SIEPR Discussion Paper No. 09-021

Testing Paternalism: Cash vs. In-kind Transfer in Rural Mexico

By
Jesse M. Cunha
Stanford University

March 2010

Stanford Institute for Economic Policy Research
Stanford University
Stanford, CA 94305
(650) 725-1874

Testing Paternalism: Cash vs. In-kind Transfers in Rural Mexico

Jesse M. Cunha*
jcunha@stanford.edu
Stanford University

March 30, 2010

Abstract: Welfare programs are often implemented in-kind to promote outcomes that might not be realized under cash transfers. I use a randomized controlled trial of the Mexican government's Food Assistance Program ('PAL') to test whether this form of paternalism is necessary, comparing precisely measured consumption and health outcomes under both in-kind food and cash transfers. Importantly, I find that households do not indulge in the consumption of vices when handed cash. Furthermore, there is little evidence that the in-kind food transfer induced more food to be consumed than did an equal-valued cash transfer. This result is partly explained by the fact that the in-kind transfer was infra-marginal in terms of total food. However, the PAL in-kind basket contained 10 individual items, and these transfers indeed altered the types of food consumed for some households. While this distorting effect of in-kind transfers must be a motivation for paternalism, I find that households receiving cash consumed equally nutritious foods. Finally, there were few differences in child nutritional intakes, and no differences in child height, weight, sickness, or anemia prevalence. While other justifications for in-kind transfers may certainly apply, there is minimal evidence supporting the paternalistic one in this context.

Keywords: In-kind transfers, Paternalism, Food expenditure, PAL

JEL classification: H42, D62, D12, O12, I38

*Address: 579 Serra Mall, Stanford, CA 94305, (650) 492-0381. I am grateful to Giacomo De Giorgi, Luigi Pistaferri, and Seema Jayachandran for advice and suggestions, and Ned Augenblick, Ryan Lampe, and Carla Roa for helpful comments. This research was funded by the Leonard W. Ely and Shirley R. Ely Graduate Student Fund Fellowship through the Stanford Institute for Economic Policy Research.

1 Introduction

Welfare transfers are often made in kind rather than in cash. In fact, governmental provision of health care, housing, child care, and food vastly dominate cash transfers in most countries, both developing and developed (Tabor 2002; Tesliuc 2006). From a rational recipient's point of view, however, an equivalent-valued cash transfer is weakly preferred as the transfer in-kind offers fewer budget choices. But, it is precisely this ability to distort consumption that motivates many in-kind transfer programs (Currie and Gahvari 2008). The use of such paternalistic in-kind transfers may be justified if either (i) the social welfare function differs from individual welfare functions, creating negative externalities (e.g., Daly and Giertz 1972; Garfinkel 1973), or (ii) the recipient is only boundedly rational (e.g., Besley 1988; Thaler and Sunstein 2003). In either case, social welfare may be maximized by forcing the poor to consume more of a good than they would have otherwise chosen. While these motivations for in-kind transfers are well-known, there is little empirical evidence as to whether such paternalism is necessary.

This paper provides such evidence, testing under weak identifying assumptions whether equal-valued cash and food transfers lead poor, rural households to different consumption and health outcomes. Assuaging one paternalistic fear, households spend very little of the cash transfer on vices, such as alcohol and tobacco; rather, the majority of the transfer is spent on nutritious food, such as fruits and vegetables. Indeed, the government may be more interested in the welfare of children rather than the household as a unit – in-kind transfers that pass through parents are simply a logistical necessity. Therefore, I analyze the nutritional intake and health of young children (ages 0 to 6) under each transfer type. While there is some evidence that one in-kind food (enriched powdered milk) led to greater intake of the essential micro-nutrient iron, there is little evidence overall of differential caloric and nutritional intake under in-kind and cash transfers. Furthermore, there is no evidence in terms of child height, weight, sickness, or anemia prevalence (precisely measured through a blood test) that an in-kind food transfer is superior to an unconditional cash transfer of equal value. Other considerations for making transfers in-kind may apply, but I find minimal evidence that paternalistic motivation is necessary in this context.[1]

The data for this study come from an experimental trial of Mexico's food assistance program, the 'Programa de Apoyo Alimentario' (PAL), which was conducted concurrent with the national roll-out of the program in late 2003. PAL's aim is to improve the food security, nutritional intake, and health of the poor. Nationwide, participants receive monthly in-kind transfers consisting of 10 basic yet nutritious food items. Over 200,000 households currently receive PAL food aid and eligibility is determined through a universal means test; households do not apply for the program. A representative, random sample of 208 villages were included in the experiment, the transfer type was randomized at the village level, and eligible households thus received either (i) the in-kind food transfer, (ii) an unrestricted

[1] Other motivations for in-kind over cash transfers include their ability to target the poor (Nichols & Zeckhauser 1982; Moffitt 1983), pecuniary redistribution no achievable through cash transfers (Coate, Johnson, & Zeckhauser 1994), and political economy considerations (De Janvry, Fargeix, and Sadoulet 1991, Epple and Romano 1996b). Currie and Gahvari (2008) offer a recent review of the motivations for in-kind transfer programs, concluding that, while other considerations may apply to specific cases, the leading contender overall is paternalism.

cash transfer, or (iii) no transfer. The Mexican National Institute of Health ('Instituto Nacional de Salud Publica' (INSP)) conducted pre- and post-transfer surveys which included detailed food recall modules at the household (7-day) and individual (24-hour) levels. The targeted population is poor (per capita consumption is less than two dollars per day), the transfers are large (at about 12% of pre-transfer household consumption), and malnutrition is a serious concern (e.g., 18% of children are anemic). Either transfer type had the potential to significantly improve welfare, and I find that both lead to significant increases in total (food plus non-food) consumption, This broadly confirms the results of INSP's initial evaluation (González-Cossío et. al. 2006).

Furthermore, this field experiment allows me to test the predictions of the canonical model of consumer demand under in-kind versus cash transfers (see, e.g., Southworth 1945, Moffitt 1989). The theory predicts that an in-kind transfer will only induce greater consumption of the transferred good than would an equal-valued cash transfer to the extent that it is *extra-marginal* and *binding*. An extra-marginal transfer is over-provided in that it is larger than the quantity that would be demanded under an equal-valued cash transfer, while a binding transfer is actually consumed, rather than re-sold. As the PAL transfer consisted of 10 food items, its distorting effect can be measured for each item individually and for the transfer as a whole. In fact, in terms of *total food* consumption, the PAL in-kind transfer was infra-marginal for all households. Consistent with the theory, I cannot reject the hypothesis that the in-kind food transfer and an equal-valued cash transfer led households to the same increase in food consumption.

For individual PAL food items, however, I find a large variation in the extent to which each is extra-marginal and binding. For example, in-kind bean transfers were small compared to overall household bean consumption (both before and after the cash transfer) and thus largely infra-marginal and binding. Powdered milk, on the other hand, was a sizeable in-kind transfer and was consumed in larger quantities under the in-kind than under the cash transfer. However, the milk transfer was not binding for many households, as I observe them consuming less milk than was transferred. Paternalistic in-kind transfers can thus differentially influence nutrition and health outcomes (compared to cash) only in these cases where they distort consumption.

However, food items are substitutable and there is no reason to believe the specific transferred items (i.e., milk or beans) are the only ones that can lead to the positive nutrition and health outcomes a paternalistic government desires. In fact, there is considerable evidence that cash transfers induced consumption of other nutritious food items which were not transferred in-kind, such as fruits, vegetables, and cheese. Furthermore, I find that binding, extra-marginal in-kind transfers induced households to substitute away from similar non-transferred foods. This type of substitution is predicted by the theory of rationing (Tobin and Houthakker 1950; Neary and Roberts 1980; Deaton 1981), and this paper provides the first empirical test in an in-kind transfer context.[2]

Despite finding little justification for paternalism at the household level, in-kind transfers may still be optimal if society desires that children consume more resources than parents

[2]Neary and Roberts (1980) and Deaton (1981) generalize the Tobin-Houthakker (1950) model of rationed consumer goods. Both papers mention that while rationing embodies a constraint on consumption from above, the model applies equally to constraints from below. Distorting in-kind transfers are one example of such a constraint.

would choose under an unrestricted cash transfer. Again, the data proves this fear largely unfounded, as both transfer mechanisms led to similar increases in calories consumed by children. There is some evidence that in-kind transfers led to greater intake of the essential micro-nutrient iron than did cash, and this increase most likely came through the higher consumption of iron-fortified powdered milk. There is no evidence, however, that differential nutrient intake led to observable health differences in terms of anemia prevalence, height, weight, or sickness two years after the start of the program.

Finally, the policy debate between equal-valued transfers in-cash and in-kind must consider the differential costs of achieving any paternalistic benefits. One cost is born directly by the recipient household - equal-valued cash transfers are weakly preferred to transfers in kind, and thus extra-marginal and binding in-kind transfers impart a lower utility than would cash. This cost is higher the more over-provided are the goods, but it is lower to the extent that in-kind goods are substitutable with non-transferred foods.[3] A second cost is that in-kind transfers more likely than not have greater distribution costs than cash transfers. In fact, I show that the PAL in-kind basket costs at least 20% more to administer than the cash transfer.

This paper offers important lessons for public policy. First, it provides some of the first evidence on the benefits - or lack thereof - arising from a paternalistic in-kind food transfer. A small body of evidence is available from the United States Food Stamp Program showing that these vouchers are infra-marginal for most recipients and thus treated like cash (Moffitt 1989; Fraker, Martini, & Ohls 1995; Hoynes & Schanzenbach 2009; Whitmore 2002).[4] For those recipients whose consumption is distorted, Whitmore (2002) shows that they have access to a well developed re-sale market in food stamps, and that over-provided stamps that are not sold tend to induce consumption of some non-nutritious foods, such as soft drinks.

The developed country context, however, is very different from the one studied in this paper. Perhaps the best evidence on the debate in low income countries comes from cash transfer programs to the poor. Evaluations of several such programs should assuage some paternalistic fears, as they demonstrate that cash is largely spent on nutritious foods (e.g., Hoddinott & Skoufias (2004) in Mexico; Attanasio & Mesnard (2005) in Colombia; Maluccio (2007) in Nicaragua). However, these cash transfers are often conditional on school attendance and visits to health centers, or are coupled with in-kind nutritional supplement for young children (see, e.g., Attanasio et. al. (2005); Behrman & Hoddinott (2005a)). As such, they do not allow us to fully separate out the effects of in-kind food transfers versus cash transfers.

In the following sections, I first outline a model of consumer demand under in-kind and

[3] Quantitatively, the household welfare cost of a distorting in-kind transfer, compared to a cash transfer, can be measured through an equivalent-variation exercise. First, we estimate the demand system for both transferred and non-transferred goods, which is analytically derived from utility maximization with respect to the usual linear budget constraint. Importantly, the estimated preference parameters also identify the conditional demand functions, derived from utility maximization under extra-marginal, binding in-kind transfers. We then calculate the maximized direct utility under (i) a cash transfer and (ii) an equal-valued in-kind transfer, both as functions of income. The income required to equate these maximized direct utilities is an estimate of the value of the in-kind transfer to the household.

[4] Other factors may also motivate in-kind transfers in the U.S., such as their political palatability; however, paternalism must also be a motivating force (see, e.g., Currie and Cole 1993; Currie and Gahvari 2008).

cash transfers which guides the empirical analysis. Then, I describe the PAL transfer program and the field experiment. Section 4 discusses identification of the empirical results, which are presented in section 5. I first estimate the extent to which the in-kind transfers distorted consumption, and then estimate average treatment effects of both transfer types on consumption and child health. Finally, I discuss the differential costs of PAL transfer types in Section 6, and conclude.

2 Cash vs. Paternalistic In-kind Transfers

This section outlines a simple demand theory of in-kind versus cash transfers (see Moffitt 1989). The model serves to clarify the concepts of *extra-marginal* and *non-binding* in-kind transfers, and it identifies the situations in which such transfers will induce different household consumption choices than would an equal-valued cash transfer. I conclude the section with a discussion of how such distortions may motivate a paternalistic government to use in-kind transfers.

2.1 A simple demand theory

Assume households have preferences over two goods, milk, q_M, and one composite good, q_F. In the absence of transfers, a well behaved utility function $U(q_M, q_F)$ is maximized with respect to the budget constraint $p_M q_M + p_F q_F \leq Y$, where p_M, p_F, and Y are the price of milk, the price of the composite good, and the household's endowment, respectively. Line $\overline{AB}$ in Figure 1 gives this budget constraint graphically. A cash transfer of T shifts the budget constraint upwards to $\overline{CE}$, corresponding to $p_M q_M + p_F q_F \leq Y + T$, while an equivalent-cost transfer of milk $\overline{q}_M (= \frac{T}{p_M})$ leads to a kinked budget constraint that depends on the re-sale price of milk $\overline{p}_M$:

$$p_M q_M + p_F q_F \leq \begin{cases} Y + \overline{p}_M \overline{q}_M & if \quad q_M \leq \overline{q}_M \\ Y + p_M \overline{q}_M \quad = Y + T & if \quad q_M > \overline{q}_M \end{cases} .$$

Assuming that no premium is placed on the in-kind transfer, the re-sale price $\overline{p}_M$ necessarily lies in the set $[0, p_M]$. Note that the re-sale price may be discounted from the market price, reflecting the search and transaction costs of finding a willing buyer. It may also represent an implicit barter price, or obligations in a credit or insurance contract.[5]

The in-kind transfer is equivalent to a cash transfer if re-sale is fricitonless; $\overline{p}_M = p_M$ and the budget line is again $\overline{CE}$. On the other hand, if re-sale is costly or not available, $\overline{p}_M \in [0, p_M)$ and the budget set is smaller. Budget line $\overline{FDE}$ reflects a re-sale price strictly between 0 and p_M, while $\overline{ADE}$ reflects the extreme case of no re-sale. As some bundles on $\overline{CD}$ are only available under in-kind transfers when re-sale is frictionless, it is clear that cash is weakly preferred to a transfer in kind.

Consider two households, I and II, with different preferences. For simplicity, assume that frictionless re-sale is not available: $\overline{p}_M < p_M$. Household I is indifferent between

[5] Such transactions have been shown to play an important role in rural economies (e.g., Townsend 1994; Angelucci and De Giorgi 2009)

transfer type, moving from indifference curve I to I' under both mechanisms. Household II is weakly worse off under the in-kind transfer. It is forced to consume at II' (the kink) if $\overline{p}_M = 0$ and at II'' if $\overline{p}_M \in [0, p_M)$ while it would have chosen II''' under the cash transfer.[6]

The in-kind transfer is considered *extra-marginal* for household II who consumes more milk than they would have under the cash transfer, and *infra-marginal* for household I. Thus, infra-marginal in-kind transfers are equivalent to cash.[7] An in-kind transfer is considered *non-binding* if the household consumes less of the good than it was provided, and binding otherwise. The transfer is non-binding for household II when facing a strictly positive re-sale price (indifference curve II'').

Formally, let q_M^{Cash} and $q_M^{In-kind}$ represent demand for milk under cash transfer T and the in-kind transfer $\overline{q}_M$, respectively. Choices under the cash transfer define the extent to which the in-kind transfer was extra-marginal (the intensive margin of the extra-marginal transfer):

$$EM_M(\overline{q}_M) = \begin{cases} \overline{q}_M - q_M^{Cash} & if \quad q_M^{Cash} < \overline{q}_M \\ 0 & otherwise \end{cases} . \tag{1}$$

Choices under the in-kind transfer define the extent to which the transfer is non-binding:

$$NB_M(\overline{q}_M) = \begin{cases} \overline{q}_M - q_M^{In-kind} & if \quad q_M^{In-kind} < \overline{q}_M \\ 0 & otherwise \end{cases} . \tag{2}$$

The amount of the in-kind transfer that is in practice consumed, over and above what would have been consumed under a cash transfer is the *Distortion Effect* of the transfer, $D_M(\overline{q}_M) = EM_M(\overline{q}_M) - NB_M(\overline{q}_M)$.

The model suggests that household utility is lower under an extra-marginal in-kind transfer than under an equal-valued cash transfer. This is reflected by the utility associated with indifference curves II' or II'' compared to the unconstrained choice I'''; the welfare loss is obviously lower for a higher re-sale price. The welfare loss is also lower the more substitutable is the in-kind good with the composite good. This is not shown in Figure 1, but would be evident if I had drawn shallower indifference curves representing a higher degree of substitutability between milk and the composite good.

2.2 Extensions

The model is readily extended to the case of multiple transferred goods and multiple non-transferred goods (Neary and Roberts 1980; Deaton 1981).[8] When more than one non-transferred good is available, a distorting in-kind transfer will induce a household to consume

[6] If preferences are non-satiated, the household would never choose a consumption bundle on $\overline{AD}$ when faced with re-sale price $\overline{p}_M = 0$.

[7] Note that extra-marginality is defined with respect to the post-cash-transfer income, rather than pre-transfer income. If the in-kind good is normal, a transfer of $\overline{q}_M$ could have been extra-marginal ex-ante but the income elasticity of milk may be large enough to induce an ex-post consumption of milk greater than $\overline{q}_M$.

