examples of such programs include the *Oportunidades* program in Mexico, the *Bolsa Familia* program in Brazil, *Bono de Desarrollo Humano* in Ecuador, *Familias en Accion* in Colombia, *PRAF* in Honduras, *PATH* in Jamaica, and *Red de Proteccion Social* in Nicaragua, among others. Rigorous evaluations of some of these types of programs suggest that they are having significantly positive impacts on consumption and nutrition as well as school attendance (e.g. Schultz, 2004, Hoddinott and Skoufias, 2004; Maluccio and Flores, 2004).

traditional economic model distinguishes between the case of an infra-marginal and an extra-marginal transfer. If the quantity transferred is smaller than what was consumed prior to the intervention (infra-marginal transfer), then the marginal effect of a transfer in-kind would be no different from the effect of a cash transfer (Southworth, 1945). If the quantity transferred is greater than what was consumed prior to the intervention (extra-marginal), then the effect of a transfer in-kind on consumption is likely to be different from the effect of a cash transfer, since an in-kind transfer constrains the beneficiary to consume more than what she would have chosen with a cash transfer.

Similar arguments apply to the impacts of in-kind and cash transfers on labor supply. The traditional economic model implies that redistributive transfers are likely to be associated with reduced work effort and thus lower efficiency in the use and allocation of resources. Provided leisure is a normal good, cash transfers leading to an increase in household income will in turn result in more leisure and less work as households attempt to increase their welfare by substituting between leisure and consumption. As long as the in-kind transfer is infra-marginal, there should be no difference in how labor supply responds to a cash or an in-kind transfer. However, as noted by Leonesio, (1988) and Gavhari (1994), in the case where in-kind transfers are extra-marginal (or overprovided) constraining beneficiaries to consume more than what they would have chosen with a cash transfer of the same value, in-kind transfers can increase, rather than decrease, labor supply.

The empirical evidence available up to now on the effect size of in-kind transfers on consumption and labor supply is derived primarily from nonexperimental studies on the food

stamp program in the US. [3] Thus the empirical estimates available are driven by the relative proportion of households in the sample analyzed for which the transfer is extra-marginal or infra-marginal. The majority of these studies have the shortcomings typically attributed to all nonexperimental studies: reliance on econometric methods and untested behavioral assumptions as a means of constructing counterfactual outcomes, functional form specification, potential biases arising from endogeneity, and selection into the program based on unobserved factors. With these caveats in mind, Senauer and Young (1986) try to distinguish econometrically between infra-marginal and extra-marginal food stamp recipients and present results that contradict the prediction of the traditional economic model by showing that food stamps have a significantly greater impact on food purchases than an equal amount of cash income, *even* for infra-marginal recipients of food. Del Ninno and Dorosh (2003), using data from various food grain distribution and cash transfer programs in Bangladesh, find that the marginal propensity to consume (MPC) out of wheat transfers in–kind is significantly higher than the MPC out of cash transfers. In a more recent study, that takes advantage of the rollout of the food stamp program, Hoynes and Schazenbach (2007) find that the introduction of food stamps led to an increase in overall food expenditure.

To date, the only empirical evidence based on an experimental design is Fraker, Martini, and Ohls (1995). Using experimental data from four demonstrations of converting food stamps into a cash transfer, they conclude that food spending would be reduced by 18 to 28 cents per dollar of food stamp benefit cashed out. In contrast to the significant positive effects of food stamps on food expenditure, Fraker and Moffitt (1988), Hagstrom (1996), Keane and Moffitt (1998) and Hoynes and Schazenbach (2007) find that participation in the food stamp program

[3] It should be kept in mind that food stamps are an unrestricted voucher, which is quite different from an in-kind transfer. This difference is likely to have important implications for differences in the results across these two types of programs.

has insignificant or small labor supply impacts.

Our paper contributes to this literature by shedding new light on the relative impacts of in-kind or cash transfers on consumption, and labor supply, using data from a conditional cash and food transfer program in the poor rural areas of Southern Mexico called PAL (*Programa Apoyo Alimentario or Food Support Program*). The principal objective of the program is to improve the food and nutrition conditions of targeted households living in rural poor communities with a population less than 2,500 and with a high and very high marginality index. The program is targeted to localities that are not covered by other federal programs with a nutritional component such as *Oportunidades* or *Abasto Social de Leche Liconsa.* The original program transfer consists of a monthly food basket with a value of 150 Mexican pesos or about US$13 for the federal government (median share of transfer to pre-program consumption is 8.9%, mean is 11.5%) and it is accompanied by an educational component (the requirement to attend diet, nutrition, and health-related educational sessions).

In this paper we do not evaluate the extent to which the nutritional objectives of the program are attained, but rather we examine the impacts of cash and in-kind transfers on a few key dimensions of household welfare as measured by food and total consumption, poverty, and labor supply.[4] A distinguishing feature of the PAL data is that they are based on a randomized design, with randomization of the type of program benefit received at the local level. Specifically, for the purpose of evaluating PAL, the selected communities were randomly assigned into a control group (C) and three treatment groups: a group (T1) that received the

[4] An analysis of the nutritional impacts of the PAL program entails a more detailed analysis of the relative impacts of cash and in-kind transfers on the consumption of micronutrient-rich food groups such as fruits and vegetables and on the anthropometric measures of children and adults. A more detailed description of the program, the evaluation design and estimates of the impact of the program on key nutritional outcomes can be found in Gonzalez-Cossio et al. (2006).

food basket without the requirement to attend educational sessions[5]; a group (T2) that received the food basket with the requirement to attend educational sessions; and a group (T3) that received the equivalent value of the food basket in cash (or $150 Mexican pesos) accompanied with the requirement to attend educational sessions. The control and the three treatment groups were surveyed before and after the implementation of the transfer program.

One key advantage offered by the evaluation design of the program is that we can also examine directly differences in the impacts of receiving cash instead of in-kind food transfers on food and total consumption. In principle, there is a variety of reasons why the impacts of in-kind and cash transfer may differ even among infra-marginal households. Women, for example, may have more control over in-kind food transfers while men may have more control over cash transfers. In this case, the impacts of cash and in-kind transfers may differ because of differences in the preferences between men and women. It is also possible that in-kind transfers may have more of social stigma attached to them than cash transfers. In-kind transfers may also affect the preferences of households in the sense that they feel socially obliged to consume everything they receive. The PAL data offer the ideal setting for testing whether indeed the impacts of the transfer in-kind differ from transfers in cash of equivalent value.

In our empirical analysis we apply the difference-in-differences estimator on repeated observations from households and their members in treatment and control villages surveyed for the purpose of evaluating the impact of the PAL program. Specifically, we investigate a number of interrelated questions. First, we examine whether the transfer and the type of transfer (in kind or in cash) affects total consumption and food consumption in particular. We find that the transfer has a positive impact on total and food consumption and confirm there are

[5] As discussed in more detail below, the treatment in the communities of group T1 was contaminated since these communities also received educational sessions.

no differences in the effect size of transfers in cash versus transfers in-kind. Second, we examine whether the transfer and the type of transfer (in-kind or in cash) affect participation in the labor market and the choice between participating in agricultural and nonagricultural activities. We find that the transfer, irrespective of type, does not affect participation in labor market activities. However, we do find that the transfer has a significant impact on the time allocation of males between agricultural and nonagricultural activities. As with consumption, we find no differences in the effects of transfers in-kind or in cash on labor supply.

Our empirical findings also shed light on the debate about the potential equity and efficiency effects of redistributive policies. Consistent with the findings of Blundell and Pistaferri (2003), who argue that the food stamp program in the US provides effective partial insurance among low-income households, our combined estimates on the impact of the PAL program on labor supply and consumption suggest that the cash or in-kind transfers provided by the PAL program manage to mitigate market imperfections, such as the absence of credit and insurance markets, that lead to higher efficiency as well as equity.

The organization of the paper is as follows. Section 2 describes the PAL program and the data used. Section 3 summarizes the theoretical predictions about the different impacts of in-kind and cash transfers on consumption and labor supply. Section 4 presents the econometric specification and discusses the results regarding the impact of PAL on food and total consumption, participation in the labor force participation and in particular on the decision to participate in agricultural and non-agricultural activities. Section 5 concludes.

2. A Brief Description of PAL and the Data

The data we use are based on a longitudinal sample of 5,851 households in 206 poor rural localities from six southern Mexican states (Chiapas, Guerrero, Oaxaca, Quintana Roo,

Tabasco, and Veracruz), surveyed in two rounds. This sample has been collected for the purpose of evaluating the *Programa de Apoyo Alimentario* (PAL). This program has as its major objective contributing to overcome poverty and improving food and nutrition conditions of target households, living in rural poor communities not covered by OPORTUNIDADES or LICONSA. The final program operation rules do not specify the woman in the household as the recipient of the food transfer, although in practice more than 75% of beneficiaries are women. In order to be incorporated into the program, the localities have to meet some requirements such as having a population of less than 2,500, having a high or very high marginality and being accessible (not more than 2.5km from a road), and close enough (not more than 2.5 km) to a DICONSA[6] store, because the distribution system was implemented by DICONSA. There is also household level targeting within the localities selected to be covered by the program. However, the household level targeting was not implemented in the localities contained in the evaluation sample, which implies that all households in the "treated localities" received the PAL benefit.

The PAL program provides in-kind transfers (food baskets) to most of the 150,000 target households that receive it. The cash transfers provided by the program were implemented for those very isolated communities where DICONSA did not regularly reach. The lack of any concrete ex-ante evidence of whether in-kind or cash transfers have a larger nutritional effect, combined with the interest of the program administrators to improve the design of the program, led to the design of an experimental field trial as part of the PAL initial evaluation. Approximately 5% of the PAL beneficiaries do receive cash as opposed to in-kind goods. The

[6] DICONSA is the Mexican government's agency that manages the supply of food (through its stores) to rural poor localities priced below those found in retail local stores.

value of both types of transfers is the same: 150 pesos every month.[7] The benefits are distributed through DICONSA, the related federal program which distributes non-perishable foods and housekeeping goods throughout rural poor communities. The PAL program offers nutrition and health education sessions (*platicas*), as well as participation in program-related logistic activities. However, given that attendance of the *platicas* is not a requirement for the receipt of the benefits, the PAL program is essentially an unconditional transfer program. [8]

The evaluation design is an experimental community trial and the data were collected on two occasions two years apart: at baseline in October 2003 through April 2004, and at follow-up in October through December 2005. A two-stage sampling was implemented: in the first stage a random sample of 206 rural (i.e. with population less than 2,500) communities was selected from a pool of 8 of the poorest states (Southeast region of Mexico); in the second stage, 33 households per community were randomly selected to be interviewed.