[8] Neary and Roberts (1980) and Deaton (1981) (independently) offer models of choice behavior under the rationing of a subset of goods when multiple other goods are available. In-kind transfers are simply a constraint from below while a ration is a constraint from above. However, they only consider the consequences of rations or transfers that are fully binding. The discussion here generalizes their framework to allow for non-binding transfers or rations.

fewer substitutes, and more complements, of the in-kind good. This will tend to mitigate the welfare loss that would result if these substitutes and complements were not available. For example, suppose that cheese and milk are (Hicks) substitutes and the household receives a binding, extra-marginal milk transfer. The household will tend to substitute away from cheese as they are now over-provided with milk. Compared to a cash transfer, the in-kind welfare loss will thus be lower as milk and cheese become more substitutable.

When more than one good is transferred in-kind, the results of the above model hold for each good separately (see Neary and Roberts 1980). However, in order to compare the in-kind bundle as a whole to an equal-valued cash transfer, we must aggregate across all in-kind goods. One meaningful aggregation uses market prices to value in-kind goods.[9] Let $(\overline{q}_n, p_n)$ represent transfer amounts and associated market prices for N in-kind goods, $n = \{1, \ldots, N\}$. With $EM_n(\overline{q}_n)$ and $NB_n(\overline{q}_n)$ defined as in (1) and (2) above, we have:

$$EM_{Total}(\overline{q}_1, \ldots, \overline{q}_N) = \sum_{n=1}^{N} p_n EM_n(\overline{q}_n) \tag{3}$$

$$NB_{Total}(\overline{q}_1, \ldots, \overline{q}_N) = \sum_{n=1}^{N} p_n NB_n(\overline{q}_n) \ . \tag{4}$$

The *Distortion Effect* for the transfer as a whole, with prices as a norm, is thus $D_{total}(\overline{q}_1, \ldots, \overline{q}_N) = EM_{Total}(\overline{q}_1, \ldots, \overline{q}_N) - NB_{total}(\overline{q}_1, \ldots, \overline{q}_N)$.

Note that this model is time-independent, leaving re-sale as the only explanation for observed non-binding transfers. In practice, however, in-kind items may be stored or consumed in an otherwise lumpy manner. If consumption choices are observed at only one point in time, non-binding transfers identify an upper bound on the extent of re-sale, and a lower bound on the quantity of the transfer that was not consumed.[10]

2.3 Social Welfare

That in-kind transfers can distort consumption compared to cash must therefore be the motivation for their use by a paternalistic government. The model shows that the differential benefits of such transfers can only be realized to the extent that they are extra-marginal and binding. However, should we believe that society cares about recipients' consumption of the specific items transferred? Or rather, is social welfare a function of the *outcomes* that in-kind transfers are designed to promote? This distinction matters when there are multiple ways to achieve the outcome of interest, as is the case with in-kind food transfers. Therefore, an appropriate test of the justification for paternalism is whether health and nutrition outcomes differ compared to equal-valued cash transfers.

Furthermore, paternalistic food transfers may be justified if recipients have time-inconsistent preferences – in-kind transfers would thus be preferred by the household in the long run if

[9] Other norms can be considered such as a count of the number of goods that were extra-marginal or non-binding for each household, or caloric content in the case of food.

[10] Shapiro (2005) is an example to the contrary in which he exploits exogenous variation in the time between the survey and the reciept of the transfer for U.S. Food Stamp recipients. Such detail is not currently available for the PAL experiment.

distorted consumption leads to superior health and human capital outcomes. Paternalistic food transfers may also be justified if social and household preferences do not coincide, as is often the case concerning outcomes of children and pregnant mothers. For example, in-kind transfers may increase social welfare by targeting these individual family members, if unconstrained choices under a cash transfer would not do so.

In addition to any potential social benefits to paternalism, the costs of in-kind transfers over cash must enter the policy debate. One cost is captured in the model above - that distorting transfers involve a loss of utility for constrained households. A second cost is any additional operating and transaction costs of in-kind over cash transfers. Purchasing, packaging, transportation, and distribution of in-kind goods likely involve higher costs than making cash transfers.[11]

3 The Transfer Program, the Experiment, and Data

3.1 The 'Programa de Apoyo Alimentario'

Started in 2004 and still on-going, PAL operates in about 5,000 rural villages throughout Mexico. It is administered by the public/private company DICONSA which also maintains subsidized general stores in these areas. Monthly in-kind transfers are comprised of seven basic items - corn, rice, beans, pasta, cookies, milk, and vegetable oil - and two to four complementary items.[12,13] The contents were chosen by nutritionists to provide a balanced, nutritious diet and contain about 1750 calories per day, per household (Campillo Garcia 1998). All of the items are common Mexican brands. The transfer is not conditional on family size, is delivered bimonthly, and the food in each basket costs the government about 150 pesos (15 U.S. dollars). Program rules state that transfers are to be made to women whenever possible. Transfers are also conditional on attending monthly classes (*platicas*, in Spanish) in health, nutrition, and hygiene which were designed to promote healthy eating and food preparation practices.

Program eligibility proceeds in two-stages where first poor, rural villages, and then poor households within eligible villages are offered the program.[14] Household eligibility is determined through a means test of all households in eligible villages (Vasquez Mota 2004). The village is required to elect a three-member 'Committee of Beneficiaries' whose responsibilities include disbursing aid within the village and teaching the educational classes. The food boxes are assembled in several warehouses throughout the country and then delivered to a

[11] Corruption may be an additional cost. It is unclear, however, whether in-kind or cash transfers are more corruptable in general.

[12] The complementary items are changed periodically to add novelty, at times containing sardines, tuna fish, lentils, chocolate, cereal, or corn starch.

[13] Due to high transportation costs, approximately 4% of the most rural villages incorporated in the program received monthly cash transfers of 150 pesos instead of the in-kind food box. This is exclusive of the experimental sample I describe below.

[14] Villages are eligible to receive PAL if they have fewer than 2,500 inhabitants, are highly marginalized (as classified by the Census Bureau), and do not currently receive aid from other food transfer programs. In practice, this last criterion implies that the village is not incorporated in either 'LICONSA', the Mexican subsidized milk program, or 'OPORTUNIDADES', a conditional cash transfer program.

central location in each village (often the DICONSA store if one exists). Each household must collect its own aid package from the Committee and is required to present their PAL identification card to receive the package.

3.2 The PAL Experiment

Concurrent with the national roll-out of the program, 208 villages were randomly selected from the universe of eligible PAL villages in eight southern states to participate in a randomized controlled trial.[15] These villages were randomized into four groups using a simple randomization algorithm (González-Cossio et. al. 2004). Eligible households would thus receive either (1) in-kind transfers plus educational classes (the standard PAL treatment), (2) in-kind transfers *without* the education classes, (3) a pure cash transfer of 150 pesos per month plus the education classes, or (4) no transfer or classes. All other aspects of the program, including the role of the Committee of Beneficiaries, were unaffected by the experiment. The means test was applied villages assigned to receive aid, and the program was offered as per program rules. Note that as the means test was *not* applied in the pure control villages; households in this group are therefore not identified in my data as eligible or ineligible.[16]

In practice, however, the orthogonal randomization into educational classes was confounded as 63% of PAL households in the In-kind *without* education treatment in fact attended classes. The reason for this departure from the experimental design is not clear, but it may lie in poor oversight of the Committees of Beneficiaries who were responsible for teaching the classes. I therefore abstract from the effects of the classes by combining both in-kind treatment groups. I refer to the resulting three groups as "In-kind," "Cash," and "Control." Further details on the randomization into education classes are available in Appendix A.

3.3 Data

In each experimental village, 33 households were randomly selected for inclusion in pre- and post-treatment panel surveys. These surveys were administered by the National Institute of Health (INSP), with the stated objective of studying the nutritional status of children and their mothers; intentionally, no mention was made of the experiment, PAL, or DICONSA. The pre-treatment survey was conducted between October 2003 and April 2004, before the means-test was applied in the Cash and In-kind villages. My data, however, does not include the household eligibility status that was determined by the means-test; I instead use self-reported measures of the reciept of PAL aid from the follow-up survey which was conducted two years later in the final quarter of 2005. Approximately 90% of households in Cash and In-kind villages received PAL transfers and it is unlikely that any ineligible households in fact

[15] The eight states are: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, and Yucatán.

[16] The pure control villages were to be incorporated in PAL at the conclusion of the experimental trial in late 2005. This gradual roll-out of benefits was necessary as not enough resources were available to include all eligible villages simultaneously at the start of the program.

received aid.[17] PAL began to phase-in aid delivery after the baseline surveys, completing coverage within a year.

A 7-day food recall captured household-level consumption of 61 food items. I use village median unit-values as measures of prices to aggregate across foods. Household consumption expenditure, but not quantities, was also collected in 26 non-food categories intended to capture the extent of household non-durable consumption. Individual-level food consumption was measured for children with a 24-hour food recall, and was subsequently converted into caloric and micro-nutrient content. Finally, precise child anthropometric and health measures were collected, including height and weight, blood tests for anemia, and self-reports of sickness in the last four weeks. Appendix B contains further details on the construction of unit-values, and consumption and health variables.

Table 1 summarizes the 10 items included in the PAL food basket at the time of the follow-up survey in late 2005. All of the items are non-perishable as delivered and the distribution of caloric content partially demonstrates that the basket contains a balanced diet (notably absent are fruits and vegetables). The powdered milk and corn flour are fortified with iron, zinc, and folic acid, three micro-nutrients known to be deficient in the Mexican diet. When valued at local prices, there is some dispersion in the basket value across villages but this variation is small as evidenced by coefficients of variation (CV) in the range of 0.6 to 0.23. As a whole, the PAL in-kind package is valued at about 202 pesos with an inter-quartile range of about 25 pesos – note that this is approximately 30% more than the 150 peso transfer received by households in the Cash treatment. I return to consider this fact in detail below.

3.4 Baseline Balance and Attrition

The usable sample contains 5,556 households in 198 villages. Details on the construction of this sample are available in Appendix C.[18] The map in Figure 2 shows that the experimental villages are geographically diverse and randomly distributed (spatially). Panel A of Table 2 confirms that treatment groups were balanced at baseline; I return to discuss Panel B below. The table contains mean household and village characteristics, by treatment group, and asterisks denote significant differences in means across groups, within a characteristic. Only 3 out of the 27 variables shown exhibit significance imbalance at the 10% level, and this pattern holds for all of the other observables that are not included here for lack of space.

Table 2 also demonstrates the sample is poor - monthly total consumption (food plus non-food) per adult equivalent is about 550 pesos per month, or 55 U.S. dollars. Furthermore, the budget share of food out of total consumption expenditure is about 65%. A small percentage of households (about 7 percent) report receiving OPORTUNIDADES transfers, and an even smaller percentage (about 3 percent) report receiving LICONSA, despite PAL rules excluding *villages* that are incorporated in these programs. However, a village-by-village check shows these households are spread evenly amongst the sample with no villages violating this eligibility rule *en masse*.

[17] Participating households were issued PAL identification cards and were required to present this card and provide a signiture to receive the aid, whether in cash or in kind.

[18] The clustering of localities in Figure 2 reflects the general population distribution in southern Mexico - a mountainous and heavily vegetated region that supports settlement only in flat or de-forested land.

Ten villages out of the original 208 surveyed at baseline are excluded for the following reasons: 2 villages could not be re-surveyed due to concerns for enumerator safety (1 In-kind and 1 Control); 2 In-Kind villages were incorporated in PAL before the baseline survey; 4 villages received the wrong treatment (2 In-kind and 1 Cash did not receive PAL, 1 Control received In-Kind aid); finally, 2 villages (1 In-kind and 1 Control), were geographically contiguous therefore possibly violating the Stable Unit Treatment Value Assumption (SUTVA) (Rubin 1980). Thus, for the remaining 198 villages (98% of the total) the randomization into transfer type was successful. Excluded villages are not significantly different from the sample as a whole in terms of baseline characteristics (results available upon request).

Finally, overall household attrition was low; however, it was significantly higher for the control group at 15.3% then for the in-kind and cash groups at 10.5% and 10.9%, respectively.[19] Despite the overall greater number of atritted households in the Control group, it does not appear that they were observably different from atritted households in the Cash and In-kind groups. This is confirmed in Appendix Table A.1 which shows that baseline characteristics of non-atritted households do not vary systematically across treatment groups.

4 Identification

This section outlines the parameters of interest and discusses their identification. The theory suggests that only extra-marginal and binding in-kind transfers will induce different consumption than would an equal-valued cash transfer. Therefore, I first estimate the extent to which PAL transfers were extra-marginal using consumption choices under the 150 peso cash transfer. Randomization provides the proper counterfactual, however EM_n and EM_{Total} in (1) and (3) are identified under an *equal-valued* cash transfer, about 202 pesos at the mean of village-level prices (see Table 1). My estimates thus serve as an upper bound on the degree of extra-marginality, as the cash transfer was in practice worth 75% of the in-kind transfer.

Second, I estimate non-binding transfers - NB_n and NB_{Total} in equations (2) and (4). They are identified directly through consumption choices under the in-kind transfer. However, recall that I only observe household consumption for a one week period, and thus can not distinguish between re-sale and storage, or otherwise lumpy consumption. This limits the extent to which the exercise measures the "stickiness" or "flypaper" effect of the transfers for the household as a whole (Jacoby 2002; Islam and Hoddinott 2008). If consumption is not smooth, my estimates of non-binding transfers are an upper bound on the amount of the transfer that was not consumed. A conservative lower bound is obviously that the household ate, or will eat, the entire package.

Third, I am interested in how household consumption was differentially influenced by the PAL food transfer and an equal-valued cash transfer. Fourth, I am interested in how the equal-valued transfers differentially influenced the food consumption, nutrition, and health outcomes of children. In these final two exercises, the parameters of interest are Average

[19] P-values on tests of equality of attrition rates between In-kind and Cash groups versus the Control group are 0.01 and 0.03, respectively.

Treatment effects on the Treated (ATTs) households and individuals for equal-valued transfers. The randomized assignment of treatment aids in identifying these ATTs, however, two issues require extra consideration.

First, recall that the 150 peso transfer was in practice only worth about 75% of the local value of the in-kind PAL basket, about 202 pesos. The government chose the cash transfer amount to equal the wholesale cost of the food in each PAL basket; it did not pass on to recipients the significant cost savings of making transfers in cash (I detail these costs in Section 6 below). Not only are the effects of equal-valued transfers of theoretical interest, but the exercise of comparing equal-valued transfers is therefore also a reasonable approximation of the feasible government policy of converting the entire cost of the in-kind transfers to cash. In practice, I lineraly scale up treatment effects on consumption of the 150 peso cash transfer by a factor of $\frac{202}{150}$. This extrapolation involves reasonable assumptions and I detail them below.

Second, recall also that I do not observe program eligibility for any households. If eligibility was observed and all eligible households accepted the program, simple differences in means would identify the ATTs (Heckman, Lalonde, and Smith 1999). This does not pose a problem for comparisons between Cash and In-kind groups as I observe program take-up which is likely to be highly, if not perfectly, correlated with eligibility - and comparisons between Cash and In-kind groups are the main results of the paper.

However, for comparisons involving the Control group unobserved eligibility status requires an additional identifying assumption - namely, that the entire Control group, both eligible and in-eligible households, is a valid counterfactual for the no-treatment outcome of treated In-kind and Cash households. While at first glance this may seem like a strong assumption, I show that there are in fact few observable differences between the treated and untreated in Cash and In-kind groups, implying that eligibles and in-eligibles in all groups are similar. Furthermore, recall that *90% of households* in the Cash and In-kind groups in fact received PAL aid – the scope for bias is small. I now formalize the identification problem to clarify the necessary assumptions, then proceed to show that these assumptions are not overly restricting.

4.1 Average Treatment Effects on the Treated (ATTs)

Let T_i be an indicator of the treatment group for household i:

$$T_i = \begin{cases} 0 & if \quad Control \\ 1 & if \quad In\text{-}Kind \\ 2 & if \quad Cash \end{cases}$$

The observed outcome Y_i is only realized in one treatment state; however, consider the triplet (Y_{0i}, Y_{1i}, Y_{2i}) which represents the potential outcomes for i in each of the possible treatment states Control, In-Kind, and Cash, respectively. Y_i thus equals the potential outcome, Y_{0i}, Y_{1i}, or Y_{2i}, of the realized treatment group T_i. Let $D_i = 1$ indicate receipt of either PAL treatment, and $D_i = 0$ otherwise. If E_i is defined as indicator of exogenous program eligibility, a maintained assumption (Assumption 1) is that $E_i = D_i$; that is, all eligible households accept the treatment if offered.