Localities were randomly assigned into three treatment groups and one control group. Two of the treatment groups were assigned to receive food transfers with and without receiving a health and nutrition education package, and a third to a cash transfer of equal value to the food basket plus the education package. The original intention was to deliver the food baskets to the beneficiary households every month, but for logistical reasons the program ended up delivering two baskets every two months.[9] The localities in the control group that did not receive any benefits were slotted for coverage by the program in the later stages of expansion of the PAL program.

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[7] It is important to note that at local prices, the food basket costs around 30% more for the consumer than for the Federal government. This suggests that the value of the cash transfer in real terms may on occasion be smaller than the transfer in-kind.

[8] Program administrators have confirmed that since the start of the PAL program there is not a single instance of a household being denied of the benefits of the program on the grounds of not attending the *platica*. As of 2008, a system of keeping track of regular attendance in *platicas* is being considered for implementation.

[9] The cash benefit and the food baskets were distributed at the same frequency.

The original food basket transferred consists of the following basic products: powdered fortified milk (8 packages of 240 gr. each), beans (2 kg), rice (2 kg), corn flour (3 kg), soup pasta (6 packages of 200 g), vegetable oil (1 lt.), cookies (1 kg), corn starch (100 g), chocolate drink in powder) (400 g), cereals (ready-to-eat) (200 g), and sardines (2 cans of 425 gr. each). [10] The basket offers approximately 400 calories per day per capita for an average household of 4.2 equivalent adults.

The sample size was calculated so that statistical tests had the power to detect statistically significant and biologically relevant differences in several nutritional and economic variables. Specifically, the calculations of the sample size prior to the baseline survey were based on 53 communities per treatment group, a power of 80 percent, and a minimum detectable difference in food per capita consumption between each treatment and control group between 17.8 percent (in T2 and T3) and 18.5 percent in T1.[11] The final sample consisted of 33 households per community and around 52 communities per treatment group.[12]

[10] This is the food basket (basket A) provided between June and October 2004. There were small changes in the contents of the food basket provided between November 2004 and April 2005 (basket B): Cereals were replaced by dried meat (100gr), and corn starch by lentils (500 gr).

[11] Also, ICC=0.220 and σ =69

[12] For more details the reader is referred to Gonzalez de Cossio et al. (2006).

3. The Expected Effects of Cash vs. In-Kind Transfers Based on Theory

The main differences between the impacts of cash and in-kind transfers on consumption and labor supply theoretically arise in the situation where the group of goods provided in-kind is "over-provided" (or extra-marginal). In order to illustrate the differences between the impacts of cash and in-kind transfers on consumption and labor supply, it is useful to consider a simple model with three commodities, leisure L, food C_F, and non-food C_{NF}.[13]

Let the utility function $U(C_F, C_{NF}, L)$ be separable in its three arguments, i.e. $U_{ij} = 0$, where *i* and *j* refer to L, C_F, and C_{NF}, and the budget constraint be $P_F C_F + P_{NF} C_{NF} + WL = V + W\Omega$ where V is non-labor income, P_F, P_{NF}, and W, is the price of food, nonfood, and time, respectively, and Ω is the time endowment of the household.

Graphically, a cash transfer of value T causes a parallel shift of the initial budget line by T/P_F to the new dotted budget line to the right, and its impact on food and nonfood consumption is summarized by the initial and post-transfer points A and A* (see figure 1). As can be inferred from figure 1, the cash transfer is likely to increase the consumption of both food and nonfood, while labor supply will decrease (assuming leisure is a normal good). At both points A and A*, the first order conditions characterizing the optimal choice of food and nonfood consumption and leisure before and after the transfer are given by the equations

$$\frac{U_F}{U_{NF}} = \frac{P_F}{P_{NF}}, \quad \frac{U_L}{U_F} = \frac{W}{P_F}, \text{ and } \quad \frac{U_L}{U_{NF}} = \frac{W}{P_{NF}}$$

In the case of an in-kind food transfer of the same quantity that could be purchased with the cash transfer T (i.e. T/P_F) the budget constraint also shifts to the right, but the region in the

[13] The theoretical model underlying the impacts of cash and kind-subsidies on consumption has been developed more than 65 years ago by Southworth (1945). The simple model presented here extends Southworth's model by including leisure in the utility function (e.g., see Killinsgworth, 1983, and Murray, 1980).

upper left corner is not attainable (see figure 2).[14] In this event there are two possible cases depending on the initial situation and the preferences of the household. For households consuming initially more food than the in-kind transfer (i.e. infra-marginal households), such as households in the lower region of the budget line before the transfer in figure 2 (e.g. point A to the right of the vertical dotted line), the in-kind transfer will have exactly the same effect as a cash transfer.[15] For these households the in-kind food transfer shifts the budget constraint parallel and to the right thus having the same effects as the cash transfer discussed in figure 1. For households consuming initially less food than the in-kind transfer (i.e., extra-marginal households), food is "over-provided" and the in-kind transfer acts as a constraint forcing them to consume more food and less nonfood compared to what they would consume had they received a cash transfer. Figure 2 presents an example of a constrained household denoted by the pre-transfer point B and the post-transfer point B*. In the same figure, the equilibrium point B** indicates the optimal choices of this household in the hypothetical case of a cash transfer instead of an in-kind transfer. For a household described by the point B* in figure 2, the first order conditions summarizing its optimal choices are given by

$$\frac{U_F}{U_{NF}} > \frac{P_F}{P_{NF}}, \quad \frac{U_L}{U_F} = \frac{W}{P_F}, \text{ and } \quad \frac{U_L}{U_{NF}} < \frac{W}{P_{NF}}.$$

Thus, although for these "constrained" households total consumption expenditures are identical (since both points B* and B** lie on the same budget line), it can be easily predicted that their expenditure on nonfood will be lower than in the case of a cash transfer of the same value, while their expenditure on food will be higher. Moreover, the level of welfare would be higher than the case where transfers are in the form of cash instead of in-kind, since point B**

[14] This assumes that the in-kind transfer cannot be sold or exchanged for cash or other nonfood items.
[15] It should be kept in mind that at the empirical level there may be other reasons why the impacts of in-kind and cash transfer may differ even among inframarginal households.

lies on a higher indifference curve compared to point B*. For extra-marginal households such as those in point B* the constraint imposed by the food transfer may also affect their labor supply quite differently than in the case of cash transfer. The budget constraint equation may be used to infer that the increased expenditure on nonfood will be met by an equal decrease in expenditures on both food and leisure. In fact, with the separable utility function assumed, it follows that both C_F and L will decrease, not just one (or the other), or else the condition $\frac{U_L}{U_F} = \frac{W}{P_F}$ will be violated.[16] Thus, in-kind transfers are likely to result in higher hours of work in cases where the in-kind commodity is "over-provided", whereas cash transfers are likely to lead to a reduction in hours worked.

To summarize, the simple economic model presented above implies that in-kind transfers, in general, are likely to have heterogeneous impacts on the consumption and labor supply of households depending on their initial situation prior to the implementation of the program. It is important to note that it is only for infra-marginal households that the food transfer is expected to have the same effect on consumption and labor supply as a cash transfer. Empirical estimates of the effect size of in-kind transfers are generally the weighted average outcome of the two different types of households. For example, the estimates of the program's impact on consumption in the treatment sample receiving the in-kind transfer (treatment group T2) would be affected by the proportion of extra-marginal households in the treatment group T2. One extreme case is the case where all households in T2 are extra-marginal (type B or B* in figure 2). In this case, the in-kind transfer is likely to increase food consumption by more than a cash transfer which implies that the impact of the in-kind transfer on the treatment group T2 is

[16] The assumption of a utility function separable in its arguments is not necessary. Gavhari (1994) and Leonesio (1988) have demonstrated that in general, if C_F and L are Hicks-Allen substitutes, then the effect of an "over-provided" in-kind transfer is to increase hours of work rather than decrease them.

likely to be higher than the impact in the treatment group receiving the cash-equivalent value of the transfer (group T3). The other extreme case is the one where all households are infra-marginal (type A in figure 2). In this case, the estimated impact on the treatment group T2 should be equal to the estimated impact in the treatment group receiving the cash-equivalent value of the transfer (group T3).

4. The Estimated Effects of Cash and In-Kind Transfers

The estimated impacts of PAL on the outcome variables of interest are based on the *difference-in-differences* (DiD) estimator. This estimator compares differences between the treatment and control groups before and after the start of the PAL program and offers the advantage that any time invariant pre-program unobserved heterogeneity between the treatment and control groups is eliminated in the estimation of impacts. The untested maintained assumption behind the application of the DiD estimator is that the time or trend effect is identical between the treatment and control groups. Specialized empirical specifications are implemented for consumption, labor force participation, and poverty estimation and are discussed below. We also include a number of control variables that may be useful for reducing any remaining statistical bias.

The following regression equation defines a model that can nest various "difference" estimators controlling for individual, household and locality observed characteristics:

$$Y(i,t) = \beta_0 + \sum_{j=1}^{3} \beta^J T_j(i) + \beta_R R2 + \sum_{j=1}^{3} \gamma^J \left(T_j(i) * R2\right) + \sum_{k=1}^{K} \theta_k X_k(i,t) + \eta(i,t) \quad . \qquad (1)$$

$Y(i,t)$ denotes the value of the outcome indicator of interest for household, or individual *i* in period/round *t*, β, γ, and θ are fixed parameters to be estimated, $T_1(i)$ is a binary variable

taking the value of 1 if the household resides in a treatment community that received the food basket without the condition to attend education sessions, and 0 otherwise, $T_2(i)$ is a binary variable taking the value of 1 if the household resides in a treatment community that received the food basket together with the condition to attend education sessions, and $T_3(i)$ is a binary variable taking the value of 1 if the household resides in a treatment community that received the cash transfer along with the condition to attend the educational sessions. The binary variable R2, is equal to 1 for the second round of the survey, and equal to zero for baseline observations. The vector $\boldsymbol{X}$ summarizes observed individual, household, and village characteristics. The last term in equation (1), η, summarizes the influence of unobserved factors. In most specifications, we assume that $\eta(i,t) = \mu(i) + \varepsilon(i,t)$ where $\mu(i)$ is a household-specific fixed-effect (or individual-specific fixed effect in the labor supply analysis) effect and $\varepsilon(i,t)$ is a pure random error term with the usual properties.

The different coefficients β^J allow the conditional mean of the outcome indicator to differ between eligible households in treatment and control localities before the initiation of the program. Given the randomized assignment into the three treatment groups and the control group, the three coefficients β^J (for J=1,2,3) are not expected to be significantly different from zero (i.e. pre-program differences in the baseline are expected to be zero).

Using the terminology of Heckman, La Londe, and Smith (1999), the parameters γ^J (where J=1,2,3) provide an estimate of the "intent to treat effect" (ITE) of the three types of treatment. The ITE is an estimate of impact that is inclusive of the operational efficiency or

inefficiency of the program implementation.[17] In fact, it turned out that the treatment in the communities of group T1 was contaminated, since these communities on their own initiative in some cases arranged to have educational sessions. The main intention of including treatment group T1 in the evaluation design was to compare potential differences in the effect size of in-kind transfers on consumption and labor supply due to the educational sessions. Given that comparisons of the coefficients γ^1 against γ^2 or γ^3 are problematic, we focus mainly on comparing the effect size of cash (γ^3) and in–kind transfers (γ^2), ceteris paribus, i.e., the treatment that are both accompanied by educational sessions. We test for differences in the effect size of in-kind transfers and cash transfers of equivalent value with a simple Wald test of the null hypothesis $\gamma^2 = \gamma^3$.[18]

Table 1

Table 1 presents the summary statistics of the key variables used in the analysis. The sample of households used for the analysis of consumption is what remains after dropping households with food consumption less than 1 percentile and more than the 99 percentile of the food distribution in the sample. The small value of the transfer in relation to the value of pre-transfer consumption (mean share 11.5% and median share 8.9%) suggests that the transfer is infra-marginal for the majority of the households. Given that the effect size of in-kind transfers is likely to be bigger depending on the extent to which the food transfer "over-provides" food for some households, table 1 also presents the fraction of households in each treatment group in

[17] Thus, γ^J provides a lower bound estimate of the impact of the program on those who actually receive the treatment (or of "the effect of the treatment on those who actually received the treatment").

[18] It is important to keep in mind that given the sample size of the different groups in the survey, tests of the null hypothesis $\gamma^2 = \gamma^3$ are likely to have low power in detecting small/marginal differences between the impact of cash and in-kind transfers. The power of these tests is examined in more detail below.

the baseline for which the nominal food consumption expenditures are less than the value of the transferred food basket (i.e. $150 pesos) as a means of identifying the fraction of households who might be constrained by the transfer to consume more food than they would like (i.e. the extra-marginal households). Table 1 reveals that there are no households in the sample who are constrained by the transfer to consume more food than they would like. However, as is shown in appendix A, this is not the case for individual food items.[19]

Food and total consumption

The survey collects information on the quantity of food consumed (including the quantity consumed out of own production and food gifts or donations including those of the PAL at follow-up) in the last seven days for 61 food items. The monthly value of food consumed is obtained by multiplying the quantity of food consumed of each food item multiplied by the median unit value of the same food item at the locality level. [20] The unit value of each food item is derived from the additional questions on the value and quantity purchased (and not necessarily consumed) in the last seven days. The total value of household food consumption per month is defined as the sum of the value of food consumed[21], and the value of meals consumed away from home. Total consumption expenditures are defined as the sum of food consumption and expenditures for goods other than food.

When examining impacts on food consumption, the dependent variable $Y(i,t)$ in equation (1) is the natural logarithm (*ln*) of the (nominal) value of food consumption per capita

[19] In appendix A we conduct a more detailed investigation of the extent to which the PAL food basket "over-provides" individual food items in relation to the consumption pattern of households in the sample in the baseline round.

[20].(The section erased was stated above already) However, we do not have the market price for all the food items that are included in the list of foods consumed (either some items are not included in the market price list or the definition of the food item is different).

[21] Deaton and Zaidi (2002) stress that in cases where the amount of food consumed can be distinguished from food purchased it is the value of food consumed that should go into the consumption aggregate.

per month. Along similar lines, when investigating impacts on total consumption the dependent variable $Y(i,t)$ in equation (1) is the natural log of the total value of food consumption and nonfood expenditures per capita per month (*lnPCE*).[22] We have also investigated the sensitivity of our finding to the use of an adult equivalent measure in place of the total number of members in the household in each round. Given that the results were qualitatively the same we only present the results using the per capita measure.

Figures 3 & 4

Figure 3 compares the kernel density function of the value of food per capita (in *ln*) of the households assigned in the treatment groups receiving the transfer in-kind (group T2) and in cash (group T3), against the corresponding density of consumption in the control group (C), separately for the baseline and the follow-up rounds. Figure 4 does the same for *lnPCE*. Given that the comparisons are conducted within survey rounds and not across survey rounds we do not adjust for potential changes in the cost of living over time. A comparison of the density functions in the baseline allows one to detect potential differences in the distribution of food and total consumption prior to the start of the program. Figure 3 for the baseline round suggests that there are no significant pre-existing differences in the distributions of consumption (food and total consumption, separately) between the two treatment groups and the control group, which confirms the successful implementation of the randomized design. The absence of significant differences in the conditional mean food and total consumption in groups T2 and T3 from the control group in the baseline is also confirmed from the regression analysis conducted below. Figure 4 of the kernel density functions of food and total consumption per capita in the follow-up round reveals a visible shift to the right in the distribution of consumption in group

[22] In appendix B, we also report the estimates obtained using levels (instead of logs) of per capita food consumption and per capita total expenditure both deflated by the value of the national consumer price index in the month of the household interview.

T2 (or T3) compared to the control group C, 18-24 months after the start of the PAL program. Thus, the PAL program appears to have a positive impact on food and total consumption per capita, irrespective of the form of the transfer.

Figure 5

Figure 5 compares the kernel density functions of food and total consumption expenditures in the treatment groups T2 (in-kind) against treatment group T3 (cash), separately for the baseline and the follow-up rounds. Figure 5 also reveals no significant differences in the distributions of food consumption and total consumption expenditures between the groups T2 and T3 in the baseline as well as in the round after the start of the PAL program. Thus, the preliminary indications so far are that there no apparent differences in the effect size of in-kind and cash transfers on food and total expenditures.[23]

In the regression analysis where we pool observations across two survey rounds that are two years apart it is necessary to take into account possible differences in initial cost of living. For this purpose, we estimate three alternative specifications that also serve as a test of the robustness of the results. In specification A, column (A) in table 2, we simply use binary variables identifying the date of interview of the household. This specification implicitly assumes that the inflation rate between all treatment and control villages is equal. In specification B, we include binary variables identifying the village of residence of the household. Lastly, in specification C we use binary variables identifying the household (or household-specific fixed effects). Specifications B and C control for initial (baseline) differences in relative prices between villages (or households).

[23] It is important to keep in mind, however, that cash and in-kind transfers are likely to have a differential impact on household welfare. As figure 2 illustrates, while the total expenditures of households receiving cash or in-kind benefits should be identical (points B** and B* are on the same budget line), the welfare of households receiving cash transfers is higher than the welfare of households receiving in-kind transfers (welfare is higher at B** than at B*).

The control variables used in place of the vector *X(i,t)* in equation (1) consist of a set of binary variables identifying the date of interview of the household, and individual and demographic composition variables in each round. In particular, we include the age of the household head, his/her gender, years of education, binary variables for his/her marital status, the household demographic composition (i.e., the number of children separately by age group, adult men (and women separately) aged 19 to 54, and men (and women) over the age of 55) a binary variable indicating whether this is an indigenous household and binary variables identifying whether the household receives benefits from other programs (such as *DIF*, *Desayunos Escolares*, and *Oportunidades*).[24], In specification A, in addition to the control variable s *X(i,t)* we also include two community level variables, such as the value of the estimated marginality index[25] for the locality, and the distance between the community and the "*cabecera municipal"* (the governing center of the municipality and likely the largest locality of the municipality).[26]

Table 2

Table 2 presents the estimates for food and total (food+nonfood) consumption. The estimates of β^1, β^2 and β^3, the coefficients of T1, T2 and T3, respectively, are occasionally statistically significant which implies that there are some pre-existing differences in food and total consumption between each one of the three different treatment groups and the control group. These findings support the use of the DiD estimator since it is able to control for these

[24] A household is classified as indigenous if one person, older than 18 years, speaks an indigenous language.
[25]We used the CONAPO marginality index for the year 2000.
[26] The community level variables are excluded when village- or household-level dummies are included in the regressions.

pre-existing differences that the randomized design was unable to eliminate.[27]

The double difference estimates of the effect size of the program in each treatment group, i.e., the estimates of γ^1, γ^2 and γ^3, the coefficients of T1xR2, T2xR2, and T3xR2, reveal that the program had a positive and significant impact on increasing food and total consumption. Overall, the estimated effect sizes reveal that inferences about the relative impacts of cash and in-kind transfers are sensitive to whether proper adjustments are made for differences in the cost of living across space and over time. Specification A, where the inflation rate between all treatment and control villages is assumed to be equal, yields lower estimates of program impact. In specifications B and C, we maintain the assumption that the inflation rate is the same between treatment and control villages, and an attempt is made to better account for initial differences in relative prices across villages, as well as other time-invariant unobserved heterogeneity, the impact of cash transfers on food or total consumption is either identical or slightly higher than that of in-kind transfers (particularly with specification B).

For each of the specifications A through C, Wald tests of the null hypothesis that the effect size of the in-kind transfer is equal to the effect size of a cash transfer, i.e., $\gamma^2 - \gamma^3 = \delta = 0$, could not reject the null for either food or total consumption (see Table 2). The inverse power function used by Andrews (1989) provides a useful tool that makes precise the inferences one can draw from these tests results. Following Andrews, we can determine two regions: (i) a region of low probability of type I error, i.e. values for the difference δ where we can conclude with significance level α =0.05 that the true difference is $|\delta| < c$, and (ii) another region of high probability (>0.50) of type II error, i.e. where no evidence is provided against values of the true difference.

[27] In principle with an experimental design, baseline or pre-program observations are not required.

Table 3

The inverse power tests for specification B for food consumption show that the difference in the effect size between cash and in-kind transfers is less than 10. 1 percentage points with significance 0.05, but the test provides no evidence that the difference in the effect size is less than 5.5 percentage points. The powers of the tests regarding total consumption expenditures are very similar, under the same specification. Overall, the inverse power tests for specifications B and C for both food and total consumption in table 3 suggest that the failure to reject the null hypothesis that the effect size of the transfer in-kind is equal to the effect size of a cash transfer, is unable to discriminate between identical effects and differences in the effect size up to 5 percentage points. Since a difference of 5 percentage points in the effect size is not very meaningful from an economic perspective it is safe to conclude that the effect size of the transfer in-kind is equal to the effect size of a cash transfer.

The estimated impact of the in-kind transfer with education (group T2) against the control group, summarized by the estimated value of the parameter γ^2, implies that the in-kind transfer leads to an increase in mean food consumption between 16.1 percent (specification A) and 17.9 percent (specification C). The impact of the cash transfer (group T3) on food consumed is between 15.7 (specification A) and 18.3 percent (specification B). In the baseline, the value of the transfer ranges from 10.6 percent of total consumption in the control group to 12.1 percent of consumption in the T1 group (see table 1). Thus a 10 to 12 percent increase in the income due to the transfers leads to a 15.7 to 18.3 percent increase in food consumption suggesting an elasticity of food consumption to the transfer between 1.31 and 1.83.