I am interested in the ATTs in all pair-wise comparisons of treatment groups. This includes not only comparisons of Cash or In-kind versus Control, but also Cash versus In-kind. Define the ATT between any two treatment groups j and k as:

$$ATT(j,k) = E\left[Y_{ji} \mid T_i = j, D_i = 1\right] - E\left[Y_{ki} \mid T_i = j, D_i = 1\right] \text{ for } j = 0,1,2;\ k \neq j \ . \quad (5)$$

As the potential outcomes Y_{ki} are never realized in treatment state j, $E\left[Y_{ki} \mid T_i = j, D_i = 1\right]$ is unobservable. Randomization, along with complete take-up (Assumption 1), implies that:

$$\text{ASSUMPTION 2:} \quad E\left[Y_{ki} \mid T_i = j, D_i = 1\right] = E\left[Y_{ki} \mid T_i = k, D_i = 1\right] \text{ for } j,k = 0,1,2 \quad (6)$$

and this alone is enough to identify $ATT(1,2)$ through:

$$E\left[Y_i \mid T_i = 1, D_i = 1\right] - E\left[Y_i \mid T_i = 2, D_i = 1\right] \ .$$

However, to identify $ATT(1,0)$ and $ATT(2,0)$, I need the additional assumption that outcomes in the no-treatment state are independent of eligibility. This implies:

$$\text{ASSUMPTION 3:} \quad E\left[Y_{0i} \mid T_i = j, D_i = 1\right] = E\left[Y_{0i} \mid T_i = 0\right] \text{ for } j = 1,2 \quad (7)$$

and thus $ATT(1,0)$ and $ATT(2,0)$ are identified through:

$$E\left[Y_i \mid T_i = j, D_i = 1\right] - E\left[Y_i \mid T_i = 0\right] \text{ for } j = 1,2 \ .$$

For convenience, I proceed referring to $ATT(1,0)$, $ATT(2,0)$, and $ATT(1,2)$ as $ATT(Cash)$, $ATT(IK)$, and $ATT(IK\text{-}Cash)$, respectively.

Equal-valued Cash and In-kind transfers

To compare equal-valued transfers, I scale up treatment effects for consumption outcomes under the 150 peso transfer to predict treatment effects under a 202 peso cash transfer - the mean value of the PAL basket in Cash villages. $ATT(Cash)$ for all consumption outcomes are identified through the exogenous income shock and are thus a local estimate of the slope of the Engel curves of each good. Assuming that Engel curves are locally linear with a slope equal to $ATT(Cash)$, the average treatment effects of equal-valued cash transfers (as compared to no transfer) are identified through $ATT^{EQ}(Cash) = ATT(Cash) * \frac{MeanBasketValue}{150}$, while $ATT^{EQ}(IK\text{-}Cash) = ATT(IK) - ATT^{EQ}(Cash)$ identifies the differential effects of equal-valued cash and in-kind transfers. Note that this assumption rules out goods being local necessities or luxuries and is thus a first-order approximation to the true Engel curve. However, the small size of the extrapolation limits the magnitude of potential biases.

This exercise makes intuitive sense for food and non-food consumption outcomes. However, I do not make such extrapolations for child health outcomes; doing so would necessitate stronger assumptions about Engel curves for outcomes not purchased in the free-market. To the extent that health outcomes are increasing in income, however, $ATT(IK\text{-}Cash)$ for child height, weight, anemia, and sickness can be taken as upper bounds on the differential effects of *equal-valued* in-kind and cash transfers.

Eligibility

Identification of treatment effects on the treated relies on the assumption that take-up is highly correlated with eligibility. Three pieces of evidence suggest that this is likely the case. First, the transfers are in practice unconditional. Even if class attendance was enforced, or if the recipient *believed* it would be enforced, the opportunity cost of attendance would have to be extremely high for a household to decline the program solely on the basis of a monetary cost/benefit comparison. Second, adverse stigma effects associated with participation (as in Moffitt 1983) are unlikely in this developing country context due to the absolute depth of poverty (Case and Deaton 1998). Finally, evidence from OPORTUNIDADES, with a similar population to the PAL villages, shows that the take up rate amongst eligible households was above 97% (Angelucci and DeGiorgi 2009).

Identification of $ATT(IK)$ and $ATT(Cash)$ also necessitates the assumption that *all* households in Control villages form a valid counterfactual group for the no-treatment outcome of treated households in Cash and In-kind villages. The evidence in Table 3 supports this assumption, using a probit model to predict which households in the Cash and In-kind villages received PAL aid as a function of pre-treatment characteristics. I do know which questions were asked in the pre-treatment census, and I include all likely predictors of poverty – the only relevant characteristic I do not possess is monthly household income.

While several coefficients are significant - receiving OPORTUNIDADES reduces participation by 7.9 percentage points and not eating meat in the last week increases participation by 3.8 points – the vast majority of variation is driven by unobservables as evidenced by the adjusted pseudo-R^2 statistic of 0.011.[20] This finding may be reflecting imperfect take-up by the eligibles, however I can not rule out that assignment was a noisy process leading to an essentially random outcome. Panel B of Table 2 corroborates this finding and suggests that the use of the full Control sample as a counterfactual is not likely to introduce bias. The panel compares baseline characteristics of all households in Control villages with treated households in the Cash and In-kind villages. Compared to Panel A (which includes all households in Cash and In-kind villages) several more characteristics become marginally significant in Panel B, but still no more than would be expected by pure chance.

4.2 Estimation

To improve efficiency and account for those chance differences in baseline characteristics mentioned above, I estimate $ATTs$ using a difference-in-differences (DD) estimator and control for pre-treatment observables:

$$Y_{ijt} = \alpha + \gamma POST_t + \sum_{g=1}^{2} \delta_g GROUP_{gj} + \sum_{g=1}^{2} \beta_g \left(GROUP_{gj} * POST_t \right) + \mathbf{X}_{ij}\lambda + \varepsilon_{ijt} \quad (8)$$

Y_{ijt} is the outcome for household i in village j at time t, $POST_t$ is an indicator for the post-intervention survey, $GROUP_{gj}, g \in \{1, 2\}$ are indicators for Cash and In-kind treatment

[20] Estimating this model for In-kind and Cash groups seperately produces similar results, as does allowing for meaningful interactions between predictors.

assignment of village j, X_{ij} is a vector of pre-intervention household and village characteristics, and ε_{jt} captures all unobserved heterogeneity in the outcome.[21] The coefficients β_g identify average treatment effects on the treated for In-kind and Cash treatment groups, $ATT(IK)$ and $ATT(Cash)$, while their difference identifies $ATT(IK\text{-}Cash)$. I test for significance of $ATT(IK\text{-}Cash)$ using a F-test of the equality of the β_g coefficients. Standard errors are always clustered at the village level to account for unobserved intra-village correlation in the outcome variable. For some child health and consumption outcomes, (8) is estimated at the individual level. Most household level consumption variables are expressed in adult equivalents.

5 Results

5.1 Extra-marginal and Non-binding In-kind Transfers

Are in-kind transfers extra-marginal?

This section presents non-parametric estimates of the distribution of extra-marginal PAL in-kind transfers. First, however, note that in terms of total food consumption, the in-kind transfer is *infra-marginal* for virtually the entire sample. That is, under the 150 peso cash transfer no household consumes less than 150 pesos of food per month, and 0.01% of the sample consumes less than 200 pesos of food per month. However, looking at individual PAL food items, there appears to be considerable over-provision.

The solid curves in Figure 3 are empirical CDFs of monthly quantities consumed by post-transfer Cash households for each PAL food item - note the different scales on the horizontal axes.[22] I discuss the dashed curves below. The vertical lines delineate the PAL transfer quantities, $\overline{q}_n$. For households consuming less than $\overline{q}_n$, the distance to the vertical line is the extra-marginality of each item: $EM_n(\overline{q}_n)$. It is evident that many households do not consume the in-kind foods *at all;* yet if transfers had been made in-kind, all would have received substantial rations. For example, milk and tuna fish are not consumed by about 35% and 50% of households, respectively. Note that PAL corn flour transfers are extra-marginal for about 80% of households, yet corn, in all its varieties, comprises 18% of total food consumption (see Table 1). Households are accustomed to eating corn in either kernel or tortillas form, yet PAL transfers include corn flour.

For the sample as a whole, integrating each CDF from zero to the vertical line gives an estimate of the average *quantity* over-provided. Also, the intersection point of the CDF and the vertical line identifies the *percentage* of over-provided households, or the extensive margin of over-provision for the sample. Part A of Table 4 summarizes this extensive margin numerically. Some items such as beans and oil are over-provided to only a few

[21]Unless otherwise noted, controls include the following pre-treatment characteristics: indicators of the presence children aged 0 to 5 and aged 6 to 12, of the household farming or raising animals, of a family member speaking an indigenous language, of any member receiving Oportunidades, of a male head of the household, of running water in the house, of owning a refrigerador, of a DICONSA store in the village, and state and month of interview indicators.

[22]The sample is top coded at the 95th percentile for expositional convenience.

households (9.6 and 10.2 percent, respectively) while others, such as corn flour and lentils are over-provided to most (82.7 and 87.2 percent, respectively).

Good-by-good comparisons do not capture the total amount of over-provision for each household. To do so, I aggregate extra-marginal transfers as in (3) using village level prices. It will prove convenient to express $EM_{Total}(\overline{q}_1, \ldots, \overline{q}_{10})$ for each household as a percentage of the value of the in-kind basket and I plot this distribution as the solid kernel density plot in Figure 4.[23] Over-provision is obviously not limited to a subset of households.[24] This density estimates the extent to which the PAL in-kind food basket would distort consumption, if it was perfectly binding (that is, the entire transfer was consumed). On average, 44.8% of the transfer was extra-marginal (the solid vertical line). However, notice that the variance across households is large implying the burden of over-provision varies across the population.[25]

Are in-kind transfers consumed?

The paternalistic benefits of in-kind transfers will be lower if households do not consume what was provided. Such non-binding transfers are measured in a similar manner to extra-marginal transfers above. Refer again to Figure 3 and focus on the dashed CDFs which plot monthly household consumption under the in-kind transfers. Transfers are non-binding for households to the left of the vertical line, in that the household is observed consuming less than the PAL transfer amount, $\overline{q}_n$. Note that *infra-marginal* transfers are by definition binding, so we would expect transfers of commonly consumed items to appear to "stick".

Three observations suggest that observed non-binding transfers are a mixture of both resale and lumpy consumption. First, all of the goods are non-perishable and can be stored. Second, upon being opened, it would be hard to store part of the package of some items (i.e., tuna fish or pasta soup). Third, for some items the quantities transferred are very small (i.e., cereal at 200 grams) and for others the discount rate is likely high (i.e., cookies). Panel B of Table 4 summarizes the percent of households consuming less than the transfer amounts.

Aggregating across goods, $NB_{Total}(\overline{q}_1, \ldots, \overline{q}_{10})$ is valued at village prices, divided by the total village price of the basket, and plotted as the dashed kernel density in Figure 4. At the mean, 28.3% of the transfer is non-binding. However, there is a large variance and the distribution is skewed left, with 22.1% of the transfer non-binding for the median household. In summary, in-kind PAL transfers were largely binding, but for specific items and some households the in-kind transfers did not appear to "stick."

[23] Algebraically, the kernel density estimates the distribution of $\frac{EM_{Total}(\overline{q}_1,\ldots,\overline{q}_{10})}{\sum_{n=1}^{10} p_{n,j}\overline{q}_n}$ evaluated at village prices $\{p_{n,j}\}$.

[24] Aggregating by the *number* of extra-marginal items leads to a similar conclusion. 99.6% of households were overprovided with at least one good, while 53.3% were overprovided with 5 or more goods.

[25] This heterogeneity is indeed correlated with many observable characteristics, such as family size and composition. However, much of the variation is unexplained and is likely caused by unobservable tastes for certain foods - this is evidenced by a strong negative correlation between extra-marginal transfers and pre-treatment consumption of the in-kind goods.

The distorting effect of In-kind transfers

The extra-marginal value of the in-kind package would not have been consumed had the transfer been made in cash, while the non-binding value is an estimate of what was not consumed in practice; their difference estimates the extent to which the in-kind transfer distorts consumption. The extensive margin of the Distortion Effect can be seen for individual food items by comparing across the panels of Table 4. For example, 82.7% of households were over-provided with corn flour, yet 55.2% report consuming less than the transfer amount. The difference, 27.5%, is an estimate of the percentage of households which were induced by the in-kind transfer to consume more corn flour than they would have under the cash transfer. A similar exercise for vegetable oil shows that consumption was distorted for only 3.5% of households.

Good-by-good comparisons are useful if the policy objective is to increase consumption of specific items. This is likely the case for an item such as milk, which is nutrient-fortified and more likely to be consumed by children. PAL milk transfers distorted consumption for $27.7\%(= 63.6\% - 35.9\%)$ of households and, given that milk comprises about 40% of the value of the transfer (Table 1), this may support the paternalistic motivation for the in-kind transfer. However, it is more likely that the policy objective is to increase nutrition and health outcomes, and we must therefore consider whether the non-PAL food consumption choices under the cash transfer were of similar nutritional value.

The overall Distortion Effect can be seen in Figure 4 as the difference between the percentage of the basket that was extra-marginal and that which was non-binding. Note that randomization only identifies mean differences between the Cash and In-kind groups; without stronger assumptions, we can not "match" the distributions to answer the policy relevant question of what would be consumed under a cash transfer by those who were most distorted by the transfer in kind. However, the Distortion Effect is small, as the plotted densities are not very dissimilar. Furthermore, comparing the means of the distributions, the average Distortion Effect is 16.5 percentage points with a clustered standard error of 2 percentage points. This suggests that, on average, in-kind PAL transfers forced households to consume 33 *pesos* $(= 202 * 16.5\%)$ more of the PAL basket than did the 150 peso cash transfer.

5.2 Treatment Effects on Consumption

Aggregate Consumption

The previous section suggests that the distorting effects of the In-kind PAL transfers are likely to be small for total food, but significant for individual food items. This section examines how these distortions influenced household consumption, first for aggregated and then for disaggregated categories.

Table 5 displays coefficients of interest from the estimation of (8) by OLS for four outcomes: total, food, and non-food consumption, and a category containing only the 10 food items in the PAL basket. The bottom panel contains $ATT^{EQ}(Cash)$ - the predicted effect of a 202 peso cash transfer - and the p-value of a test of its significant difference from $ATT(IK)$. Odd numbered columns trim the top 1% of observations in each survey wave while even numbered columns trim the top 5%; both samples are shown in order to address a slight imbalance in baseline consumption across treatment groups that I discuss below. First, note that treatment effects on total consumption are large and significant – cash transfers raised consumption by about 50 pesos per adult equivalent per month and in-kind transfers raised it by a little over 60 pesos.

Caveat on Baseline Balance. Scaling per AE treatment effects up to the household level implies that treatment effects are relatively large in comparison to the value of the transfers. For example, multiplier effects for total consumption are 1.34 ($s.e.$0.36) and 1.44 ($s.e.$0.28) for the In-kind and Cash treatments, respectively.[26] Although these multipliers are large in absolute terms, I can not reject the hypotheses that either multiplier is unity. The source of the large multiplier effects is partly found in the sizeable (yet insignificant) baseline imbalance of consumption in the Control households with respect to the treated Cash and In-kind households, which are propagated into the $ATTs$ through the DD estimator. For example, total consumption per AE in column 1 for treated In-kind and Cash households was 38.31 and 40.43 pesos lower at baseline than for Control households. Further exploration shows that the imbalance is concentrated in the right tail of the distribution. Thus, trimming the top 5% of the distribution somewhat corrects the imbalance at baseline, reducing the $ATTs$ (even numbered columns). For example, total consumption multipliers fall to 1.28 for the In-kind group and to 1.29 for the Cash group. I therefore focus on the 5% trimmed sample.[27]

Note that multipliers in the range of 1.3 are not uncommon for transfer programs in Latin America. For example, Gertler, Martinez, and Rubio-Codina (2006) find a multiplier of 1.34 from the Mexican cash transfer program OPORTUNIDADES, Martinez (2004) finds a multiplier of 1.50 from the BONOSOL old-age pension in Bolivia, and Sadoulet, de Janvry, and Davis (2001) find multipliers ranging from 1.5 to 2.6 from the Mexican cash transfer program to farmers PROCAMPO. These papers suggest that the multiplying effects of transfers result from investments in physical capital not previously made due to either a lack of credit or a risk aversion profile that declines with income. These are plausible explainations for the PAL villages and this issue deserves further consideration I do not provide here.

Importantly, recall that comparisons between Cash and In-kind treatments do not necessitate information on the Control, and are thus not influenced by potential baseline imbalance. Nonetheless, I present $ATT(Cash)$ and $ATT(IK)$ to see overall treatment effects.

Aggregate Consumption Categories. Starting with column (2), both transfer types significantly increased total consumption per AE, but effect sizes are indistinguishable from one another (p-$value$=0.37). Furthermore, if the cash transfer had been of equal monetary value to the in-kind basket, the mean treatment effects become virtually identical - a 202

[26]Using the 1% trimmed sample (column 1), treated In-kind households have an average of 4.09 AE: $(\frac{65.98*4.09}{202}) = 1.34$;treated Cash households have an average of 4.03 AE: $(\frac{53.58*4.03}{150}) = 1.44$

[27]Obviously, the imbalance may due to the inclusion of both eligible and ineligible households. This is unlikely, however, as (i) village level randomization implies that around 90% of households must be eligible, and (ii) the regressions control for observable characteristics. The imbalance must be driven by either pure chance or unobservable characteristics, such as household income (see the section on Identification above).

peso cash transfer and the in-kind transfer lead to consumption increases of 64 pesos and 63 pesos per AE, respectively.

Moving to column (4), if we consider the program as implemented ($ATT(IK)$ versus $ATT(Cash)$), food comprised more of the increase in total consumption under in-kind than under cash transfers – comparing across columns (2) and (4), food comprised $80\%(=\frac{50.71}{63.45})$ of the increase in total consumption for In-kind households, and only $55\%(=\frac{26.43}{47.95})$ of the increase for cash households. However, if the transfers had been of equal value, we would not be able to reject the hypothesis that food consumption increased by the same amount across transfer types. $ATT^{EQ}(Cash)$ for food is 36 pesos per AE, which is insignificantly different from the $ATT(IK)$ for food of 51 pesos.

Furthermore, column (6) shows that consumption of the 10 food items in the PAL basket increased significantly more under the in-kind than the cash transfer - in-kind transfers induced an extra 26 pesos of consumption per AE of in-kind food items while the 150 peso cash transfer only induced a 6 peso increase. With approximately 4 adult equivalents per household, treated in-kind households only increased consumption of in-kind goods by about 100 pesos, or half of the value of the in-kind transfer. This is *prima facie* evidence that in-kind transfers were either infra-marginal or non-binding; if not, we would expect $ATT(IK)$ for in-kind goods to equal the entire value of the in-kind transfer. A similar comparison for the Cash group implies that total household consumption of the PAL in-kind goods only increased by about 24 pesos. Even under an equal-valued cash transfer, we only would have seen an 8 peso per AE increase in the consumption of in-kind goods ($ATT^{EQ}(Cash)$), or about 32 pesos for the household as a whole. Comparing across columns (4) and (6), $52\%(=\frac{26.38}{50.71})$ of food increases for in-kind households were on in-kind goods, while under a 150 peso Cash transfer about half that percentage, or $23\%(=\frac{5.98}{26.43})$, of the food increase consisted of the PAL in-kind goods.

Finally, column (8) shows that the cash transfer increased consumption of non-food goods more than did the in-kind treatment, although the difference is only barely significant (p-value=0.10). If the transfers had been of equal monetary value, the differential treatment effects on non-food goods becomes significant at the 5% level.

In summary, both In-kind and Cash transfers led to large increases in total consumption of similar magnitude. In-kind households spent somewhat more of the increase on food than did Cash households, but not significantly so. I now explore disaggregated consumption categories in order to expose whether Cash transfers were spent in a manner consistent with the social preferences that motivated the PAL food transfers, and to what extent the PAL in-kind transfers altered consumption compared to an unrestricted cash transfer.

Disaggregate Consumption

Table 6 contains treatment effects for 8 main consumption categories and several sub-categories. The categories are largely self-explanatory except for the "Other" categories, which contain items that are consumed infrequently, if at all, by most households.[28] I

[28] The categories are mutually exclusive and exhaustive of the 61 food and 26 non-food categories included in the analysis. "Other Grains" include: white and sweet rolls, sliced bread, wheat flour, and wheat tortillas. "Other Starches" include: oats, soy, and the corn-based drink *atole*. "Junk Food" includes: sweet cakes

present estimates of $ATT^{EQ}(Cash)$ and $ATT(IK)$, along with the p-value of a test of their equality – appendix Table A.3 contains comparisons of $ATT(Cash)$ and $ATT(IK)$.

Fruits and Vegetables The top row shows that consumption of fruits and vegetables increase markedly under both equal-valued Cash and In-kind transfers, and that Cash induced greater consumption, but not significantly so (*p-value*=0.19). In fact, comparing to column (4) of Table 5, fruits and vegetables compose a large percentage of the increase in food for both transfer types at $45\%(=\frac{16.13}{35.54})$ under a 202 peso Cash transfers and $24\%(=\frac{12.06}{50.71})$ under the In-kind transfer. To the extent that fruits and vegetables lead to improved health, this is evidence against the paternalistic justification for in-kind transfers. Furthermore, it shows that the bundle the government chose constrained households to eat less fruits and vegetables than they would under the equal-value cash transfer.

Grains and Pulses Five of the 10 PAL goods were grains - corn flour, rice, pasta, cookies, and cereal - and the second row of Table 6 shows that consumption of all increased significantly under in-kind transfers, compared to both no transfer and an equivalent-valued cash transfer. However, increases in *overall* grain consumption under both transfers types are indistinguishable from one another (p-value of 0.37), at 13.04 pesos under In-kind transfers and 9.96 pesos under equivalent-valued cash transfers. This is evidence that the in-kind transfers forced households to shift their consumption amongst types of grains, but that there was only a slight distorting effect of the in-kind transfers for grains overall.

Evidence of this substitution effect of in-kind transfers can be seen in the differential consumption of corn types by transfer mechanism. In-kind households increased their consumption of the corn flour that was provided to them by 2.85 pesos per AE, while Cash households increased their consumption corn grain and tortillas by a noisy 3.70 pesos per AE. Note that the in-kind corn flour is nutrient-enriched while the corn grain and tortillas are in general not; the in-kind corn-flour may therefore induce better nutrition, but the effect sizes are small compared to the amount of corn consumed (median corn consumption per AE is about 155 pesos per month) and will likely not lead to significant health differences. Considering the consumption of pulses (beans and lentils), only lentil consumption increases significantly under the in-kind transfer ($ATT(IK) = 1.57$ pesos).

Dairy, Meat, and Fats In-kind milk transfers led to increased milk consumption, and this increase is about two-thirds higher than that which would have occurred under an equivalent-valued cash transfers (11.51 pesos for $ATT(IK)$ compared to 4.89 pesos for $ATT^{EQ}(Cash)$). Again, there is evidence that milk transfers led to substitution within dairy products – the unconstrained cash transfer induced a marginally significant increase in cheese and yogurt ($ATT^{EQ}(Cash) = 2.53$ pesos), with no similar effect of in-kind transfers ($ATT(IK) = 0.15$ pesos). Overall dairy consumption may be an important determinant in child health, especially given that the in-kind milk is fortified with essential micro-nutrients. As more milk was consumed under in-kind transfers, the evidence again suggests that we must turn to health outcomes in an effort to justify transfers in-kind.

(*pastelillos*), fried chips (*frituras*), chocolate, and sweets (*dulces*). "Junk Drink" includes: soda, bottled fruit drinks, and fruit drink powder.

There is more evidence of substitution induced by the in-kind transfers in the next two rows: "Animal" and "Fats." In-kind transfers of tuna fish increased the consumption of canned fish ($ATT(IK) = 4.00$ pesos) relative to the cash transfer, but that increase is offset partially by the consumption of other seafood ($ATT^{EQ}(Cash) = 2.84$ pesos).[29] The "fats" category is disaggregated to oil and the oil substitutes mayonnaise and lard. The in-kind oil transfer increased consumption of oil significantly, but with a small economic magnitude (0.88 pesos per AE), while cash transfers increased consumption of mayonnaise and lard a similar amout (1.09 pesos per AE).

Alcohol, Tobacco, and Junk Food Of interest in the "other foods" category are Junk Food & Drink, Alcohol, and Tobacco. The decision to make paternalistic food transfers may have been motivated by the fear that unconstrained cash transfers would have been spent on these goods; however, the evidence suggests otherwise. Junk Food & Drink contains consumption of candies, fried chips, soda, sweet cakes, and sweet fruit juices, and consumption increased by a significant 4.55 pesos per AE under in-kind transfers and an insignificant 3.11 pesos per AE under equal-valued cash transfers. These point estimates are insignificantly different from one another (p-value=0.49). Similarly for Alcohol consumption, while both treatments induced statistically significant increases (1.30 pesos per AE under in-kind transfers and 2.68 under cash) they are also indistinguishable from each other. Note that only 5% of households report consuming alcohol *at all* (results not shown) and that the survey was usually answered by the female head of the households who might not be aware of all alcohol purchases. On the other hand, expenditure on tobacco *decreased* significantly under the cash transfer, although the point estimate is small (1.23 pesos) and this is not different from the essentially zero effect of the in-kind transfer (p-value=0.20).[30]

Non-food goods Finally, the bottom row of Table 6 shows that the significant increase in non-food consumption experiences by the cash over the in-kind treatment is concentrated in Medicine & Hygiene and Transportation categories. The spending on Medicine and Hygiene products, which includes the Medicine, Medical fees, and personal hygiene products, is insignificantly different across transfer types, with a 5.93 peso increase under in-kind and a 9.03 peso increase under cash transfers. However, both effect sizes are relatively large.

In summary, it appears that cash transfers were not spent on the "vices" or non-nutritious foods that may have motivated the paternalistic in-kind transfers. There is evidence that milk consumption was higher under in-kind transfers, but that more fruits and vegetables would have been consumed under an equal-valued cash transfer. Cash transfers only significantly increased the consumption of 3 in-kind items (cookies, cereal, and tuna fish) while in-kind transfers increased consumption of all transferred items except beans. Note that PAL transfers may have influenced consumption through general equilibrium price effects, and these effects could differ by transfer type. However, Appendix D contains evidence

[29] In the questionnaire, tuna and sardines were included in the same food category.

[30] Estimating a Tobit model for Alcohol and Tobacco consumption leads to similar conclusions, as does using data from a separate module that collected individual information on alcohol and tobacco consumption. Both methods suggest there is little effect of either transfer type on the consumption of these goods versus the Control, and no difference between In-kind and Cash villages.

suggesting this was not the case. I now consider whether the small observed differences in consumption led to meaningful changes in health and nutrition of children.

5.3 Nutrition and Health Outcomes

I report average treatment effects for children aged 0 to 6 years old in the follow-up survey for the following outcomes: anemia, self-reported sickness, height, weight, total calories consumed, and consumption of three micro-nutrients, vitamin C, Iron, and Zinc. The literature has documented wide-spread deficiencies in vitamin C, Iron, and Zinc in Mexican children and shown that such deficiencies can negatively impact both short and long term child health and development (Barquera et. al. 2001). Table 7 contains baseline summary statistics, and conveys the age structure of the data available.[31] At baseline, children consumed fewer calories than recommended, and, for many, those calories do not contain essential micro-nutrients – 32% of children are not consuming the Recommended Dietary Allowance (RDA) of iron, while 47% and 41% are not consuming the RDA of Vitamin C and Zinc, respectively. 9% are under-weight and 18% are stunted, while over a third report being sick in the last week. Anemia is caused by an iron deficiency and its prevalence is high (18%), especially amongst younger children.[32]

I estimate equation (8) for each outcome, pooling all children and including age fixed effects. The only exception is for anemia prevalence which uses a single differenced version of (8) as only follow-up data was available. Again, I am interested in the effects of equal-valued cash and in-kind transfers, so I report $ATT^{EQ}(Cash)$ for the levels of calories and micro-nutrients in Panel A of Table 8. However, the extrapolation is not well-defined for the distribution of treatment effects, so I instead report $ATT(Cash)$ for the percentage of children that move above the RDA for micro-nutrients in Panel B.

Nutrition $ATT^{EQ}(Cash)$ and $ATT(IK)$ for caloric intake are nosily centered around zero with point estimates suggesting small positive program effects; however, the effects ar not significantly different (p-value=0.59).[33] Caloric intake alone, however, does not imply a nutritious diet is being consumed.

In fact, Table 8 shows that equal-valued Cash and In-kind transfers both led to increased consumption of essential micro-nutrients. There is a clear indication that more iron (p-value=0.09), and possibly more zinc (p-value=0.14), were consumed under the in-kind transfer than would have been consumed under an equal-valued cash transfer. Vitamin C intake increased by similar magnitudes under each transfer type and Panel B of Table 8 shows these increases were meaningful. The probability of consuming above the RDA of

[31] The 24-hr food recall was a rolling module for children aged 1 to 4 in the baseline and 2 to 6 in the followup. Anthropometric measurments were made for children aged 0 to 4 in the baseline and 0 to 6 in the followup. Sickness was asked of all children in both waves. Anemia prevelance data is only available for the follow-up, ages 2 to 6.

[32] The statistics on anemia reported in Table 7 are for the Control group in the follow-up, as blood tests for anemia are not available in the baseline.

[33] Pooling all ages masks some heterogeneity across ages, but there is still no consistent difference between transfers type. In particular, children aged 2 in the follow-up in both In-kind and Cash groups show large increases in caloric intake compared to the Control.

Vitamin C increased by 19.9 and 13.7 percentage points for the In-kind and Cash groups, respectively. Recall that this outcome is likely a lower bound on the positive effects of an equal-valued cash transfer. The increases in iron and zinc consumption under the In-kind transfer was similarly meaningful; the probability of consuming above the RDA for iron increased by 9.6 percentage points and by 10.8 percentage points for zinc. The larger increase in iron and zinc consumption is likely reflecting increased milk consumption by the In-kind group, as the PAL milk is enriched with iron and zinc.

Health Moving to health outcomes in Table 9, I report $ATT(Cash)$ instead of the equal-valued extrapolations as such predictions are less meaningful in the context of health. Treatment effects on health in column (1) are in general more muted than for micro-nutrient intake. This may, however, be partly due to the fact that on average PAL aid, in either form, was only received for about one year between survey waves. Pooling ages, child height did not increase significantly over the Control for either the In-kind or Cash transfer. Although we might expect to only see short term effects of either transfer on the youngest cohorts, column (2) shows there are no significant effects of either transfer over the Control, and importantly no difference between transfer type. The incidence of sickness is significantly lower for both In-kind and Cash transfers as compared to the Control, at 7 and 9 percentage points, respectively, but again there is no difference between transfer types.[34] Finally, there is no trend in changes in the prevalence of anemia for either transfer type.[35]

The results of Tables 8 and 9 suggest that there were small positive program effects on nutrition and health for both Cash and In-kind transfers, but differences across transfer types are small or non-existent. This broadly confirms the findings of González-Cossío et. al. (2006). There is some evidence that the positive nutrition effects for the in-kind group are coming through milk consumption, as evidenced by the larger intake of iron and zinc. If the goal of the PAL transfers was to have more children consuming adequate amounts of iron and zinc, these results show that In-kind transfers were slightly more effective than cash transfers.

6 Cost Effectiveness

The debate over whether paternalistic in-kind transfers are superior to cash is centered around the costs and benefits of each transfer mechanism. Cost estimates of distributing the PAL in-kind food transfers come from a government commissioned evaluation of the program for the years 2004-05 (Yarahuán et. al. 2006). Per package, the operating and distribution costs are estimated to be about 30 pesos (p. 395). The majority of this cost went to salaries for PAL staff to assemble the packages, facilities operations for warehouses where the boxes were packaged and stored, and transportation of the boxes to the villages. However, the authors acknowledge that the 30 peso per box cost is likely a lower-bound on the total costs of making transfers in-kind, as it proved difficult to account for costs of the

[34] The decreased sickness may be a result of the increased Vitamin C intake which has been shown to improve immune system function (Hemila 1992).

[35] This conclusion is robust to using blood hemoglobin *levels* as an outcome.

PAL food transfers that were incurred by its parent organization DICONSA. For example, DICONSA maintains a system of subsidized rural food stores and offered the PAL the all the benefits of its well organized distribution and supply network. Also, PAL utilized the administrative capacities of DICONSA and these are not captured in the 30 peso per box estimate. As Yarahuán et. al. report that the wholesale cost of the food in each in-kind package was about 150 pesos, this implies an in-kind operating cost of 20% of the value of the basket to the government.

In terms of cash transfers, no specific information is available on their associated administration costs. However, given that the above caveat about cost-sharing between PAL and DICONSA applies to both cash and in-kind transfers, it is reasonable to assume that cost differential *between* transfers mechanisms is no less than 30 pesos per box.

7 Discussion and Conclusion

This paper offers clean evidence on the differential costs and benefits of cash and in-kind food transfers under the Mexican governments' *Programa de Apoyo Alimentario*. More generally, it offers a clear test of the predictions of the canonical theory of consumer demand under distorting in-kind transfers. In terms of total food, the in-kind transfer was completely infra-marginal and, as predicted by the model, there was no differential impact on total food consumption as compared to an equal-valued cash transfer. However, considering individual food items in the basket separately, there is clear evidence of over-provision. Importantly, the data also show that households receiving cash transfers bought largely nutritious foods, such as fruits and vegetables.

Overall, I find minimal evidence in support of the paternalistic motivation behind this in-kind food transfer program. Moreover, cost savings of replacing the PAL food transfers with cash would also be sizeable. This paper has important implications for public policy. First, it provides a framework for policy makers to follow when deciding to use in-kind transfers to distort consumption in to maximize paternalistic preferences. Second, the results of this experiment are externally valid for a broad population, as the PAL experimental sample is similar in many respects to much of poor, rural Latin America, and indeed much of the rest of the developing world.

References

Angelucci, M. and G. De Giorgi. 2009. "Indirect Effects of an Aid Program: How to Cash Transfers Affect Ineligibles' Consumption?" *American Economic Review*, 99(1): 486-508.