The elasticity estimates are a bit lower when considering total consumption. The impact of the in-kind transfer on total consumption, summarized by the estimated value of γ^3, is

between 14.2 percent and 15.6 percent. The impact of the cash transfer (group T3) on total consumption is between 13.9 and 17.1 percent. Thus, a 10 to 12 percent increase in the income due to the transfers leads to a 13.9 to 17.1 percent increase in total consumption suggesting an elasticity of total consumption to the transfer between 1.16 and 1.71.

These elasticity estimates suggest the presence of sizeable multiplier effects eighteen to twenty four months after the initiation of the PAL transfers. One plausible explanation for these large feedback effects associated with the PAL program may be due to the effects of the intervention on overall productivity.[28] In relatively isolated rural village economies characterized by the nonseparability of the production decisions of a household from its consumption needs, government social assistance programs such as the PAL program examined here, lead to a change in the shadow value of time of rural household members, which in turn may trigger behavioral responses by the recipient households not only on the consumption side but also on the production side (Strauss, 1986; de Janvry et al., 1991; Taylor, 2005). Blundell and Pistaferri (2003), for example, present statistical evidence that the food stamp program in the US provided effective partial insurance, especially among low-income households. Thus, it is quite plausible that the insurance against downside risk provided by the steady flow of food by the PAL program is associated with a reallocation of labor from less to more productive activities. The potential effects on the allocation of labor among labor activities are investigated in more detail below.

[28] The sizeable multiplier effects of the PAL program on consumption are consistent with the findings of Gertler et al. (2006), who found that rural households receiving PROGRESA/*Oporuninades* cash transfers increased their investments in micro enterprises and agricultural activities which, in turn, improved the households' ability to generate income.

Adult labor force participation

In our analysis of the impact of the PAL program on labor supply, we focus on adult males and females between 18 and 60 years of age (in the baseline round). The dependent variable $Y(i,t)$ in equation (1) is specified by a binary variable indicating whether an individual i works in the labor market in period *t*. Specifically, a person is classified as working in the labor market ($Y(i,t)=1$) if he/she reported having worked over the previous week (paid or unpaid) or had work but did not work. All others, such as those looking for work, students, doing household chores, and retired/pensioners, are classified as not working in the labor market (($Y(i,t)=0$).[29]

Equation (1) is estimated using a linear probability model.[30] Table 3 presents the DiD estimates (summarized by the parameters γ^J in equation 1) of the impact of PAL on participation in labor market activities of male and female adults.[31] Two specifications are used: in specification A we use same set of control variables in consumption (including binary variables for the round of interview) as well as binary variables for each village in the sample (and correcting standard errors for clustering of individuals at the village level). Specifically, the vector *X(i,t)* in equation (1) consist of a set of binary variables identifying the date of interview of the household, and the age of the individual, his/her gender, years of education, binary variables for his/her marital status, the household demographic composition (i.e., the number of children separately by age group, adult men (and women separately) aged 19 to 54,

[29] Individuals who reported permanent incapacity to work are dropped from the sample analyzed. In fact, the classification was based on questions 2.15, 2.16, and 2.18 in the baseline survey, (and questions 2.12, 2.14, and 2.15 in the follow-up survey). The set of three questions in each survey round is useful for verifying the nature of the work performed.

[30] As Ai and Norton (2003) have demonstrated, the coefficient of the interaction term in nonlinear models, such as probit or logit, does not equal the marginal effect calculated by statistical software. We have also estimated the marginal effect of the interaction terms using the *inteff* command in Stata proposed by Norton et al (2004) with similar qualitative results as with linear probability model presented here.

[31] The complete set of parameter estimates is available directly from the authors upon request.

and men (and women) over the age of 55) a binary variable indicating whether this is an indigenous household and binary variables identifying whether the household receives benefits from other programs (such as *DIF*, *Desayunos*, and *Oportunidades*). In specification B we include binary variable for each individual in the sample (individual fixed effects) in place of the village fixed effects.

Table 4

The two specifications used may be considered as a check for the robustness of the estimated impacts, since specification A ignores the panel nature of the sample and treats the two rounds as different cross-sections of individuals, whereas specification B simply utilizes the panel of individuals for which we have two observations. In short, the estimates reveal no significant effects of PAL on total labor market participation and there are no differences in the impacts of the food basket and the cash transfers.[32] These empirical results confirm the prediction of the theory that for infra-marginal households there should be no differences in the effect of cash and in-kind transfers on labor supply. Unlike many of the transfer programs in the US, there is no reduction in the benefits of the PAL program if beneficiary labor supply or labor income increases. Thus the PAL transfer acts as pure income effect. Assuming that leisure is a normal good, theory predicts that for infra-marginal households transfers (in cash or in-kind) are likely to increase leisure and reduce work. The apparent absence of a significant effect on labor market participation suggests that the income effect of the transfer is too small. These results are consistent with the empirical evidence from the US where participation in the food stamp program has insignificant or small labor supply impacts (Fraker and Moffitt (1988), Hagstrom (1996), Keane and Moffit (1998) and Hoynes and Schazenbach (2007). According to

[32] To know if there is an impact difference on the size of the impact among the three treatment groups we implement a test using the lincom command in Stata 9.0 and adjusting p value for multiple comparisons with Bonferroni's method. (p-value adjusted to 0.016 for 3 comparisons).

Moffitt (2002), an explanation for these findings is that the food stamp program is an infra-marginal transfer for most recipient households, which makes them nearly equivalent to cash.

In table 4 we also present separate estimates on the impacts of transfers on participation in agricultural and nonagricultural activities. Individuals who reported working in the labor market are classified as working in agricultural activities if they reported working in primary sector activities such as caring for animals, farming, forestry or fishing (INEGI, 2007). [33] Individuals who do not work in these activities are considered as performing nonagricultural activities, such as selling clothes, cosmetics, foods, handicrafts, etc. The double difference estimates in table 4 are both negative for agricultural activities which implies that participation in agricultural activities decreases among male adults receiving the cash transfers (T3xR2). Food basket with education is not significant but neither is statistically different from the other treatments. It appears that PAL does not have a statistically significant effect on the participation of adult females in non-agricultural activities.

Thus, PAL may provide partial insurance for food consumption (reduces down-side risk) sufficient to allow recipients to allocate less of their time in agricultural production intended to guarantee food in the event of income and other shocks and more towards nonagricultural activities. This is consistent with the prediction of the basic non-separable agricultural household model with incomplete markets for credit, or insurance. As Morduch (1992) and Bardhan and Udry (1989) demonstrate, an agricultural household that is likely to face binding liquidity constraints will choose a more conservative portfolio of activities that reduces the variance of its incomes, but that also has a lower expected income than the activities

[33] To better classify individuals working in agricultural and nonagricultural activities we also used the information reported on the type of tasks performed in their work (question 2.17 in the baseline survey and question 2.13 in the follow-up round). We obtained the same qualitative results without the tedious effort of reclassifying individuals based on the information on actual tasks performed.

chosen in the absence of any liquidity constraints. The switch from agricultural activities to nonagricultural activities suggests that the steady flow of food available through the food basket provided by the PAL program relaxes the binding liquidity constraints faced by poor agricultural households and causes a reallocation of labor towards nonagricultural activities with higher returns (Lanjow, 1999). Overall these findings suggest that the PAL transfer, irrespective of whether in cash or in-kind, is able to mitigate the impact of market imperfections thus increasing both equity and efficiency.

The impact of PAL on poverty

Even though the positive impacts on average household consumption documented in the earlier part of this section suggest potential reductions in poverty, a separate analysis of the impacts of the program on different measures of poverty is of more relevance to policy. In this last section we report difference-in-difference estimates of the impacts of the program on poverty, i.e., compare the change in a poverty measure in treatment villages to the changes in the corresponding poverty measure in control villages. In addition to controlling for macroeconomic shocks common to both treatment and control localities, this estimate allows one to account for any pre-existing differences in poverty between control and treatment localities and thus yield "cleaner" estimate of the impact of the program on poverty.

The choice of a poverty line is a major concern when poverty measures are estimated. For this reason we report estimates of the program's impact on poverty using three different poverty lines for rural areas of Mexico (expressed in June 2002 pesos): the national food poverty line (*linea alimentaria*) that is equal to the value of the basic food basket (*canasta basica*), the "capacity" or basic needs poverty line that includes the value of the basic food basket and the monetary amount necessary to satisfy basic health and education services, and the

"patrimonial" poverty line, which includes other basic nonexpenditures in addition to basic health and education services.[34]

Poverty is measured along the lines suggested by Foster, Greer, and Thorbecke (1984), henceforth FGT. The FGT poverty measures are summarized by the formula:

$$P(\alpha) = \left(1/N\right)\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^{\alpha},$$

where N is the total number of households, y_i is the per capita consumption of the ith household, z is the poverty line, q is the number of poor individuals, and α is the weight attached to the severity of household poverty (or the distance from the poverty line) and takes the value of 0, 1 or 2. When α = 0, the FGT measure collapses to the Headcount Index, or the percentage of the population that is below the poverty line. When α = 1 the FGT measure gives the *poverty gap* P(1), a measure of the average depth of poverty. When α = 2, the FGT index becomes the *severity of poverty* index. The P(2) measure assigns more weight to individuals that are further away from the poverty line.

The regression equation behind the estimation of PAL's impact on poverty is:

$$P\ (i,t,\alpha) = \beta_0 + \sum_{j=1}^{3}\beta_T^J T_j(i) + \beta_{R2}R2 + \sum_{j=1}^{3}\gamma^J\left(T_j(i) * R2\right) + \eta(i,t) \qquad (2)$$

where the left hand side variable $P(i,t,\alpha)$ is defined as

[34] For rural areas, the national food poverty line (basic food basket per capita) is P$494.77 per capita per month, the "capacity" poverty line is P$587.29/mo, and the "patrimonial" poverty line is $946.49/mo (all poverty lines expressed in June 2002 pesos).
http://www.indesol.gob.mx/docs/3_genero/niv_Nota_tecnica_pobreza_2002.swf

$$P(i,t,\alpha)=\left(\frac{z-PCE(i,t)}{z}\right)^{\alpha} * Poor(i,t),$$

where $PCE(i,t)$ denotes the monthly PCE of household i in the month of interview t divided by the value of the consumer piece index for Southern Mexico in the month of interview of the household[35], z is the poverty line used (in June 2002 Pesos), α takes on the values 0, 1, and 2, and $Poor(i,t)$ is a binary variable taking the value of 1 if $PCE(i,t) \leq z$, and equal to 0 otherwise. Based on the specification of the regression equation (2), the intercept term β_0 is the estimate of the poverty rate (headcount ratio, poverty gap, or the severity of poverty) in the control localities in the baseline round, while $\beta_0 + \beta_T^J$ is the corresponding estimate of poverty in the three treatment localities of type J (where J=1,2,3) (in the baseline round).[36]. The estimates of the parameters γ^J are the DiD estimates of the impact of the program on poverty in round 2 (follow-up) of the survey.