Attanasio, O., L. C. Gómez, P. Heredia, and M. Vera-Hernández. 2005. "The short-term impact of a conditional cash subsidy on child health and nutrition in Colombia," *The Institute for Fiscal Studies Report Summary:* Familias 03.

Attanasio, O. and A. Mesnard. 2005. "The impact of a conditional cash transfer programme on consumption in Colombia," *The Institute for Fiscal Studies Report Summary:* Familias 02.

Barquera S., J. Rivera-Dommarco, and A. Gasca-García. 2001. "Food and nutrition policies and programs in Mexico," *Salud Publica Mex*; 43:464-477.

Behrman, J. and J. Hoddinott. 2005. "Programme Evaluation with Unobserved Heterogeneity and Selective Implementation: The Mexican *PROGRESA* Impact on Child Nutrition," *Oxford Bulletin of Economics and Statistics*, 67(4).

Besley, T. 1988. “A Simple Model for Merit Good Argument,” *Journal of Public Economics*, 35(3): 371–83.

Bruhn, M. and D. McKenzie. 2009. "In Pursuit of Balance: Randomization in Practice in Development Field Experiments," *American Economic Journal: Applied Economics,* 1(4):200-32.

Campillo Garcia, J. 1998. "Official Mexican Standard (NOM-169-SSA1-1998) for Social Food Assistance to At-risk Groups," (In Spanish) *Government of Mexico manuscript,* Available at http://bibliotecas.salud.gob.mx/gsdl/collect/nomssa/index/assoc/HASH015c.dir/doc.pdf

Case, A. and A. Deaton. 1998. "Large Cash Transfers to the Elderly in South Africa," *The Economic Journal*, 108(450): 1330-61.

Coate, S., S. Johnson, and R. Zeckhauser. 1994. "Pecuniary redistribution through in-kind programs," *Journal of Public Economics*, 55:19-40.

Currie, J and N. Cole. 1993. "Welfare and Child Health: The Link Between AFDC Participation and Birth Weight," *American Economic Review*, 83(4):971-85.

Currie, J and F. Gahvari. 2008. "Transfers in Cash and In-Kind: Theory Meets the Data," *Journal of Economic Literature*, 46(2):333-383.

Daly, G. and F. Giertz. 1972. “Welfare Economics and Welfare Reform,” *American Economic Review*, 62(1): 131–38.

De Janvry, A., A. Fargeix, and E. Sadoulet. 1991. “The Political Feasibility of Rural Poverty Reduction,” *Journal of Development Economics*, 37(1–2): 351–67.

Deaton, A. S. 1981. "Theoretical and Empirical Approaches to Consumer Demand Under Rationing," *In Essays in the Theory and Measurement of Consumer Behavior, in honour of Sir Richard Stone. Cambridge University Press*, Ch. 3: 55-72.

Del Ninno, C. and P. Dorosh. 2003. "Impacts of In-kind Transfers on Household Food Consumption: Evidence from Targeted Food Programmes in Bangladesh," *The Journal of Development Studies*, 40(1):48-78.

Duflo, E., R. Glennerster, and M. Kremer. 2008. "Using Randomization in Development Economics Research: A Toolkit." *In T. P. Schultz and J. Strauss (Eds), Handbook of Development Economics.* Vol. 4, 3895-962.

Epple, D. and R. Romano. 1996. "Public Provision of Private Goods,” *Journal of Political Economy*, 104(1): 57–84.

Fraker, T., A. Martini, and J. Ohls. 1995. "The Effect of Food Stamp Cashout on Food Expenditures: An Assessment of the Findings from Four Demonstrations," *The Journal of Human Resources*, 30(4):633-49.

Garfinkel, I. 1973. "Is In-Kind Redistribution Efficient?" *Quarterly Journal of Economics*, 87(2):320–30.

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

González-Cossío, T., J. Rivera-Dommarco, J.P. Gutiérrez, S. Rodríguez, D. González, M. Unar, J. Leroy, and S. Bertozzi. 2006. "Evaluation of the nutrition status of children under 5 years old and their mothers, and of food expenditures of marginalized families in Mexico," (In Spanish) *Instituto Nacional de Salud Publica report,* Available at www.diconsa.gob.mx

Heckman, J., R. LaLonde, and J. Smith. 1999. "The economics and econometrics of active labor market programs," *In the Handbook of Labor Economics, North Holland, O. Ashenfelter and D. Card (eds.)*, Vol. 3A., Ch. 31:1865-2097.

Hemila, H. 2007. "Vitamin C and the common cold," *British Journal of Nutrition*, 67:3-16.

Hoddinott, J. and E. Skoufias. 2004. "The Impact of PROGRESA on Food Consumption," *Economic Development and Cultural Change*, 53:37-61.

Hoynes, H. and D. Schanzenbach. 2009. "Consumption Responses to In-kind Transfers: Evidence from the Introduction of the Food Stamp Program," *American Economic Journal: Applied Economics*, 1(4):109-39.

Islam, M. and J. Hoddinott. 2009. "Evidence of Intrahousehold Flypaper Effects from a Nutrition Intervention in Rural Guatemala," *Economic Development and Cultural Change*, 2009

Jacoby, H. 2002. "Is There an Intrahousehold 'Flypaper Effect'? Evidence from a School Feeding Programme," *The Economic Journal*, 112(476):196-221.

Kremer, M. 2003. "Randomized Evaluations of Educational Programs in Developing Countries: Some Lessons," *American Economic Review*, 93(2): 102-6.

Maluccio, J. 2007. "The Impact of Conditional Cash Transfers on Consumption and Investment in Nicaragua," *Middlebury College Economics Discussion Paper*, No. 07-22.

Martinez, S. 2004. "Pensions, Poverty, and Household Investments in Bolivia." *Mimeo, U.C. Berkeley.*

Moffitt, R. 1983. "An Economic Model of Welfare Stigma," *American Economic Review*, 73(5):1023-35.

Moffitt, R. 1989. "Estimating the Value of an In-Kind Transfer: The Case of Food Stamps," *Econometrica*, 57(2): 385-409.

Neary, J.P. and K.W.S. Roberts. 1980. "The Theory of Household Behaviour Under Rationing," *European Economic Review*, 13: 25-42.

Nichols, A. and R. Zeckhauser. 1982. "Targeting Transfers through Restrictions on Recipients," *American Economic Review*, 72(2):372-7.

Rodríguez Herrero, H. 2005. "Qualitative Evaluation of the 'Programa de Apoyo Alimentario'. Final Report." (In Spanish) *CIESAS,* Available at www.diconsa.gob.mx

Rubin, D. 1986. "Which ifs have causal answers? Discussion of Hollands Statistics and causal inference," *Journal of the American Statistical Association*, 81(396): 961-62.

Pazner, E. 1972. "Merit Wants and the Theory of Taxation," *Public Finance*, 27(4): 460–72.

Pollak, R. A. 1969. "Conditional Demand Functions and Consumption Theory," *Quarterly Journal of Economics*, 83(1):60-78.

Sadoulet, E., A. de Janvry, and B. Davis. 2001. "Cash Transfer Programs with Income Multipliers: PROCAMPO in Mexico," *World Development*, 29(6):1043-56.

Shapiro, J. M. 2005. "Is there a daily discount rate? Evidence from the food stamp nutrition cycle," *Journal of Public Economics,* 89: 303-325.

Skoufias, E., M. Unar, and T. González-Cossio. 2008. "The Impacts of Cash and In-Kind Transfers on Consumption and Labor Supply," *World Bank Policy Research Working Paper*, No. 4778.

Southworth, H. 1945. "The Economics of Public Measures to Subsidize Food Consumption," *Journal of Farm Economics*, 27(1):38-66.

Tabor, S. 2002. "Assisting the Poor with Cash: Design and Implementation of Social Transfer Programs," *World Bank Social Protection Discussion Paper*, No. 0223.

Tesliuc, E. 2006. "Social Safety Nets in OECD Countries," *World Bank Social Safety Nets Primer Notes*, No.25.

Thaler, R. and C. Sunstein. 2003. "Libertarian Paternalism," *American Economic Review*, 93(2): 175-9.

Tobin, J. and H. Houthakker. 1950. "The Effects of Rationing on Demand Elasticities," *Review of Economic Studies*, 18(3):140-153.

Townsend, R. 1994. "Risk and Insurance in Village India," *Econometrica*, 62(3):539-91.

Vazquez Mota, J. 2004. "Rules of Operation for the 'Programa de Apoyo Alimentario'," (In Spanish) *Government of Mexico manuscript,* Available at www.diconsa.gob.mx

Whitmore, D. 2002. "What Are Food Stamps Worth?" *Princeton University Industrial Relations Section Working Paper* No. 468.

Yarahuán, G. P. et. al. 2006. "External Evaluation of the 'Programa de Apoyo Alimentario'," (In Spanish) *Universidad Iberoamericana,* Available at www.diconsa.gob.mx

A Education Classes

This appendix details the unsuccessful randomization into educational classes. The treatment was motivated by a desire to learn if information on nutrition, hygiene, and health is an important determinant of the effectiveness of in-kind food transfers. While orthogonal randomizations of this type are a cost-effective way to test multiple hypotheses within the context of one field experiment (Duflo et. al. 2008; Kremer 2003), the education treatment was in practice contaminated as some households in the "no-education" in-kind treatment group did in fact receive classes.

In the follow-up survey, all households, regardless of their treatment status, were asked the number of classes they attended and what themes were covered. They were allowed to list up to 4 themes from the choices of: Organization of PAL, Nutrition, Health, and Hygiene. Table A.2 displays attendance rates on the intensive and extensive margins, by treatment group. As every PAL village, regardless of treatment group, was instructed to hold an introductory class on the organization and operation of PAL, columns 2 and 4 therefore exclude such classes.

Several departures from the experimental design are of note. First, of households in the "In-kind only" group that were not supposed to attend educational classes, well more than half did attend non-organizational classes (column 2). Second, of the households in the "In-kind plus Education" and "Cash plus education" treatment groups that were supposed to receive educational classes, over 1/4 did not receive any non-organizational classes (again, column 2). Evidence from the rest of the country suggests that non-compliance with the educational component of PAL was not unique to the experimental villages (Rodríguez 2005). Importantly, program administrators confirmed that the conditionality of the transfers was never enforced (Skoufias, Unar, and González-Cossío 2008).

Third, columns 3 and 4 show that conditional on attendance at any class, only about 5 sessions were attended, and this is true of all treatment groups. This is much less than the one class per month specified in PAL rules and, given that households received on average 12 months of aid between survey rounds, represents an attendance rate of about 40 percent. I can not conclude whether households were not attending classes or whether the classes were not held by the Committee of Beneficiaries. In either case, the evidence strongly suggests that randomization into educational classes was not successful, rendering it useless for causal inference.

B Data

B.1 Food Consumption and Unit values

Households reported for each of 61 food items the quantity consumed (from all sources, whether purchased, donated, or self-produced), the quantity purchased, and the value of purchased quantities in the past seven days. Enumerators were instructed to convert reported units into either kilograms or liters; however, the option to record units as "pieces", "packets", or "other" were also available and were used in a minority of cases (this happened more often in the baseline than in the follow-up). In order to compare unit quantities consumed across households - as opposed to the monetary value of those quantities - I convert all reported units to kilograms or liters using conversion factors complied by the INSP. Monthly quantities are obtained from the reported weekly quantities using a conversion factor of 4.35. I also calculate calories, micro-nutrients, and macro-nutrients consumed using a separate conversion table from the INSP.[36] In many exercises I convert consumption expenditure into adult equivalent scales (AE) using a conversion suggested by the INSP (González-Cossío et. al. 2006).

The value of food consumption is obtained as follows. First, unit-values are computed by dividing the monetary value of purchases by the quantity purchased, for all households with non-zero purchases.[37] I define the village level price as the median observed unit-value in the village. Consumption values are thus the product of the quantity consumed and the village price. If there are fewer than 8 observed unit-values within a village, I use the municipality median unit-value to value consumption. If there are still fewer than 8 observations at the municipality level, I use the state median. Consumption in the follow-up is valued using baseline village prices.

I aggregate the 61 reported food items to varying degrees in the analysis, and one deserves explicit explanation. Milk consumption is reported in two forms - "Milk, other than vitamin-enriched powdered milk" and "Vitamin-enriched powdered milk" - and I aggregate these into one category, "Milk". There is no way of knowing whether liquid milk was vitamin-enriched, nor can we know if households report reconstituted powdered milk as liquid milk. The in-kind transfers of enriched powdered milk is included in this aggregate category.

B.2 Non-food consumption

Households also reported consumption expenditures, but not quantities, in the following categories: *school and non-school transportation, tobacco, personal hygiene products, household cleaning products, medicine, doctor fees, school fees, fuel for cooking and heating, electricity, rent, household items, clothes, shoes, ceremonies, and hospitalizations.* Some items were asked about at the weekly or semi-annual level and I converted them to monthly levels. Expenditures in the follow-up are deflated to baseline levels using the monthly CPI from the Bank of Mexico. In defining total non-food consumption, I exclude three variables: rent, ceremonies, and hospitalizations. Rent is excluded as data is only available on monetized rent payments and I can not value the informal rental agreements that are likely to be present in these rural villages. Furthermore, only 1% of the sample reports any rent payments. Ceremonies and hospitalizations are excluded as they happen infrequently, often unexpectedly, and therefore do not represent normal consumption patterns. This is evidenced in that fewer than 5% of households report consumption on these items.

B.3 Child Nutrition and Health

Child-level nutrient and caloric consumption were obtained through a 24-hour food recall, in which the respondent – usually the female head of the household – listed the quantities

[36] I am grateful to Orazio Attanasio and Vincenzo di Maro for providing me with the INSP's calorie/micro-nutrient and unit conversion factor tables.

[37] Households purchased an average of 15 items out of the 61 items asked about in the survey.

of foods consumed by the household in the past day and how much was consumed by each child. This diet was converted into calories and micro-nutrients levels, and then compared to Recommended Dietary Allowances (RDAs) in order to assess the relative extent of under-nourishment. Anemia is diagnosed through a safe and simple finger prick blood test. A child is classified as anemic If the altitude-adjusted concentration of hemoglobin in the blood is lower than 11 grams per deciliter (g/dL) for ages 1 to 4, and 11.5 g/dL for ages 5 and 6. Height, in centimeters, and weight, in kilograms, were measured by the survey team in accordance with international standards (González-Cossío et. al. 2005). Finally, the survey respondent was asked if the each person in the household was sick in the last four weeks and for how many days.

C Sample and Receipt of Treatment

C.1 Sample

Excluding incomplete surveys and split-off households, the sample contains 6,706 baseline and 5,851 follow-up households in 208 villages. Excluding the 10 villages as described in the paper drops an additional 306 baseline and 216 follow-up households. 35 baseline and 78 follow-up households with more than half of the consumption categories missing were then dropped, as were 11 more baseline households with no individual level information. Finally, one control household that reported receiving PAL is dropped from both waves. This leaves a final sample of 6,353 baseline and 5,556 follow-up households in 198 villages. I do not observe whether atritted households in the Cash and In-kind groups recieved treatment; thus, for consistency, I do not use data from any atritted households regardless of treatment group. After these cuts, there are still 10% of households for which information on one or more food items is missing and thus various empirical exercises use fewer than 5,556 household/survey-wave observations.

C.2 Receipt of Treatment

All households, regardless of treatment group, were asked in the follow-up survey if they were incorporated in PAL. If so, enumerators asked to see their identification card and then asked, month-by-month for the past 2 years, whether they received a package and how many were received. A household is classified as treated if they report receiving a PAL transfer within the last 3 months. This excludes less than 1% of outliers. On average 90.9% and 86.3% of households in In-kind and Cash treatment groups, respectively, received aid. While this difference is significantly different from zero (p-value=0.04), there is no observable difference in the pre-treatment characteristics of participating households across Cash and In-kind treatment groups (results available upon request).

PAL began to phase-in aid delivery after the baseline surveys, appearing to complete coverage within a year. There is a slight imbalance between In-kind and Cash groups in the number of aid packages received, conditional on receiving any package. In-kind households received an average of 12.7 transfers while Cash households received a significantly lower 11.7 transfers. However, this difference is explained by the fact that in-kind villages began receiving packages slightly *earlier*. Defining the number of Expected Packages as the difference in months between the follow-up interview and the receipt of the first package, the Coverage Rate is then the ratio of received packages to Expected Packages (González-Cossio et. al. 2006). Coverage Rates for In-kind and Cash households are insignificantly different at 90.7% and 89.0%, respectively.

Finally, of those treated households that had a woman aged 20-60 in the household, 77% of recipients were female. Theories of intra-household allocation suggest that transfers may have different effects depending on the gender of the recipient (Duflo 2003). Importantly, the gender of the recipient of PAL transfers did not vary by transfer type (p-value=0.95).