In Table 5, the constant term summarizes the poverty rate in the control localities in the baseline while the estimates of the coefficients of T1, T2 and T3 show the baseline differences in the poverty rate between the treatments groups (T1, T2 and T3). To calculate baseline poverty rates between treatments, one adds the constant term to each of the treatment coefficients. For example, the food poverty line yields a baseline headcount poverty rate P(0) of 63.5% in the control localities and a headcount poverty rate of 67% in group T2 and 65.7% in group T3.

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[35] The national consumer price index (base year June 2002) was obtained from Banco de México for the baseline survey months between October 2003 and April 2004 and for the follow-up survey from October to December 2005.
http://www.banxico.com.mx/polmoneinflacion/estadisticas/indicesPrecios/indicesPreciosConsumidor.html

[36] Along similar lines, $\beta_0 + \beta_{R2}$ is the poverty rate in control localities in round 2 and $\beta_0 + \beta_T + \beta_{R2} + \gamma$ is the poverty rate in treatment localities in the same round.

The negative and strongly significant estimates of γ^j, imply that PAL had a significant impact in reducing poverty between the two rounds. Using the food poverty line, for example, the double difference estimate of the impact of PAL on T2, i.e. the coefficient of T2xR2, suggests that PAL decreased the headcount poverty rate in T2 by 15.2% (using as a reference the 67% headcount poverty rate in T2 in the baseline). Thus, a transfer of 11.5% of the pre-transfer level of consumption appears to set in motion multiplier effects that lead to a reduction of 15.2% in the headcount poverty rate two years later.

With the same poverty line the impact of PAL on poverty is even higher when we measure poverty by the poverty gap and the severity of poverty (squared poverty gap). The poverty gap in T2 decreases by 22.3% while the severity of poverty decreases by 27.8%. The same general pattern emerges when we use the capacity poverty line and the patrimonial poverty line. [37]

In sum, we find that PAL has a significant effect at reducing poverty among households in the treated localities. Aside from the relatively obvious finding that the extent to which PAL affects the headcount poverty rate P(0) depends on the value of the poverty line, the impact of PAL is greater at reducing the poverty gap P(1) and the severity of poverty index P(2). The latter poverty measure places greater weight on the poorest of the poor. Finally, as was the case for consumption, we do not find any statistical evidence of differences on the impact of in-kind food transfers or cash transfers on poverty rates.

[37] The same pattern of findings emerged when also estimated the impacts on poverty using the median of PCE in the sample (which results in lower poverty line than the national food poverty line). It should be noted that with the patrimonial poverty line, PAL has no significant impact on the headcount poverty rate. This is due to the fact that the patrimonial poverty line is very high relative to the PCE in this sample, which leads to a very high headcount poverty rate in the baseline.

5. Concluding Remarks

In this paper we present some of the first evidence based on experimental data regarding the relative effects of in-kind and cash transfers. We first examine whether the transfer and the type of transfer (in-kind or cash) affects total consumption and food consumption in particular. We (i) find that the transfer has a large and significantly positive impact on total and food consumption, and (ii) confirm there are no differences in the impacts of transfers in cash versus transfers in-kind on consumption. Our analysis also reveals that the PAL transfer, although small, results in large reductions in poverty (a reduction of 15% in the headcount poverty rate two years later) and the same reduction in poverty is achieved irrespective of the form of the transfer. These results imply that at least in the case of infra-marginal or small transfers, with the explicit objective of alleviating poverty, the choice of whether to provide transfers in the from of cash or food in-kind should be determined primarily, if not exclusively, by the administrative cost incurred per unit value of the benefit. In-kind transfers typically involve high handling and transportation costs, whereas cash transfers are relatively cheaper to deliver.

In an effort to identify potential impacts of the PAL program on labor supply as well as possible explanations for the large impacts of the program on consumption and poverty, we also examined whether the transfer and the type of transfer (in-kind or cash) affects participation in the labor market and the choice between participating in agricultural and nonagricultural activities. We find that the transfer, irrespective of whether it is cash or in-kind, does not affect participation in labor market activities. However, we do find that the transfer has a significant impact on the time allocation of males (and not females) between agricultural and nonagricultural activities. Thus, the steady flow of food available through the food basket provided by the PAL program appears to relax binding liquidity constraints faced by poor

agricultural households sufficiently so as to allow recipients to switch their time from less productive activities in agriculture towards more productive ones. Overall these findings suggest that the PAL transfer, irrespective of whether in cash or in-kind, is able to mitigate the impact of market imperfections, thus increasing both equity and efficiency.

Before concluding, it is important to point out some important caveats. In this paper we evaluate the impacts of the program only from the angle of welfare and poverty, measured by a few key outcome variables such as consumption and labor supply. To the extent that the objective of a program is to improve nutrition, more careful consideration needs to be given to the impacts of cash and in-kind transfers on the different types of food consumed and the nutritional impacts of cash and in-kind transfers on children and adults. A careful investigation of the nutritional impacts of the PAL program, such as impacts on children's height or the quality of diet, concluded that the PAL program overall had significant effects on nutritional outcomes (Gonzalez-Cossio et al., 2006). However, the evidence on the relative size effects of cash and in-kind transfers was mixed and dependent on the outcome examined. On the one hand, cash transfers had a higher impact on the height for age z-score of children less than two years of age. On the other hand, dietary quality (consumption of iron and zinc) was significantly better in those families receiving in-kind transfers (T1 and T2) most probably due to the consumption of the fortified milk in the basket.

Clearly, neither cash nor in-kind transfers are a panacea. The results of our study suggest that social assistance programs, especially those involving transfers in–kind, would do well to analyze and document the costs of administering and delivering their benefits to poor households. Carefully targeted and carefully designed cash interventions in rural communities can not only redistribute resources to poor households but also promote poverty reduction.

References

Ai, C., and E. C. Norton, 2003, "Interaction Terms in Logit and Probit models" *Economics Letters*, 80. Elsevier Science B.V. pp. 123-129.

Andrews, D. W. K., 1989. "Power in Econometric Applications," *Econometrica*, Vol. 57, No. 5 (September), pp. 1059-1090.

Bardhan, P., and C. Urdy, 1999. *Development Microeconomics*, Oxford University Press.

Blank, R. 2002. "Can Equity and Efficiency Complement Each Other?" Working Paper 8820, National Bureau of Economic Research, http://www.mber.org/papers/w8820.

Blundell, R., and L. Pistaferri, 2003. "Income Volatility and Household Consumption: The Impact of Food Assistance Programs," *The Journal of Human Resources*, Vol. 38, Special Issue on Income Volatility and implications for Food Assistance Programs, pp. 1032-1050.

Currie, J. and F. Gahvari, 2008. "Transfers in Cash and In –Kind: Theory Meets the Data," *Journal of Economic Literature*, Vol. 46, No. 2, pp. 333-83.

de Janvry, A., M. Fafchamps, E. Sadoulet, 1991. "Peasant Household Behavior with Missing Markets: Some Paradoxes Explained, " *Economic Journal*, Vol. 101, No. 409, (November), pp. 1400-1417.

del Ninno, C., and P. Dorosh, 2003. "Impacts of In-Kind-Transfers on Household Food Consumption: Evidence from Targeted Food Programs in Bangladesh," *Journal of Development Studies*, Vol. 40, No. 1, (October), pp. 48-78.

Foster J, J. Greer and E. Thorbecke, 1984 "A class of decomposable poverty measures", *Econometrica* 52, 761-65

Fraker T. M., A. P. Matrtini, and J. C. Ohls, 1995. "The Effects of Food Stamp Cashout on Food Expenditures: An Assessment of the Findings from Four Demonstrations," *The Journal of Human Resources*, Vol. 30, No. 4, (Autumn), pp. 633-649.

Gahvari, F., 1994. "In-kind Transfers, Cash Grants and Labor Supply," *Journal of Public Economics*, Vol. 55, pp. 495-504.

Gertler, P., S. Martinez, and M. Rubio, 2006. "Investing Cash Transfers to Raise Long Term Living Standards." World Bank Policy Research Working Paper No. 3994. Washington DC: World Bank.

Gonzalez-Cossio T., Rivera-Dommarco J., Gutierrez J.P., Rodríguez S., Gonzalez D., Unar M, Leroy J., and Bertozzi, S., 2006. "Evaluation of the Nutritional Status of Children Less than Five and their Mothers, and Food Expenditures of Families in Marginal Localities in Mexico: A Comparative Analysis of the in-Kind and Cash Transfers 2003-2005" Instituto Nacional de Salud Pública (INSP), Final Report, (September 26)

Hagstrom, P. 1996. The Food Stamp Participation and Labor Supply of Married Couples: An Empirical Analysis of Joint Decisions," *Journal of Human Resources*, Vol. 31, No. 2, pp. 383-403.

Heckman, J. J, R. La Londe, and J. Smith. 1999. "The Economics and Econometrics of Active Labor Market Programs", chapter 31, in Ashenfelter O. and D. Card (eds.) *Handbook of Labor Economics*, vol. 3A. Amsterdam, The Netherlands: North Holland, pp. 1865-2097.

Hoddinott J. and E. Skoufias, 2004, "The Impact of PROGRESA on Food Consumption", *Economic Development and Cultural Change*, Vol. 53, No. 1, October 2004, pp. 37-61

Hoynes, H.W., and D. Schanzenbach, 2007, "Consumption Responses to In-Kind Transfers: Evidence from the Introduction of the Food Stamp Program", National Bureau of Economic Research Working Paper 13025. Cambridge, MA.