D Prices

In this Appendix, I present evidence that neither cash nor PAL in-kind food transfers systematically altered local food prices. Specifically, I look at village-level food prices and use a difference-in-differences estimator to see if mean prices changed differentially across Cash, In-kind, and Control villages. One might be worried that cash transfers will increase prices through higher demand, or that in-kind transfers will depress prices by increasing supply. However, in-kind transfers may also increase demand due to a pure income effect thus pushing prices up - especially to the extent that they are infra-marginal. While the expected sign of the price changes are ambiguous, any price change would complicate identification of the pure effect of the cash versus the in-kind transfer.

Many of the 61 food items were only consumed by a handful of households (e.g., watermelon, processed meats, and alcohol) leaving too few observations to draw meaningful statistical conclusions. Thus, village prices are defined as above using the median household unit-value, but only when more than 8 unit-value observations exist. This leaves 37 foods. Table A.4 presents coefficients of interest from a difference-in-differences estimator across time and treatment group. The coefficient estimate on "POST" is the time specific price change in the Control villages. Only 3 out of the 37 items (lettuce, chayote, and sugar) show significant differences at the 10% level across In-kind and Cash villages post-transfer. Finally, I constructed a budget-share weighted basket of prices as an aggregate indicator of price changes and find no differences in this index across treatment groups (results available on request). These results suggest that the observed differential effects of cash and in-kind transfers on consumption were not driven by differential prices.

Figure 1: In-kind Milk vs. an Equivalent-Valued Cash Transfer

Demand for Milk (q_M) and other goods (q_F), Re-sale Allowed

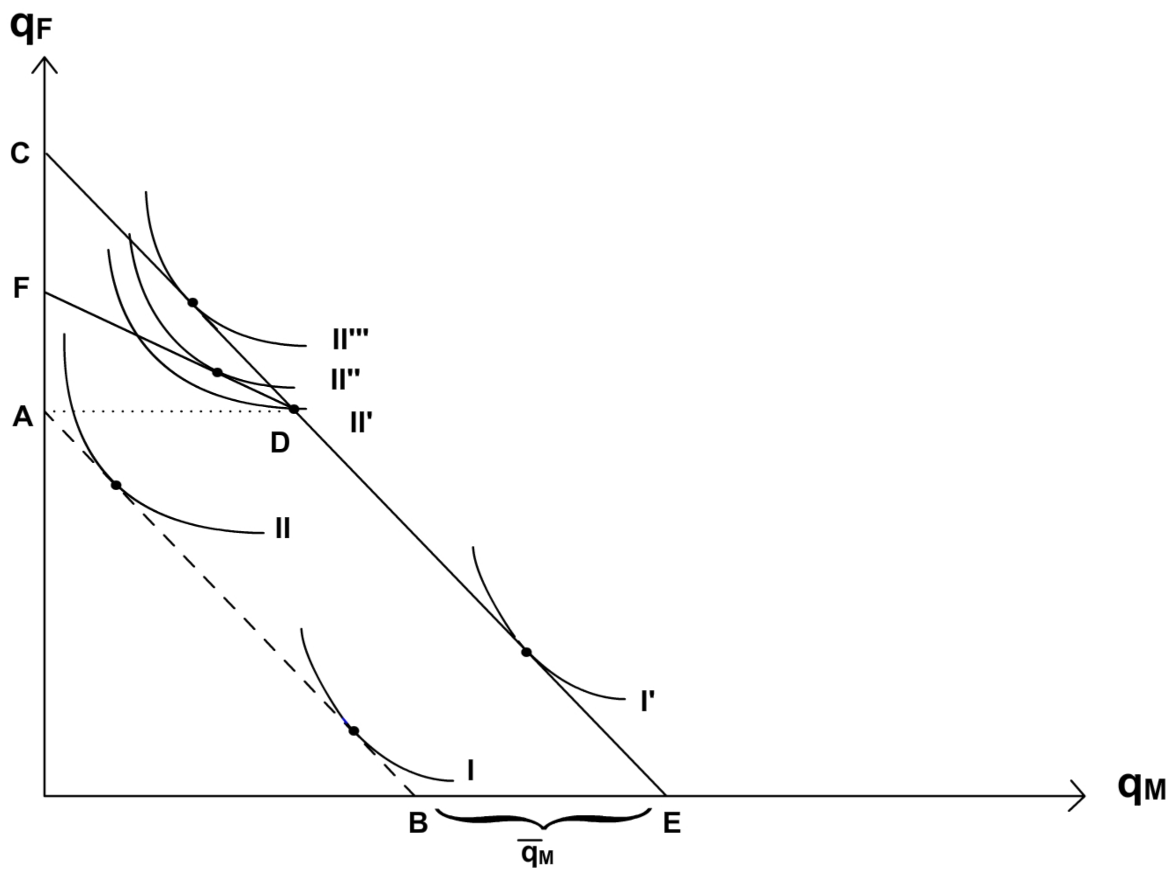


Figure 2: PAL Experimental Villages. Cash = $, In-kind = IK, Control = C.

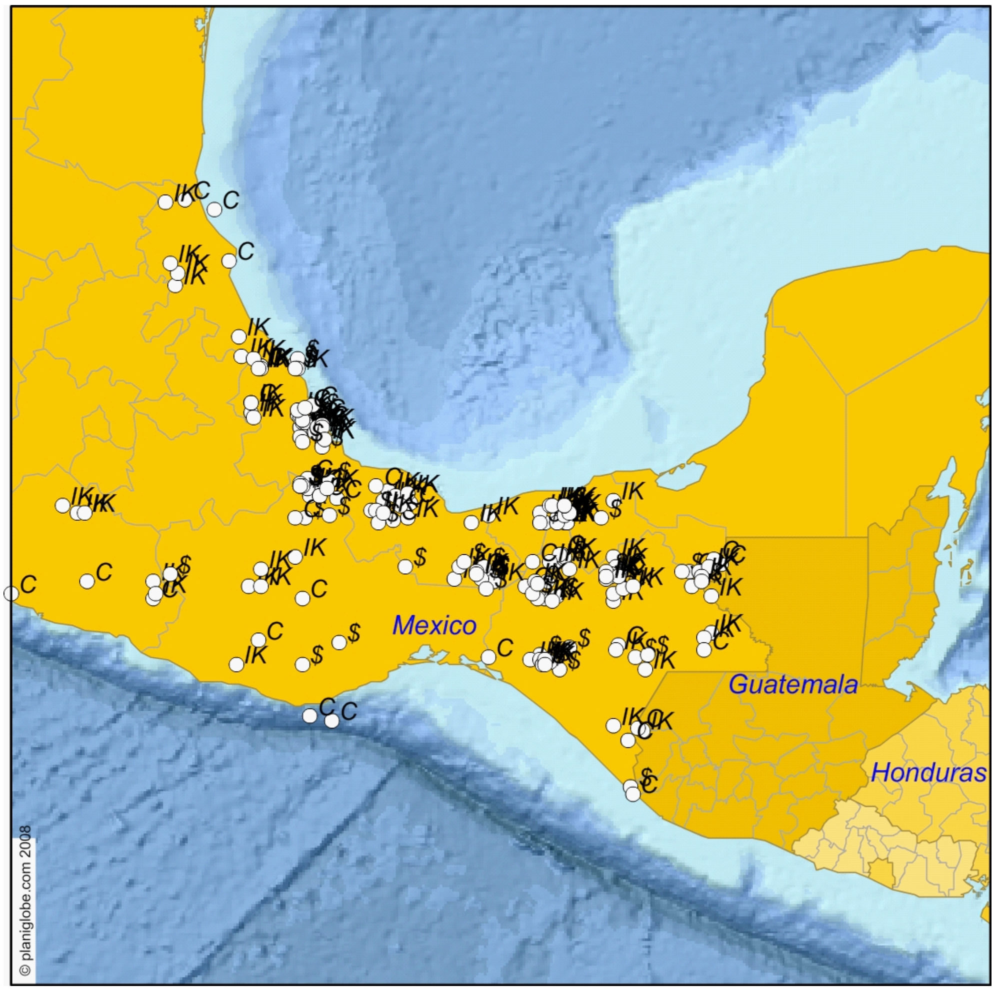
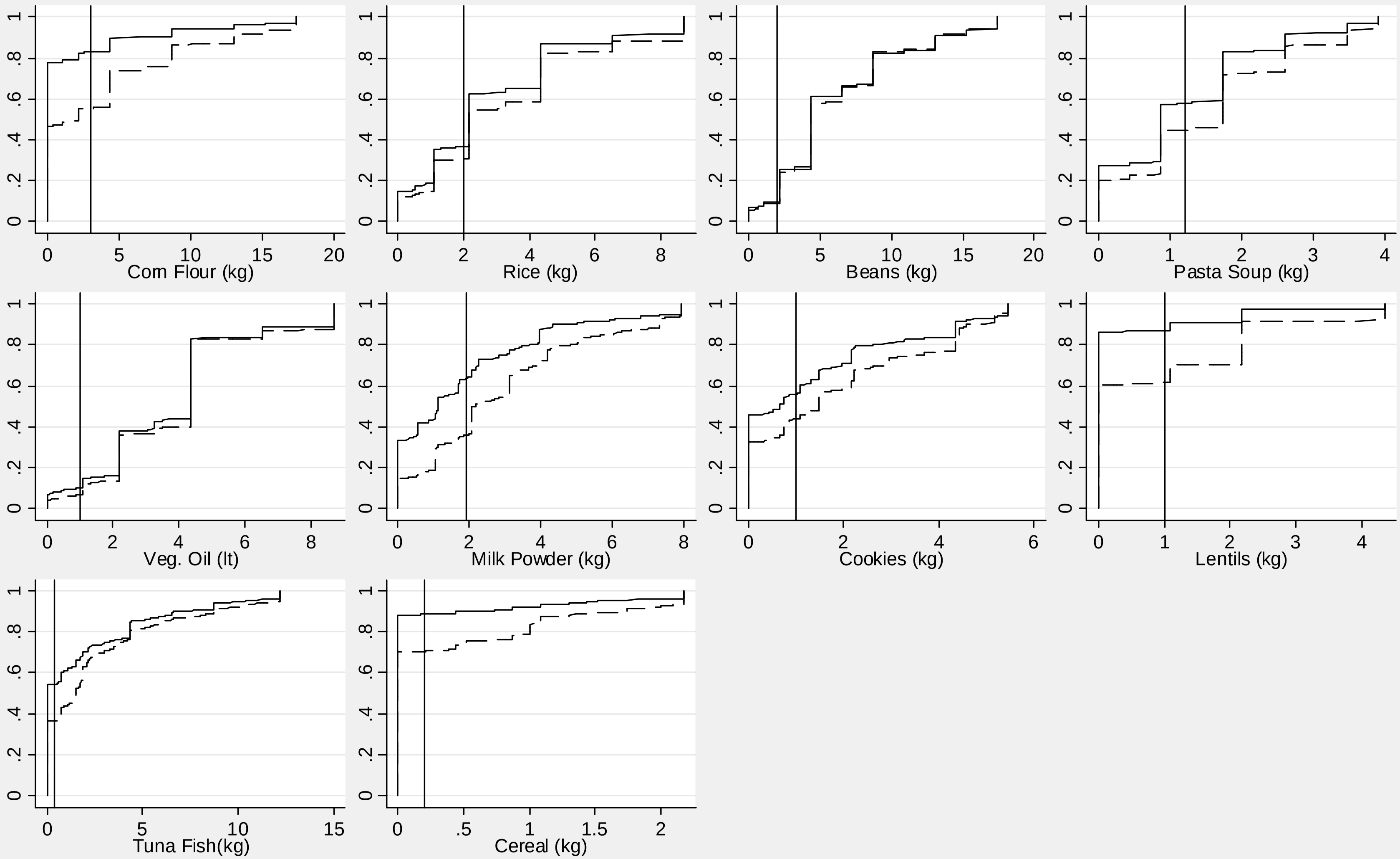


Figure 3: Extra-marginal & Non-binding In-kind Transfers

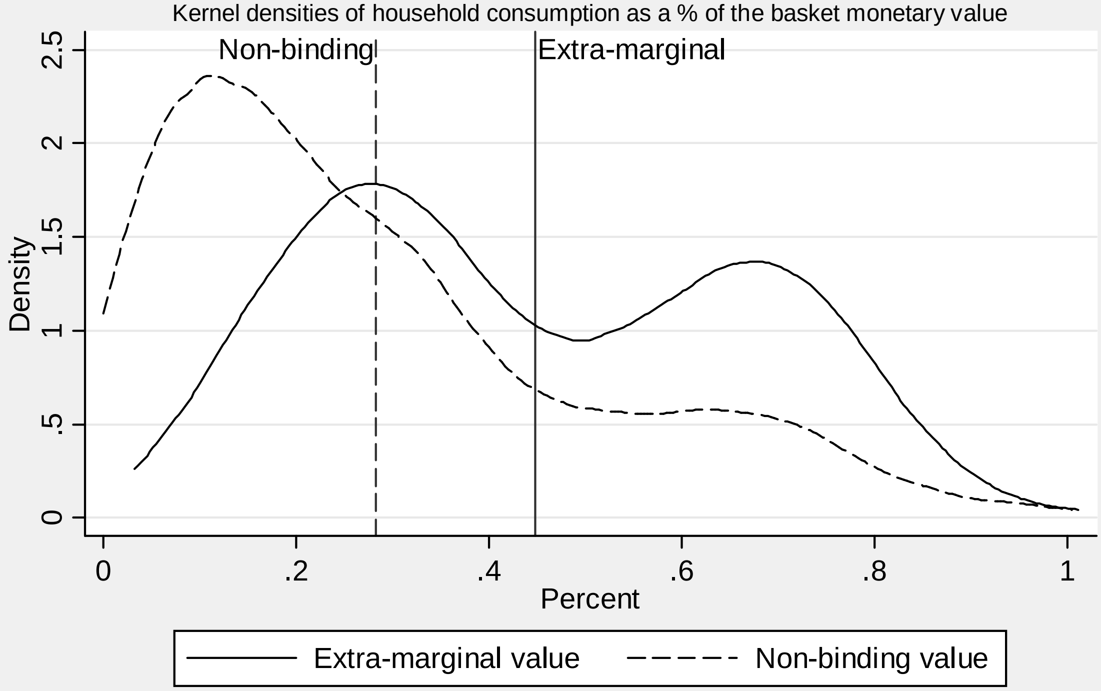
CDFs of household consumption quantities. [Solid = Extra-marginal, Dash = Non-binding]



Notes: Vertical lines denote in-kind transfer quantities. Data is from treated, post-transfer households: Extra-marginal from Cash treatment,. Non-binding from In-kind treatment. Each good top-coded at the 95th percentile.

Figure 4: Extra-marginal and Non-binding Value of In-kind Basket

Kernel densities of household consumption as a % of the basket monetary value



Notes: Vertical lines denote means. Data: extra-marginal value uses treated Cash households, non-binding value uses treated In-kind households.

Table 1: In-kind PAL Food Transfers, summary statistics

Item	Details	Amount (kg)	Value (pesos)				Calories
			Mean	*C.V.*	*25th p-tile*	*75th p-tile*	% of total
Corn Flour	--	3	15.0	0.06	15.0	15.0	20%
Rice	--	2	12.8	0.13	12.0	14.0	12%
Beans	--	2	21.0	0.17	20.0	24.0	13%
Pasta Soup	6 packets	1.2	16.2	0.13	15.0	18.0	8%
Veg. Oil	--	1 (lt)	10.4	0.09	10.0	11.0	16%
Milk Powder	6 packets	1.92	82.2	0.20	73.5	93.0	17%
Cookies	--	1	18.5	0.23	15.0	20.6	8%
Lentils	--	1	9.6	0.12	9.0	10.0	2%
Tuna Fish	2 cans	0.35	8.7	0.17	7.7	9.5	1%
Cereal	--	0.2	8.1	0.10	7.6	8.0	1%
Total	--	--	202.2	0.11	191.7	216.9	100%

Notes: Items are valued using baseline village level median unit-values. Number of villages = 198. C.V.= Coefficient of Variation. 10 pesos = 1 U.S. dollar.