INEGI: Instituto Nacional de Geografía y Estadística, 2007, "Instructivo para la codificación de ocupación" Encuesta Nacional de Ocupación y Empleo (ENOE)

http://www.inegi.gob.mx/inegi/contenidos/espanol/clasificadores/Instructivo%20ocupacion.pdf
Kakwani, N, 1993. "Statistical Inference in the Measurement of Poverty", *The Review of Economics and Statistics*, MIT Press, vol. 75(4), pages 632-39.
Keane, M. and R. Moffitt, 1998. " A Structural Model of Multiple Welfare Program Participation and Labor Supply," *International Economic Review*, Vol. 39, No. 3, pp. 553-589.
Killinsgworth, M. 1983. *Labor Supply*, Cambridge Surveys of Economic Literature, Cambridge University Press.
Lanjouw, P. 1999. "Rural Nonagricultural Employment and Poverty in Ecuador," *Economic Development and Cultural Change*, Vol. 48, No. 1, pp. 91-122.
Leonesio, M., 1988. "In-Kind Transfers and Work Incentives" *Journal of Labor Economics*, Vol. 6, no. 4 (October), pp. 515-529.
Maluccio J.A. and R. Flores, 2004, "Impact Evaluation of a Conditional Cash Transfer Program: The Nicaraguan Red de Protección Social", IFPRI Discussion Paper No.184. Washington DC: International Food Policy Research Institute.
Moffitt, R., 2002. "Welfare Programs and Labor Supply" Chapter 34 in A.J. Auerbach, A.J. and Feldstein M. (eds.) *Handbook of Public Economics*, volume 4. Amsterdam, The Netherlands: North Holland, pp. 2393-2430.
Moffitt, R., 1992. "Incentive Effects of the U.S. Welfare System: A Review," *Journal of Economic Literature*, Vol. 30, No. 1 (March), pp. 1-61.
Morduch, J., 1992 "Risk, Production and Saving: Theory and Evidence from Indian Households," unpublished paper, Harvard University.
Murray, M., 1980. "A Reinterpretation of the Traditional Income-Leisure Model with Application to In-Kind Subsidy Programs," *Journal of Public Economics,* Vol. 14, pp. 69-81.
Norton, E. C., H. Wang and. A. Chunrong, 2004, "Computing Interaction Effects and Standard Errors in Logit and Probit models" *The Stata Journal*, 2004, 4(2) pp. 103-116
Parker, S. and E. Skoufias, 2000, "The impact of PROGRESA on work, leisure and time allocation", Washington DC, International Food Policy Research Institute.
Ravallion, M. , 1994, "*Poverty Comparisons, Fundamentals of Pure and Applied Economics*", Switzerland: Harwood Academic Publishers.
Roe, T., and T. Graham-Tomasi, 1986 "Yield Risk in a Dynamic Model of the Agricultural Household," in Singh I., L. Squire, and J. Strauss, 1986, *Agricultural Household Models*, Baltimore: The Johns Hopkins University Press.
Schultz, T.P., 2004. "School Subsidies for the Poor: Evaluating the Mexican Progresa Poverty Program" *Journal of Development Economics*, vol. 74, no. 1 (June), pp. 199-250.
Senauer, B., and N. Young, 1986. "The Impact of Food Stamps on Food Expenditures: Rejection of the Traditional Model," *American Journal of Agricultural Economics*, Vol. 68, No. 1, pp. 37-43.
Singh I., L. Squire, and J. Strauss, eds. 1986, *Agricultural Household Models:* , Baltimore: The Johns Hopkins University Press.
Skoufias, E., and V. di Maro 2008. "Conditional Cash Transfers, Adult Work Incentives and Poverty," *Journal of Development Studies,* Vol. 44, No. 7 (August), pp. 935-960.
Skoufias, E., 2005. "PROGRESA and its Impacts on the Welfare of Rural Households in Mexico" IFPRI Research Report No. 139. Washington DC, International Food Policy Research Institute.
Skoufias, E., and Parker S.W., 2001. Conditional cash transfers and their impact on child work and schooling: Evidence from the PROGRESA program in Mexico, *Economia*, Vol.2, No. 1, Fall 2001, pp. 45-96.
Southworth, H. M., 1945. "The Economics of Public Measures to Subsidize Food Consumption,"

Journal of Farm Economics, vol. 27, No. 1, pp. 38-66.
Stafford, F., 1985. "Income-Maintenance Policy and Work Effort: Learning from Experiments and Labor Market Studies," In Hausman J.A. and Wise D.A. (Eds.) *Social Experimentatio*n, University of Chicago Press, Chicago, pp. 95-143.
Strauss, J., 1986. "The Theory and Comparative Statics of Agricultural Household Models: A General Approach, "In Singh I., L. Squire, and J. Strauss, 1986, *Agricultural Household Models*, Baltimore: The Johns Hopkins University Press.
Taylor, J.E. , G.A. Dyer, and A. Yunez-Naude, 2005, "Disaggregated Rural Economywide Models for Policy Analysis," *World Development*, Vol. 33, No. 10, pp. 1671-1688