Table 2: Pre-treatment Balance - Mean Characteristics, by Treatment Group

	Panel A - Full Sample				Panel B - Estimation Sample			
	Treatment Group				Treatment Group			
	Control	*In-kind*	*Cash*	Obs.	*Control*	*In-kind*	*Cash*	Obs.
Household Demographics								
Adult equivalents (AE)	4.18	4.07	4.01	5538	4.18	4.05	4.00	5117
	(0.11)	(0.08)	(0.10)		(0.11)	(0.08)	(0.10)	
# Children aged 0 to 5	0.75	0.69	0.67	5538	0.75	0.69	0.65	5117
	(0.05)	(0.03)	(0.05)		(0.05)	(0.03)	(0.05)	
Male household head	**0.84**	0.86	**0.88**	5538	**0.84**	0.86	**0.88**	5117
	(0.01)*	(0.01)	**(0.01)***		**(0.01)***	(0.01)	**(0.01)***	
Education of head (yrs)	4.23	4.26	3.95	5535	4.23	4.33	3.99	5114
	(0.17)	(0.14)	(0.17)		(0.17)	(0.14)	(0.16)	
Speak indigenous language	0.21	0.17	0.14	5538	0.21	0.17	0.13	5117
	(0.06)	(0.03)	(0.04)		(0.06)	(0.03)	(0.04)	
Food Consumption per AE	347.89	327.01	321.94	5527	347.89	326.45	324.27	5106
	(16.33)	(10.46)	(10.92)		(16.33)	(10.74)	(10.87)	
Non-food Consumption per AE	231.76	217.95	223.85	5523	231.76	218.31	223.56	5103
	(16.69)	(10.76)	(13.86)		(16.69)	(11.03)	(14.61)	
Budget Shares								
Food (out of total)	0.65	0.66	0.65	5499	0.65	0.66	0.65	5080
	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	
Corn (out of food)	0.17	0.17	0.18	5444	0.17	0.18	0.18	5029
	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	
Frt. & Veg. (out of food)	0.19	0.18	0.19	5480	0.19	0.18	0.19	5063
	(0.01)	(0.00)	(0.01)		(0.01)	(0.00)	(0.01)	
Milk (out of food)	0.05	0.06	0.05	5467	0.05	0.06	0.05	5050
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)	
Meat (out of food)	0.19	0.19	0.19	5487	0.19	0.19	0.19	5067
	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	
Received Program?								
Liconsa	0.03	0.03	0.02	5538	0.03	0.03	0.02	5117
	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	
DIF	0.15	0.09	0.07	5538	0.15	0.08	0.07	5117
	(0.05)	(0.02)	(0.03)		(0.05)	(0.02)	(0.03)	
Oportunidades	0.10	0.06	0.06	5538	0.10	0.06	0.06	5117
	(0.02)	(0.01)	(0.01)		(0.02)	(0.01)	(0.01)	
Household Characteristics								
Has dirt floor	0.32	0.30	0.32	5538	0.32	0.29	0.31	5117
	(0.04)	(0.03)	(0.03)		(0.04)	(0.03)	(0.03)	
Piped water in home	0.63	0.58	0.51	5538	**0.63**	0.59	**0.50**	5117
	(0.05)	(0.04)	(0.06)		**(0.05)***	(0.04)	**(0.06)***	
Temporary walls or roof	0.15	0.18	0.16	5538	0.15	0.18	0.16	5117
	(0.03)	(0.02)	(0.03)		(0.03)	(0.02)	(0.03)	
Toilet in the home	0.61	0.61	0.61	5538	0.61	0.62	0.61	5117
	(0.04)	(0.03)	(0.05)		(0.04)	(0.03)	(0.05)	
Electric lights	0.82	0.91	0.89	5538	0.82	0.91	0.90	5117
	(0.05)	(0.02)	(0.04)		(0.05)	(0.02)	(0.03)	
Owns refrigerator	0.42	0.46	0.50	5538	**0.42**	0.46	**0.52**	5117
	(0.05)	(0.03)	(0.04)		**(0.05)***	(0.03)	**(0.03)***	
Owns washing mach.	0.24	0.21	0.21	5538	0.24	0.22	0.21	5117
	(0.03)	(0.02)	(0.02)		(0.03)	(0.02)	(0.02)	
Owns home	0.84	0.83	0.83	5538	0.84	0.83	0.82	5117
	(0.02)	(0.01)	(0.02)		(0.02)	(0.01)	(0.02)	
Farms or raises animals	**0.32**	0.37	**0.44**	5538	**0.32**	0.37	**0.43**	5117
	(0.04)**	(0.03)	**(0.04)****		**(0.04)****	(0.03)	**(0.04)****	
Village Characterictics								
Km. to municipal head	253.64	**270.20**	**188.74**	5538	253.64	**272.50**	**192.25**	5117
	(34.14)	**(20.98)****	**(26.37)****		(34.14)	**(21.11)****	**(26.79)****	
Village population	670.06	577.64	547.80	5538	670.06	582.35	557.52	5117
	(84.34)	(52.56)	(71.59)		(84.35)	(52.58)	(74.32)	
Price of In-Kind basket	202.33	202.07	202.30	5538	202.33	201.87	201.73	5117
	(3.24)	(2.16)	(3.13)		(3.24)	(2.20)	(3.18)	

Notes: PanelA: Includes all households. Panel B: Includes all Control households, but only those receiving PAL aid in the Cash and In-kind groups. F-tests of equality of means were performed for all pair-wise comparisions of groups: *** p<0.01, ** p<0.05, * p<0.1. Robust (s.e.) clustered at the village level. Consumption is measured in Mexican Pesos (~10 pesos / 1 U.S. dollar). Receipt of programs LICONSA (milk subsidies), DIF (school breakfasts), and Oportunidades (conditional cash transfers) are self-reported and included if any household member recieved the program in the past year.

Table 3: Probit predicting Receipt of PAL. Cash and In-kind villages
Dependent variable = 1 if Household received PAL aid

VARIABLES	Marginal Effect	(s.e.)
Has dirt floor	-0.017	(0.012)
Has temporary walls/roof	-0.009	(0.013)
Does not have separate kitchen	**-0.023**	**(0.012)***
Has piped water	-0.007	(0.010)
Has refrigerator	0.011	(0.011)
Has car/motorcycle	0.020	(0.018)
Log PC Food Consumption	-0.007	(0.020)
Milk consumed in last week	-0.007	(0.010)
Meat consumed in last week	**-0.038**	**(0.015)****
Receive Oportunidades	**-0.074**	**(0.021)*****
# hh members	-0.011	(0.011)
(# hh members)^2	0.000	(0.001)
Has children aged [0,5]	**0.020**	**(0.012)***
Has children aged [6,12]	0.003	(0.012)
Farms / Raises Animals	0.005	(0.010)
Speaks Indigenous Language	-0.014	(0.014)
Age household head	**0.003**	**(0.002)***
(Age household head)^2	**-0.001**	**(0.000)****
Male household head	0.012	(0.015)
Observed probability	0.9	
Observations	4215	
McFadden's Pseudo R^2	**0.028**	
McFadden's Pseudo R^2 Adj.	**0.011**	

Notes: s.e. NOT clustered at the village level. All baseline households in Cash and In-kind treatment groups included, with reciept of treatment determined by self-report in the follow-up survey.

Table 4: Extra-marginal and Non-binding Transfers. Individual In-kind Items.

% of households consuming below In-kind amount

Food Item	In-kind amount	Panel A Extra-marginal Transfers	Panel B Non-binding Transfers
Corn Flour	3 (kg)	82.7%	55.2%
Rice	2 (kg)	36.7%	30.5%
Beans	2 (kg)	9.6%	8.9%
Pasta Soup	1.2 (kg)	57.7%	44.7%
Oil	1 (lt)	10.2%	6.7%
Milk Powder	1.92 (kg)	63.6%	35.9%
Cookies	1 (kg)	55.7%	43.5%
Lentils	1 (kg)	87.2%	61.7%
Tuna Fish	0.35 (kg)	54.4%	36.6%
Cereal	0.2 (kg)	88.5%	70.4%

Notes:
Panel A data is from treated, post-transfer Cash households and an item is considered extra-marginal if observed monthly consumption is less than the in-kind PAL quantity. Sample sizes range from 1,245 to 1,257.
Panel B data is from treated, post-transfer In-kind households and an item is considered non-binding if observed monthly consumption is less than the in-kind PAL quantity. Sample sizes range from 2,513 to 2,543.

Table 5: Average Treatment on the Treated. Consumption per AE (pesos). OLS Difference-in-Differences.

	Total (Food + Non-food)		Food Only		PAL In-kind food items		Non-food Only	
	1% trimmed	5% trimmed	1% trimmed	5% trimmed	1% trimmed	5% trimmed	1% trimmed	5% trimmed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimated Coefficients								
In-Kind	-38.31	-31.61	-22.15	-14.47	-0.50	-1.73	-15.86	-9.85
	(24.10)	(19.53)	(13.49)	(11.04)	(2.86)	(2.43)	(12.60)	(9.82)
Cash	-40.43	-27.21	-18.93	-13.25	-2.60	-3.61	-15.09	-11.20
	(28.56)	(22.65)	(15.45)	(12.08)	(3.22)	(2.73)	(14.98)	(11.35)
POST	136.38	126.22	30.69	32.75	9.86	10.50	93.63	89.48
	(20.88)***	(16.06)***	(12.07)**	(9.13)***	(2.52)***	(2.15)***	(10.59)***	(8.32)***
In-kind x POST: ATT(In-kind)	65.98	63.45	58.74	50.71	27.92	26.38	16.21	8.79
	(21.72)***	(17.56)***	(12.88)***	(10.01)***	(3.28)***	(3.01)***	(11.89)	(9.71)
Cash x POST: ATT(Cash)	53.58	47.95	35.68	26.43	5.20	5.98	35.11	24.98
	(26.38)**	(20.85)**	(15.28)**	(11.54)**	(2.92)*	(2.79)**	(14.60)**	(11.45)**
H_{01}: ATT(IK) = ATT(Cash), p-value	0.56	0.37	0.01	0.01	0.00	0.00	0.14	0.10
Equal-valued transfers:								
Extrapolation								
ATT^{EQ}(Cash)	--	64.48	--	35.54	--	8.04	--	33.59
	--	(28.04)**	--	(15.51)**	--	(3.75)*	--	(15.40)**
H_{02}: ATT(IK) = ATT^{EQ}(Cash), p-value	--	0.96	--	0.23	--	0.00	--	0.05
Observations	9994	9580	9997	9583	9943	9524	9861	9459
R-squared	0.225	0.237	0.188	0.186	0.182	0.201	0.165	0.174

Notes: 1% and 5% trimmed refer to the percentage of households at the top of the distribution that are excluded from each survey round. The bottom 1% of each survey round were always excluded. Hypotheses H01 & H02 are tested with an F-test, with p-values reported. All regressions include the following baseline controls: XXXXXXXXXX. PAL In-kind food items include: Corn flour, Rice, Beans, Pasta soup, Oil, Milk, Cookies, Lentils, Sardines, & Cereal. Robust (s.e.) clustered at the village level. *** sig. at 1%, ** sig. at 5%, * sig. at 10%

Table 6: ATTs for Equal-Valued Cash & In-kind Transfers. Main and sub- AE consumption categories.

	Main	Sub (mutually exclusive & exhaustive)						
	Fruit & Veg.	Fruit	Vegetables					
ATT(In-kind)	12.06	7.36	2.82					
	(2.67)***	(1.67)***	(1.34)**					
ATT^{EQ}(Cash)	16.13	9.45	4.87					
	(4.16)***	(2.46)***	(2.19)**					
H_0 (p-value)	0.19	0.26	0.25					
Obs.	9686	9760	9699					
	Grains	Corn Flour†	Corn Grain,Tortillas	Rice†	Pasta†	Cookies†	Cereal†	Other
ATT(In-kind)	13.04	2.85	1.12	0.94	1.41	4.30	3.54	0.31
	(2.76)***	(0.50)***	(2.00)	(0.23)***	(0.21)***	(0.56)***	(0.53)***	(0.79)
ATT^{EQ}(Cash)	9.96	0.29	3.70	0.23	0.21	2.13	1.10	0.74
	(4.05)**	(0.61)	(3.28)	(0.34)	(0.34)	(0.68)***	(0.54)**	(1.21)
H_0 (p-value)	0.37	**0.00**	0.34	**0.01**	**0.00**	**0.00**	**0.00**	0.64
Obs.	9698	10081	9670	9767	9844	9904	10121	9840
	Pulses	Beans†	Lentils†					
ATT(In-kind)	2.12	0.78	1.57					
	(0.58)***	(0.52)	(0.13)***					
ATT^{EQ}(Cash)	0.29	0.54	0.12					
	(0.90)	(0.82)	(0.17)					
H_0 (p-value)	**0.01**	0.72	**0.00**					
Obs.	9740	9716	10129					
	Dairy	Milk†	Cheese,Yogurt					
ATT(In-kind)	12.29	11.51	0.15					
	(2.24)***	(1.67)***	(0.97)					
ATT^{EQ}(Cash)	6.14	4.89	2.53					
	(3.32)*	(2.13)**	(1.62)*					
H_0 (p-value)	**0.02**	**0.00**	0.06					
Obs.	9828	9801	9959					
	Animal	Chicken	Beef/Pork	Seafood	Tuna/Sardin.†	Eggs		
ATT(In-kind)	4.13	-0.59	3.71	0.23	4.00	-0.76		
	(3.07)	(1.42)	(1.11)***	(1.35)	(0.49)***	(0.42)*		
ATT^{EQ}(Cash)	5.25	1.78	2.85	2.84	1.37	-1.03		
	(5.15)	(2.51)	(1.79)	(2.44)	(0.60)**	(0.71)		
H_0 (p-value)	0.79	0.30	0.58	0.22	**0.00**	0.66		
Obs.	9730	9824	10015	10081	10063	9760		
	Fats	Oil†	Mayonnaise,Lard					
ATT(In-kind)	0.71	0.88	0.03					
	-0.57	(0.48)*	(0.34)					
ATT^{EQ}(Cash)	0.53	0.10	1.09					
	(0.87)	(0.47)	(0.55)**					
H_0 (p-value)	0.79	0.12	**0.02**					
Obs.	9614	9727	9999					
	Other food	Oth. Starch	Junk Food & Drink	Alcohol	Coffee	Sugar		
ATT(In-kind)	4.60	0.56	4.55	1.30	-1.29	0.82		
	(2.47)*	(0.22)**	(1.79)**	(0.76)*	(0.75)*	(0.39)**		
ATT^{EQ}(Cash)	1.10	1.25	3.11	2.68	-1.10	1.28		
	(3.64)	(0.31)***	(2.60)	(1.35)**	(1.16)	(0.62)**		
H_0 (p-value)	0.21	**0.02**	0.49	0.25	0.83	0.34		
Obs.	9703	10121	10063	10011	9660	9699		
	Non-food	School	Medicne & Hygiene	Transport.	Clothes	HH items	Tobacco	Toys
ATT(In-kind)	8.79	-0.81	5.93	1.71	0.35	-0.40	-0.51	0.44
	(9.71)	(2.03)	(2.52)**	(3.30)	(1.03)	(2.86)	(0.41)	(0.23)*
ATT^{EQ}(Cash)	33.59	1.97	9.03	6.43	0.75	-2.17	-1.23	0.45
	(15.40)**	(3.69)	(4.70)*	(4.90)	(1.62)	(4.22)	(0.72)*	(0.32)
H_0 (p-value)	**0.03**	0.37	0.46	0.20	0.77	0.61	0.20	0.96
Obs.	9671	9870	9705	9975	9794	9699	9935	9699

Notes: H_0 is the hypotheseis that ATT(IK) = ATT^{EQ}(Cash), tested with an F-test, p-values reported. The top 1% of each wave is trimmed, for each category individually. † indicates In-kind item. Main Food Categories are mutually-exclusive and exhasstive subsets of Total Food. Sub-categories do not sum to their aggregate due to missing observations and outliers. ATTs estimated with equation (8) by OLS, controlling for baseline observables . Robust s.e. clustered at the village level. *** p<0.01, ** p<0.05, * p<0.1 for test of differences of ATT(IK) and ATT^{EQ}(Cash) from zero.

Table 7: Child Nutrition & Health, summary statistics.

			Pooled	Age						
				0	1	2	3	4	5	6
Calories		*Mean*	--	--	744	862	901	957	--	--
		RDA	--	--	900	1000	1300	1300	--	--
Micro-nutrients										
	Iron	*% < RDA*	32%	--	47%	27%	20%	34%	--	--
	Vitamin C	*% < RDA*	47%	--	45%	41%	41%	58%	--	--
	Zinc	*% < RDA*	41%		37%	31%	33%	62%	--	--
Under-weight		*%*	9%	5%	13%	12%	7%	9%	--	--
Under-height		*%*	18%	6%	25%	19%	18%	22%	--	--
Sick in last 4 weeks		*%*	36%	40%	46%	41%	38%	33%	33%	22%
Anemic*		*%*	18%	--	--	24%	20%	15%	19%	14%

Notes: Baseline summary statistics, except for anemia prevelance for which only follow-up Control group data is reported. Calories & micro-nutrients converted from food intakes collected in the 24-hr recall, and compared to US Department of Agriculture Recommended Dietary Allowences (RDA). Under-weight and under-height defined as less than 2 s.d. from the mean of the US Center for Disease Control reference groups, by age (2000). Sickness is reported by the survey respondent. Anemia is asessed through a finger blood prick test, adjusted for alititude: for ages (2,4), anemia=1[Hb?11g/dL], for ages=(5,6), anemia=1[Hb?11.5g/dL].

Table 8: ATTs for Child Nutrition. Daily caloric & Micro-nutrient intake. Pooled ages.