Figure 1: Cash transfer

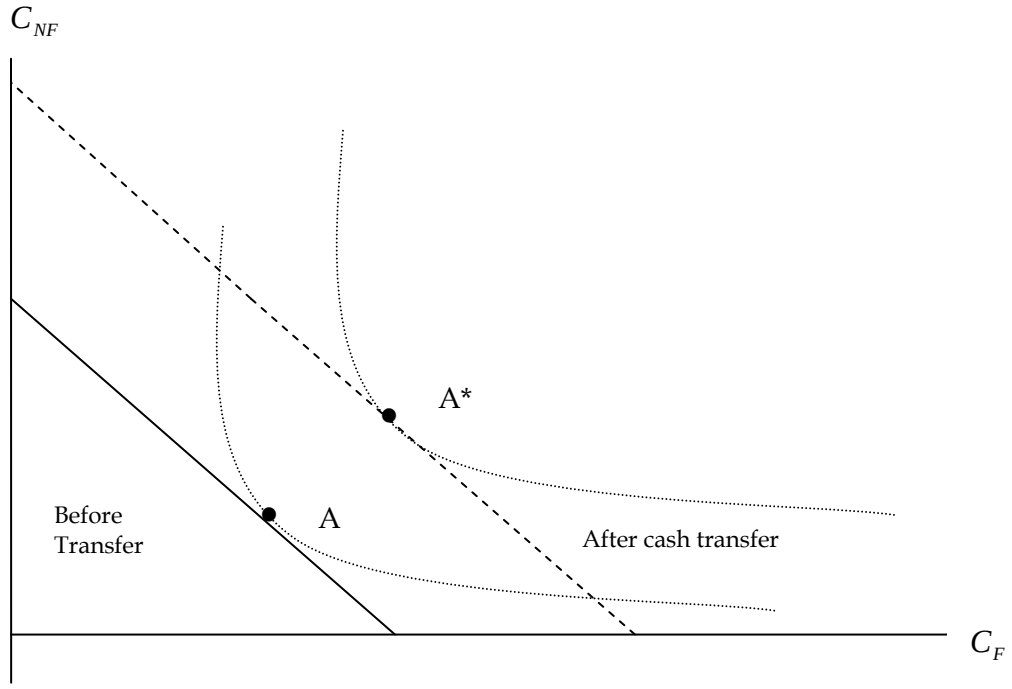

Figure 2: In-kind transfer

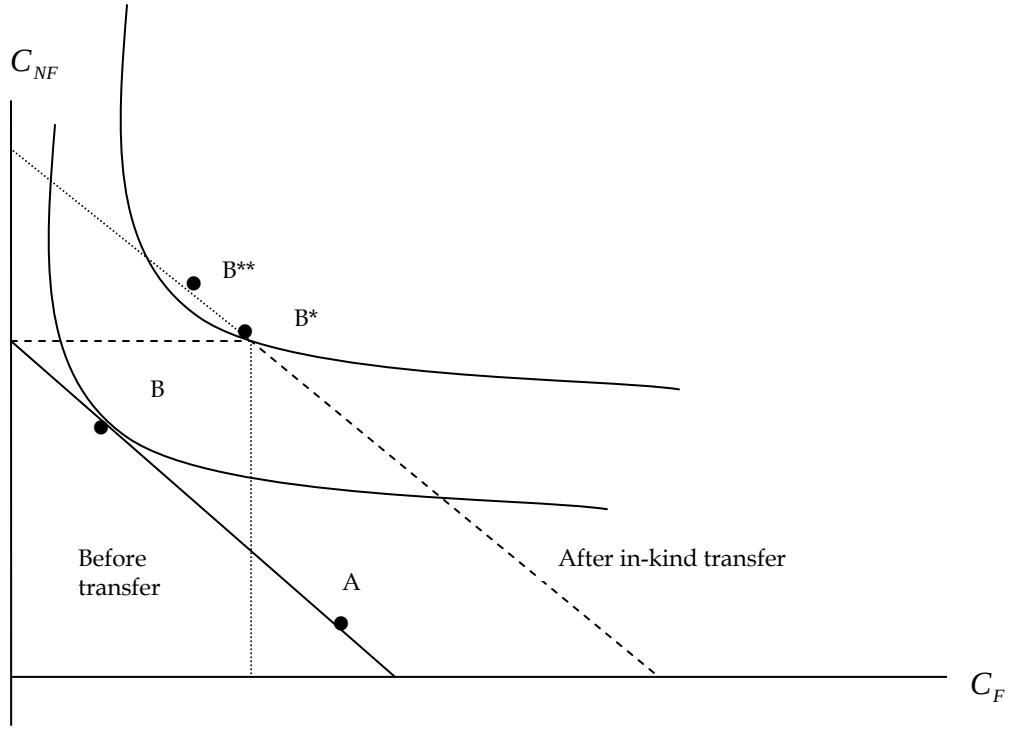

Figure 3: Baseline round ln Food per capita and lnPCE: T2 vs. C and T3 vs C

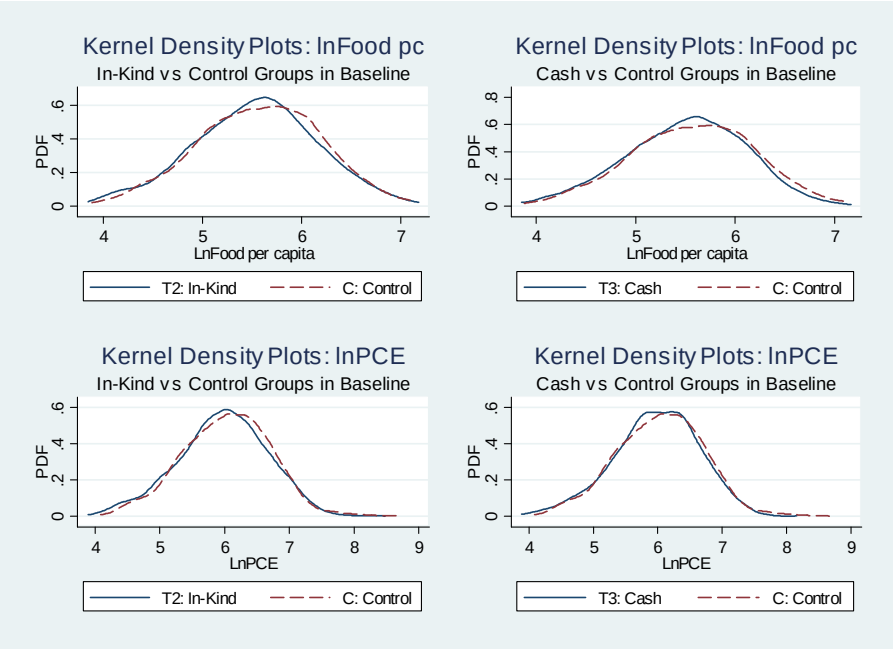

Figure 4: Follow-up round ln Food per capita and lnPCE: T2 vs. C and T3 vs C

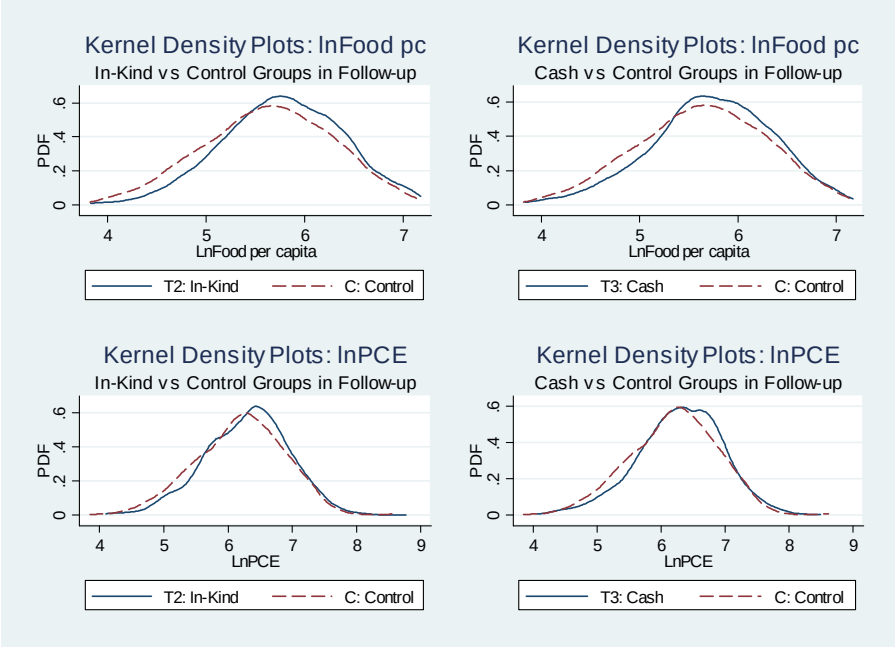

Figure 5: Baseline and Follow-up rounds ln Food per capita and lnPCE: T2 vs T3

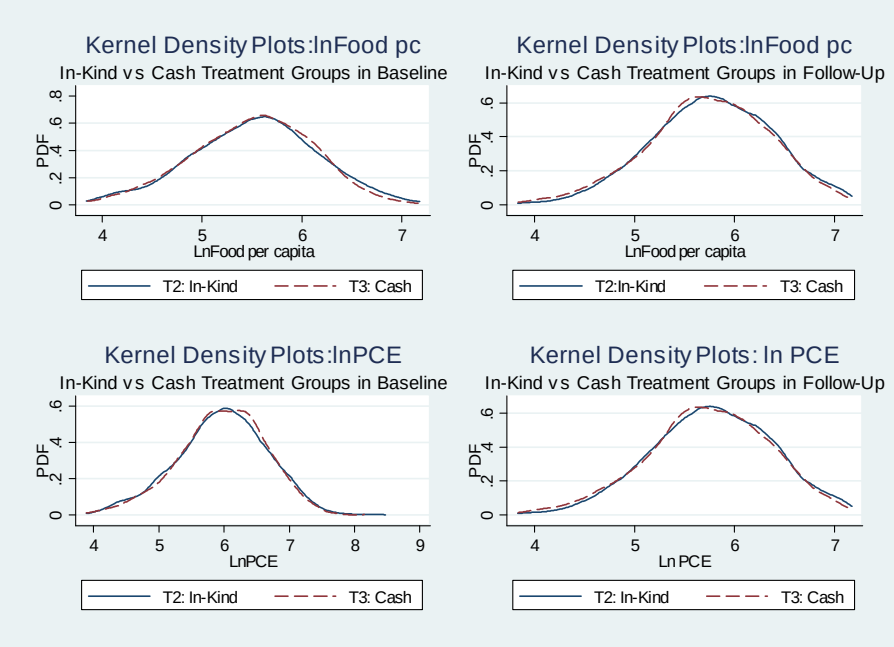

Table 1: Means of main variables used in the empirical analysis

	Baseline survey				Follow-up survey			
	T1 In-Kind-	T2 In-Kind+	T3 Cash+	C Control	T1 In-Kind-	T2 In-Kind+	T3 Cash+	C Control
Monthly value of (household level):								
Food per capita	292	306	293	316	384	384	370	341
Total Consumption per capita	471	490	483	524	648	666	668	616
Ratio of transfer to Food Cons.[1] (%)	18.1	17.4	18.0	16.3	12.6	12.5	13.3	14.3
Ratio of transfer to Total Cons[1] (%)	12.1	11.6	11.7	10.6	7.8	7.5	7.7	8.2
Extramarginal households[2] (%)	0	0	0.14	0				
Household size (no. of members)	4.7	4.7	4.6	4.8	5.0	5.1	5.0	5.2
Speaking indigenous language (%)	23.9	14.3	14.2	21.0	24.3	14.5	15.3	21.1
Indigenous Health program (%)	0.1	0.0	0.5	0.0	0.1	0.0	0.5	0.0
DIF (%)	4.8	1.7	6.0	6.4	4.8	1.7	6.0	6.3
Desayunos(%)	15.7	9.6	11.2	13.6	16.0	9.7	11.4	13.9
Oportunidades (%)	11.9	8.9	9.3	18.7	12.2	9.0	9.4	19.1
Number of households	1,391	1,448	1,415	1,325	1,388	1,441	1,402	1,294
Males 18-60 yrs of age participating in								
Labor market activities (%)	88.5	87.9	89.4	88.0	87.5	87.4	88.0	86.4
Agricultural activities (%)	57.2	64.5	66.7	57.6	54.5	59.2	61.4	57.0
Nonagricultural activities (%)	31.3	23.4	22.7	30.4	32.9	28.2	26.6	29.4
Number of males	1,670	1,728	1,716	1,684	1,331	1,397	1,343	1,240
Females 18-60 yrs of age participating in								
Labor market activities (%)	24.7	21.9	21.9	23.9	27.6	24.7	28.6	28.3
Agricultural activities (%)	3.9	4.1	5.5	3.6	5.1	4.8	7.3	6.0
Nonagricultural activities (%)	20.8	17.8	16.4	20.4	22.5	19.9	21.4	22.3
Number of females	1,861	1,851	1,965	1,951	1,547	1,574	1,653	1,511

Notes:
This is the sample mean of the ratio of the value of the transfer (P$150) to nominal (food or total) household consumption
Extramarginal household is defined as: =1 if monthly household Food expenditure<=P$150, =0 otherwise.

Table 2 – The impact of PAL (difference in difference estimates) on (ln) Food and Total Consumption per capita (per month)

	ln(Monthly Food Consumption p.c.) (nobs=11,072)			ln(Monthly Total Consumption p.c.) (nobs=11,072)		
Coeff. of:	**(A)**	**(B)**	**(C)**	**(A)**	**(B)**	**(C)**
β^1	-0.100** [0.049]			-0.129** [0.057]		
β^2	-0.043 [0.060]			-0.078 [0.066]		
β^3	-0.098** [0.048]			-0.094* [0.055]		
β_R	0.058 [0.058]	0.036 [0.050]	0.069** [0.031]	0.191*** [0.062]	0.178*** [0.047]	0.213*** [0.030]
γ^1	0.225*** [0.042]	0.233*** [0.040]	0.229*** [0.025]	0.172*** [0.041]	0.182*** [0.038]	0.175*** [0.025]
γ^2	0.161*** [0.051]	0.176*** [0.045]	0.179*** [0.025]	0.142*** [0.049]	0.155*** [0.043]	0.156*** [0.025]
γ^3	0.157*** [0.046]	0.183*** [0.047]	0.179*** [0.026]	0.139*** [0.043]	0.171*** [0.041]	0.170*** [0.026]
Binary vars incl.?	Month of interview (Moi)	Moi & Village	Moi & Household	Month of interview (Moi)	Moi & Village	Moi & Household
R-squared	0.24	0.16	0.15	0.31	0.21	0.23
H_0: $\gamma^1 = \gamma^2 = \gamma^3$	1.78 [[0.1707]	2.74 [0.0643]	2.91 [0.0546]	0.42 [0.6567]	0.50 [0.6071]	0.35 [0.7057]
H_0: $\gamma^2 - \gamma^3 = 0$	0.01 [0.9302]	0.06 [0.8131]	0.00 [0.9856]	0.00 [0.9643]	0.33 [0.5680]	0.33 [0.5677]
H_0: $\gamma^1 - \gamma^2 = 0$	2.03 [0.1553]	4.57 [0.0326]	4.24 [0.0395]	0.48 [0.4910]	0.99 [0.3191]	0.67 [0.4141]
H_0: $\gamma^1 - \gamma^3 = 0$	2.62 [0.1070]	3.40 [0.0653]	4.17 [0.0411]	0.64 [0.4239]	0.16 [0.6910]	0.04 [0.8363]

Notes:

Robust standard errors in brackets *** significant at 1%, ** significant at 5%, * significant at 10%

γ^1 =DiD estimate of the impact in group T1=Food Basket without education

γ^2 = DiD estimate of the impact in group T2=Food Basket with education

γ^3 = DiD estimate of the impact in group T3=Cash transfer with education

For a complete list of the additional variables included as controls in the regression see text.

Hypotheses tests: The numbers reported are the values of the F-statistic under the null and underneath in brackets is the associated p-value.

Table 3—The power of the null hypothesis H_0 : $\gamma^2 - \gamma^3 = \delta = 0$

	Monthly Food Consumption p.c.			Monthly Total Consumption p.c.		
	(A)	**(B)**	**(C)**	**(A)**	**(B)**	**(C)**
$\hat{\sigma}$	0.051	0.028	0.026	0.048	0.029	0.025
c	0.184	0.101	0.092	0.295	0.104	0.091
b	0.099	0.055	0.050	0.094	0.057	0.049

Notes:

$\hat{\sigma}$ denotes the standard error estimate for $\hat{\delta}$

The parameter c defines the region of high power, i.e., $\{\delta : |\delta| > c\}$

The parameter b defines the region of low power, i.e., $\{\delta : 0 < \delta \leq b\}$

Table 4 –The impact of PAL (difference in difference estimates) on the probability of working

MALES (n=12101)	**All activities**		**Agricultural activities**		**Non-Agricultural Activities**	
	(A)	(B)				
Coeff. of:			(A)	(B)	(A)	(B)
β_R	0.01	0.016	0.078***	0.062**	-0.068***	-0.029
	[0.018]	[0.020]	[0.024]	[0.027]	[0.022]	[0.025]
γ^1	0.018	0.022	-0.02	-0.011	0.038*	0.033
	[0.017]	[0.017]	[0.023]	[0.022]	[0.022]	[0.021]
γ^2	0.022	0.023	-0.035	-0.037	0.058***	0.059***
	[0.017]	[0.017]	[0.023]	[0.023]	[0.022]	[0.021]
γ^3	0.012	0.013	-0.059**	-0.050**	0.071***	0.063***
	[0.017]	[0.017]	[0.023]	[0.023]	[0.022]	[0.021]
Control vars X(i,t) included?	YES	YES	YES	YES	YES	YES
Binary vars incl.?	Village	Individual	Village	Individual	Village	Individual
R-squared	0.02	0.01	0.03	0.02	0.03	0.01
FEMALES (n=13860) Coeff. of:						
β_R	0.021	0.034	0.057***	0.050***	-0.036**	-0.016
	[0.021]	[0.021]	[0.013]	[0.014]	[0.018]	[0.018]
γ^1	-0.013	-0.026	0.001	0	-0.014	-0.026
	[0.020]	[0.019]	[0.010]	[0.010]	[0.019]	[0.018]
γ^2	-0.018	-0.017	-0.012	-0.011	-0.006	-0.006
	[0.020]	[0.018]	[0.010]	[0.010]	[0.018]	[0.017]
γ^3	0.03	0.02	-0.001	-0.005	0.03	0.025
	[0.020]	[0.019]	[0.011]	[0.011]	[0.018]	[0.017]
Control vars X(i,t) included?	YES	YES	YES	YES	YES	YES
Binary vars incl.?	Village	Individual	Village	Individual	Village	Individual
R-Squared	0.1	0.02	0.02	0.01	0.09	0.02

Notes:
Robust standard errors in brackets
*** significant at 1%, ** significant at 5%, * significant at 10%

γ^1 =DiD estimate of the impact in group T1=Food Basket without education

γ^2 = DiD estimate of the impact in group T2=Food Basket with education

γ^3 = DiD estimate of the impact in group T3=Cash transfer with education

For a complete list of the other variables included as controls in the regression see text.

Table 5 – The impact of PAL (difference in difference estimates) on poverty[A]			
POVERTY LINE	**Headcount poverty ratio**	**Gap poverty ratio**	**Severity of poverty ratio**
Food poverty line	**P(0)**	**P(1)**	**P(2)**
β^1	0.06 [0.043]	0.042 [0.033]	0.029 [0.025]
β^2	0.035 [0.045]	0.024 [0.033]	0.017 [0.024]
β^3	0.023 [0.040]	0.015 [0.030]	0.01 [0.022]
β^R	-0.050** [0.020]	-0.029** [0.012]	-0.017* [0.009]
γ^1	-0.113*** [0.027]	-0.080*** [0.016]	-0.054*** [0.013]
γ^2	-0.102*** [0.030]	-0.065*** [0.018]	-0.046*** [0.014]
γ^3	-0.089*** [0.028]	-0.055*** [0.017]	-0.038*** [0.012]
Constant	0.635*** [0.032]	0.268*** [0.022]	0.147*** [0.016]
"Capacity" poverty line	**P(0)**	**P(1)**	**P(2)**
β^1	0.061* [0.036]	0.045 [0.033]	0.033 [0.027]
β^2	0.036 [0.039]	0.025 [0.034]	0.019 [0.027]
β^3	0.04 [0.036]	0.018 [0.031]	0.012 [0.024]
β^R	-0.042** [0.016]	-0.032*** [0.012]	-0.021** [0.009]
γ^1	-0.094*** [0.023]	-0.084*** [0.016]	-0.062*** [0.013]
γ^2	-0.085*** [0.026]	-0.070*** [0.018]	-0.052*** [0.015]
γ^3	-0.100*** [0.026]	-0.062*** [0.017]	-0.044*** [0.013]
Constant	0.720*** [0.028]	0.333*** [0.023]	0.192*** [0.018]
"Patrimonial" poverty line	**P(0)**	**P(1)**	**P(2)**
β^1	0.009 [0.015]	0.039 [0.029]	0.039 [0.030]
β^2	0.004 [0.016]	0.021 [0.030]	0.022 [0.030]
β^3	0.015 [0.014]	0.02 [0.027]	0.017 [0.027]

β^R	-0.041*** [0.011]	-0.036*** [0.011]	-0.030*** [0.011]
γ^1	-0.009 [0.015]	-0.068*** [0.014]	-0.071*** [0.014]
γ^2	-0.013 [0.017]	-0.059*** [0.017]	-0.061*** [0.016]
γ^3	-0.017 [0.017]	-0.060*** [0.016]	-0.056*** [0.015]
Constant	0.922*** [0.011]	0.527*** [0.021]	0.348*** [0.020]

Notes:
Poverty lines are in 2002 pesos. Per-capita consumption in baseline and follow-up were deflated to 2002 pesos
Robust standard errors in brackets
*** significant at 1%, ** significant at 5%, * significant at 10%

γ^1 =DiD estimate of the impact in group T1=Food Basket without education

γ^2 = DiD estimate of the impact in group T2=Food Basket with education

γ^3 = DiD estimate of the impact in group T3=Cash transfer with education

APPENDIX A

The food items of the PAL food basket and the consumption patterns of households in the sample

In this appendix we conduct a more detailed investigation of the extent to which the PAL food basket "over-provides" individual food items in relation to the consumption pattern of households in the sample in the baseline round.

The table below presents the fraction of households which report consuming the specific food items contained in either of the two versions of the PAL food basket as well as the fraction of households consuming less than what is provided (on a weekly basis) by the food basket.[38] By construction, the food basket will appear to "over-provide" food items that households did not happen to consume in the last seven days.

Table A.1

Food item in PAL food basket (quantity per month)	Households consuming the food item in the last seven days (in %)	Households consuming a smaller quantity than that in the PAL basket (in %)
Corn flower (3 kg/mo)	13	88
Soup pasta (1.2 kg/mo)	66	62
Rice (2 kg/mo)	79	40
Cookies (1 kg/mo)	39	71
Cereal (ready to eat) (200g/mo)	5	95
Beans (2 kg/mo)	94	9
Lentils (500g/mo)	9	92
Dry Meat (100g/mo)	n.a.	
Sardines (2 cans 425 gr each)	n.a	
Powder Milk (fortified) (1.92 kg/mo)	6	97
Vegetable Oil (1 Ltr/mo)	91	12
Chocolate (powder) (400g/mo)	5	96
Corn starch (100g/mo)	3	97

[38] As discussed in footnote 7 of the paper, basket A was provided between June and October 2004 and basket B between November 2004 and April 2005.

APPENDIX B

In this appendix we report estimates of the impact of the PAL program on the level of real food consumption per capita and total expenditures per capita per month instead of the impact estimates on the logarithmic transformation of food and total consumption per capita per month. Real consumption is derived by dividing the value of food consumption and total consumption of each household by the value of the consumer piece index for Southern Mexico in the month of interview of the household.[39]

One caveat associated with all the estimates reported in this appendix, is that the measure of real consumption used imposes the same inflation rate across villages in the sample. In contrast, the logarithmic specification reported in section 4 of the paper, allows for initial differences in relative prices by the inclusion of the village level fixed effects.

Table B.1– The impact of PAL (difference in difference estimates) on Food and Total Consumption per capita

	Food Consumption p.c. (nobs=11,072)			Total Consumption p.c. (nobs=11,072)		
Coeff. of:	**(A)**	**(B)**	**(C)**	**(A)**	**(B)**	**(C)**
β^1	-25.951* [13.188]			-59.593** [24.261]		
β^2	-8.81 [16.749]			-37.222 [28.537]		
β^3	-30.374** [12.871]			-54.184** [24.642]		
β_R	-11.713 [16.514]	-12.244 [9.948]	-1.06 [9.205]	30.008 [32.274]	33.250* [19.215]	51.851*** [16.742]
γ^1	51.658*** [11.522]	55.636*** [9.019]	53.660*** [7.786]	60.629*** [20.568]	65.763*** [18.038]	58.562*** [14.520]
γ^2	36.418** [15.857]	42.386*** [8.936]	43.758*** [8.046]	59.308** [24.914]	69.487*** [18.065]	69.833*** [15.192]
γ^3	39.529*** [12.948]	48.151*** [9.075]	46.024*** [7.964]	67.159*** [22.940]	81.580*** [18.147]	76.355*** [14.747]
Binary vars incl.?	Month of interview (Moi)	Moi & Village	Moi & Household	Month of interview (Moi)	Moi & Village	Moi & Household
R-squared	0.1814	0.1610	0.1018	0.2092	0.1885	0.0814
H_o: $\gamma^2 - \gamma^3 = 0$	0.04 [0.8413]	0.42 [0.5175]	0.08 [0.7822]	0.12 [0.7315]	0.53 [0.4683]	0.22 [0.6402]

Notes:
Robust standard errors in brackets*significant at 10%; ** significant at 5%; *** significant at 1%

γ^1 =DiD estimate of the impact in group T1=Food Basket without education

γ^2 = DiD estimate of the impact in group T2=Food Basket with education

γ^3 = DiD estimate of the impact in group T3=Cash transfer with education

Hypotheses test: The numbers reported are the values of the F-statistic under the null and underneath in brackets is the associated p-value.

[39] The national consumer price index (base year June 2002) was obtained from Banco de México for the baseline survey months between October 2003 and April 2004 and for the follow-up survey from October to December 2005.
http://www.banxico.com.mx/polmoneinflacion/estadisticas/indicesPrecios/indicesPreciosConsumidor.html

A common empirical finding in the studies based on the food stamp program in the US (e.g., Fraker et al., 1995 ; Senauer and Young, 1986) as well from other developing countries (Del Ninno and Dorosh, 2003) is that the marginal propensity to consume food out of a transfer in-kind is typically greater than the marginal propensity to consume food out a cash transfer. In fact Senauer and Young (1986) provide evidence that this is the case even for inframarginal households.

Irrespective of the specification used, the hypothesis that the marginal propensity to consume food out of a transfer in-kind is equal to the marginal propensity to consume food out a cash transfer is not rejected in our sample. Further investigation into the power of this hypotheses tests reported in Table B.2 using the inverse power tests for specification B reveals that the difference in the effect size on food consumption between cash and in-kind transfers is less than 32 pesos per capita per month with significance 0.05, but the test provides no evidence that the difference in the effect size is less than 17.4 pesos per capita per month, a magnitude that is more than the value of the PAL transfer of 15 pesos per capita per month. These results imply that the tests comparing the marginal propensity to consume food out of cash and in-kind transfers have low power.

Table B.2—The power of the null hypothesis H_0 : $\gamma^2 - \gamma^3 = \delta = 0$

	Monthly Food Consumption p.c.			Monthly Total Consumption p.c.		
	(A)	(B)	(C)	(A)	(B)	(C)
$\hat{\sigma}$	15.516	8.906	8.1944	22.85	16.17	13.952
c	55.934	32.106	29.54	82.37	60.095	50.290
b	30.41	17.456	16.06	44.79	32.673	27.345

Notes:

$\hat{\sigma}$ denotes the standard error estimate for $\hat{\delta}$

The parameter c defines the region of high power, i.e., $\{\delta : |\delta| > c\}$

The parameter b defines the region of low power, i.e., $\{\delta : 0 < \delta \leq b\}$

Emmanuel Skoufias
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