Panel A - Levels			Panel B - Relative to RDAs		
Calories	ATT(In-kind)	34.4			
		(38.80)			
	ATT^{EQ}(Cash)	46.2			
		(65.35)			
	Ho (p-value)	0.59			
Iron (mg)	ATT(In-kind)	0.93**	**Iron (> RDA)**	ATT(In-kind)	0.096**
		(0.36)			(0.041)
	ATT^{EQ}(Cash)	0.12		ATT(Cash)	0.000
		(0.58)			(0.040)
	Ho (p-value)	**0.09**		Ho (p-value)	**0.01**
Vit C (mg)	ATT(In-kind)	16.01***	**Vit C (> RDA)**	ATT(In-kind)	0.199***
		(3.86)			(0.040)
	ATT^{EQ}(Cash)	15.28***		ATT(Cash)	0.137***
		(5.35)			(0.047)
	Ho (p-value)	0.91		Ho (p-value)	0.16
Zinc (mg)	ATT(In-kind)	0.94***	**Zinc (> RDA)**	ATT(In-kind)	0.108**
		(0.26)			(0.053)
	ATT^{EQ}(Cash)	0.44		ATT(Cash)	0.040
		(0.41)			(0.059)
	Ho (p-value)	0.14		Ho (p-value)	0.16

Notes: OLS dif-in-dif estimates including all ages (1 to 4 in the baseline, 2 to 6 in the followup). Age dummies and household and village controls included. Panel A reports treatment effects for levels consumed of equal-valued transfers. The independent variable in Panel B is an indicator if the child is above the Recommended Dietary Allowance (RDA), and no extrapolation is made to compare equal-valued transfers. (s.e.) clustered at the village level. Sample size = 3606

Table 9: ATTs for Child Health. Anemia, Sickness, Height, & Weight.

		Pooled Ages	Ages 0 and 1
		(1)	(2)
Height (cm)	ATT(In-kind)	0.33	0.63
		(0.27)	(0.97)
	ATT(Cash)	0.13	0.49
		(0.34)	(1.13)
	Ho (p-value)	0.49	0.89
	Obs.	5420	1655
Weight (kg)	ATT(In-kind)	0.24**	0.22
		(0.11)	(0.23)
	ATT(Cash)	0.10	0.07
		(0.12)	(0.28)
	Ho (p-value)	0.18	0.56
	Obs.	5520	1699
Sickness (indicator)	ATT(In-kind)	-0.07*	-0.04
		(0.04)	(0.06)
	ATT(Cash)	-0.09*	-0.04
		(0.05)	(0.08)
	Ho (p-value)	0.68	0.98
	Obs.	6916	1812
Anemia (indicator)	ATT(In-kind)	-0.01	--
		(0.03)	
	ATT(Cash)	-0.03	--
		(0.03)	
	Ho (p-value)	0.48	--
	Obs.	2071	--

Notes: Panel A: Height and Weight: OLS dif-in-dif estimates including all ages (0 to 4 in the baseline, 0 to 6 in the followup). Age dummies and household and village controls included. Sickness is self-reported, and includes all children aged 0 to 6 in both survey waves. Anemia uses only follow-up data for children aged 2 to 6. Panel B OLS dif-in-dif estimates including only ages 0 and 1 in both survey waves. No extrapolation is made to compare equal-valued transfers. (s.e.) clustered at the village level.

Table A.1: Mean Baseline Characteristics of Non-Attrited Households, by Group (s.e.)

	Treatment Group			
	Control	In-kind	Cash	Obs.
Household Demographics				
Adult Equivalents	4.17	4.06	4.01	5604
	(0.11)	(0.08)	(0.10)	
# Children age 0-5	0.74	0.69	0.66	5604
	(0.05)	(0.03)	(0.05)	
Male HH head	0.84	0.86	0.87	5604
	(0.01)	(0.01)	(0.01)	
Educ. Of HH head (yrs)	4.21	4.24	3.95	5600
	(0.17)	(0.14)	(0.17)	
Indigenous HH	0.21	0.17	0.14	5604
	(0.06)	(0.03)	(0.04)	
Cons. Food per AE (pesos)	348.08	327.50	324.37	5592
	(16.51)	(10.46)	(11.08)	
Cons. Other per AE (pesos)	231.83	217.81	224.63	5589
	(16.65)	(10.79)	(13.84)	
Budget Shares				
Food (out of total)	0.65	0.66	0.65	5563
	(0.01)	(0.01)	(0.01)	
Corn (out of food)	0.17	0.17	0.18	5506
	(0.01)	(0.01)	(0.01)	
Fruit & Veg. (out of food)	0.19	0.18	0.19	5544
	(0.01)	(0.00)	(0.01)	
Milk (out of food)	0.05	0.06	0.05	5536
	(0.00)	(0.00)	(0.00)	
Meat (out of food)	0.19	0.20	0.19	5555
	(0.01)	(0.01)	(0.01)	
Received Program?				
Liconsa	0.03	0.03	0.02	5604
	(0.01)	(0.01)	(0.01)	
DIF	0.10	0.06	0.06	5604
	(0.02)	(0.01)	(0.01)	
Oportunidades	0.15	0.09	0.07	5604
	(0.04)	(0.02)	(0.03)	
Household Characteristics				
Has dirt floor	0.32	0.30	0.32	5604
	(0.04)	(0.03)	(0.03)	
Piped water in home	0.63	0.58	0.51	5604
	(0.05)	(0.04)	(0.06)	
Temporary Walls or Roof	0.15	0.18	0.16	5604
	(0.03)	(0.02)	(0.02)	
Toilet in the home	0.61	0.61	0.60	5604
	(0.04)	(0.03)	(0.05)	
Electric lights	0.83	0.91	0.89	5604
	(0.05)	(0.02)	(0.04)	
Owns refrigerator	0.42	0.46	0.50	5604
	(0.05)	(0.03)	(0.04)	
Owns washing mach.	0.24	0.21	0.21	5604
	(0.03)	(0.02)	(0.02)	
Owns home	0.84	0.83	0.83	5604
	(0.02)	(0.01)	(0.02)	
Farms or raises animals	**0.32**	0.37	**0.44**	5604
	(0.04)**	(0.03)	**(0.04)****	
Village Characterictics				
Km. to municipal head	253.93	**269.93**	**188.60**	5604
	(33.86)	**(20.90)****	**(26.25)****	
Village population	672.65	579.51	548.12	5604
	(84.22)	(52.82)	(71.22)	
Price IK basket	201.51	201.08	201.33	5604
	(3.38)	(2.20)	(3.20)	

Notes: Sample includes all baseline households with completed follow-up surveys. Raw attrition rates were 15%, 11%, and 11% for Control, In-kind, and Cash groups respectively; a significant difference (p-value=0.02) between Control and both In-kind and Cash. Tests of equality of means were performed for all pair-wise comparisions of groups, and **asteriks** indicate significant differences with *** p<0.01, ** p<0.05, * p<0.1. Robust (s.e.) are clustered at the village level.

Table A.2: Receipt of Educational Classes - Intrinsic and Extrinsic Margins

Including and Excluding Organizational Classes

	Extensive Margin % of housholds attending classes		Intensive Margin # of classes attended	
Treatment Group	Including Organizational Classes (1)	Excluding Organizational Calsses (2)	Including Organizational Classes (3)	Excluding Organizational Calsses (4)
In-kind only	**76.1** **(3.3)****	**62.8** **(3.6)****	5.2 (0.4)	5.5 (0.5)
In-kind plus Education	**84.8** **(2.0)****	**74.3** **(2.5)****	5.4 (0.3)	5.6 (0.4)
Cash plus Education	78.8 (3.6)	67.1 (3.9)	5.2 (0.4)	5.5 (0.4)
Observations	3829	3829	3060	2606

Notes: Intensive margin refers to the average number of classes attended, conditional on any attendance. Data is self-reported from the post-treatment survey and including only households that report receiving a physical PAL transfer. Households were asked the total number of classes attended and allowed to list up to 4 themes that were covered from the choices of Organization, Health, Hygiene, and Nutrition. If "Organization" was listed, I exclude that class in columns (2) and (4). Robust s.e. in parentheses, clustered at the village level. Within a column, all pair-wise equality of means tests were performed, with ** signifying rejection at the 5% level.

Table A.3: ATTs for 150 peso Cash & In-kind Transfers. Main and sub- AE consumption categories.

	Main	Sub (mutually exclusive & exhaustive)						
	Fruit & Veg.	Fruit	Vegetables					
ATT(In-kind)	12.06	7.36	2.82					
	(2.67)***	(1.67)***	(1.34)**					
ATT(Cash)	11.98	7.02	3.62					
	(3.09)***	(1.83)***	(1.63)**					
H_0 (p-value)	0.62	0.95	0.26					
Obs.	9686	9760	9699					
	Grains	Corn Flour†	Corn Grain,Tortillas	Rice†	Pasta†	Cookies†	Cereal†	Other
ATT(In-kind)	13.04	2.85	1.12	0.94	1.41	4.30	3.54	0.31
	(2.76)***	(0.50)***	(2.00)	(0.23)***	(0.21)***	(0.56)***	(0.53)***	(0.79)
ATT(Cash)	7.39	0.22	2.75	0.17	0.15	1.59	0.82	0.55
	(3.01)**	(0.45)	(2.44)	(0.25)	(0.25)	(0.50)***	(0.40)**	(0.90)
H_0 (p-value)	0.09	**0.00**	0.50	**0.01**	**0.00**	**0.00**	**0.00**	0.53
Obs.	9698	10081	9670	9767	9844	9904	10121	9840
	Pulses	Beans†	Lentils†					
ATT(In-kind)	2.12	0.78	1.57					
	(0.58)***	(0.52)	(0.13)***					
ATT(Cash)	0.21	0.40	0.09					
	(0.67)	(0.61)	(0.12)					
H_0 (p-value)	**0.01**	0.98	**0.00**					
Obs.	9740	9716	10129					
	Dairy	Milk†	Cheese,Yogurt					
ATT(In-kind)	12.29	11.51	0.15					
	(2.24)***	(1.67)***	(0.97)					
ATT(Cash)	4.56	3.63	1.88					
	(2.46)*	(1.58)**	(1.20)*					
H_0 (p-value)	**0.00**	**0.00**	0.10					
Obs.	9828	9801	9959					
	Animal	Chicken	Beef/Pork	Seafood	Tuna/Sardin.†	Eggs		
ATT(In-kind)	4.13	-0.59	3.71	0.23	4.00	-0.76		
	(3.07)	(1.42)	(1.11)***	(1.35)	(0.49)***	(0.42)*		
ATT(Cash)	3.90	1.32	2.12	2.11	1.02	-0.77		
	(3.82)	(1.86)	(1.33)	(1.82)	(0.45)**	(0.53)		
H_0 (p-value)	0.92	0.17	0.48	0.34	**0.00**	0.85		
Obs.	9730	9824	10015	10081	10063	9760		
	Fats	Oil†	Mayonnaise,Lard					
ATT(In-kind)	0.71	0.88	0.03					
	(0.57)	(0.48)*	(0.34)					
ATT(Cash)	0.39	0.07	0.81					
	(0.64)	(0.34)	(0.41)**					
H_0 (p-value)	0.56	**0.05**	**0.03**					
Obs.	9614	9727	9999					
	Other food	Oth. Starch	Junk Food & Drink	Alcohol	Coffee	Sugar		
ATT(In-kind)	4.60	0.56	4.55	1.30	-1.29	0.82		
	(2.47)*	(0.22)**	(1.79)**	(0.76)*	(0.75)*	(0.39)**		
ATT(Cash)	0.82	0.93	2.31	1.99	-0.82	0.95		
	(2.71)	(0.23)***	(1.93)	(1.00)**	(0.86)	(0.46)**		
H_0 (p-value)	0.44	0.17	0.63	0.67	0.42	0.31		
Obs.	9703	10121	10063	10011	9660	9699		
	Non-food	School	Medicne & Hygiene	Transport.	Clothes	HH items	Tobacco	Toys
ATT(In-kind)	8.79	-0.81	5.93	1.71	0.35	-0.40	-0.51	0.44
	(9.71)	(2.03)	(2.52)**	(3.30)	(1.03)	(2.86)	(0.41)	(0.23)*
ATT(Cash)	27.73	1.47	6.70	4.78	0.56	-1.61	-0.91	0.33
	(11.50)**	(2.74)	(3.49)*	(3.64)	(1.20)	(3.13)	(0.53)*	(0.24)
H_0 (p-value)	0.17	0.47	0.17	0.25	0.80	0.91	0.35	0.52
Obs.	9671	9870	9705	9975	9794	9699	9935	9699

Notes: H_0 is the hypotheseis that ATT(IK) = ATT(Cash), tested with an F-test, p-values reported. The top 1% of each wave is trimmed, for each category individually. † indicates In-kind item. Main Food Categories are mutually-exclusive and exhasstive subsets of Total Food. Sub-categories do not sum to their aggregate due to missing observations and outliers. ATTs estimated with equation (8) by OLS, controlling for baseline observables . Robust s.e. clustered at the village level. *** p<0.01, ** p<0.05, * p<0.1 for test of differences of ATT(IK) and ATT(Cash) from zero.

A.4: Diference-in-Difference Treatment Effects for Village Median Prices

VARIABLES	(1) Tomato	(2) Onion	(3) Potato	(5) Lettuce	(6) Chayote	(7) Chiles	(8) Oranges	(9) Bananas
Post	-1.616***	-0.899***	0.380	0.669	-0.558	0.698	0.663	0.110
	(0.400)	(0.269)	(0.444)	(1.252)	(0.908)	(1.399)	(0.601)	(0.303)
IK*Post	-0.780	-0.0894	-0.0781	-0.656	-0.00470	-0.167	0.0323	-0.136
	(0.489)	(0.329)	(0.537)	(1.573)	(1.089)	(1.714)	(0.771)	(0.373)
Cash*Post	-0.637	-0.140	-0.249	-4.447**	1.769	-0.636	-0.511	0.193
	(0.560)	(0.371)	(0.607)	(1.877)	(1.200)	(2.000)	(0.981)	(0.439)
H0:βik=βcash	0.77	0.87	0.74	**0.03**	**0.08**	0.79	0.55	0.39
Obs.	380	389	296	101	99	246	76	219

VARIABLES	(10) Apples	(11) Corn Flr.	(12) Corn Kernels	(13) Corn Tortilla	(14) White roll	(15) Sweet Roll	(16) Bread loaf	(17) Rice
Post	-0.628	-0.237	-0.433***	-0.0448	0.266	-0.322	0.0137	0.108
	(1.021)	(0.261)	(0.149)	(0.220)	(1.324)	(1.428)	(0.349)	(0.171)
IK*Post	0.768	0.167	0.153	-0.179	-0.721	0.989	-0.190	-0.0934
	(1.282)	(0.324)	(0.189)	(0.276)	(1.637)	(1.733)	(0.508)	(0.240)
Cash*Post	0.434	0.318	-0.0304	0.172	-1.577	1.539	0.162	-0.0175
	(1.596)	(0.358)	(0.222)	(0.329)	(1.884)	(1.935)	(0.479)	(0.237)
H0:βik=βcash	0.82	0.63	0.36	0.24	0.61	0.74	0.48	0.75
Obs.	82	234	146	70	139	281	310	319

VARIABLES	(18) Biscuits	(19) Beans	(21) Chicken	(22) Beef/Pork	(23) Fish	(25) Eggs	(26) Milk	(27) Cheese
Post	0.316	-1.056***	0.853	10.71***	4.967	-0.166	3.154	-1.886
	(1.202)	(0.335)	(5.572)	(2.220)	(3.475)	(0.404)	(3.092)	(1.966)
IK*Post	-0.307	-0.225	9.297	-3.818	-2.408	-0.0385	-1.201	1.744
	(1.602)	(0.482)	(6.854)	(2.648)	(4.860)	(0.497)	(4.102)	(2.499)
Cash*Post	-1.399	-0.372	8.059	-3.472	-3.226	-0.163	2.736	2.451
	(1.633)	(0.473)	(7.836)	(2.928)	(5.228)	(0.565)	(4.326)	(2.846)
H0:βik=βcash	0.48	0.76	0.86	0.88	0.88	0.80	0.33	0.78
Obs.	256	309	330	235	56	359	229	203

VARIABLES	(30) Soda	(31) Coffee	(32) Sugar	(33) Veg. Oil	(34) Candy	(35) Soup	(36) Atole	(37) Chiles(can)
Post	-0.713**	57.06***	0.00876	0.524***	27.05*	-13.64	45.22	2.543
	(0.294)	(14.60)	(0.0766)	(0.184)	(15.24)	(15.22)	(37.24)	(3.541)
IK*Post	-0.241	-10.46	0.0145	0.0481	11.83	46.33**	-19.42	-0.952
	(0.359)	(17.95)	(0.0936)	(0.234)	(19.95)	(19.68)	(43.21)	(4.766)
Cash*Post	0.0803	-16.21	-0.180*	0.0488	-10.58	51.67**	-26.48	1.020
	(0.425)	(19.98)	(0.106)	(0.255)	(29.21)	(21.55)	(49.25)	(5.276)
H0:βik=βcash	0.38	0.74	**0.03**	0.99	0.43	0.79	0.86	0.70
Obs.	267	341	393	360	53	98	107	60

Notes: Observations are village prices, defined as the median household unit-value. Village price is set to missing if less than 9 households report unit-values. Table includes all food items for which there more than 50 villages have a defined village price.
Post=1 if in follow-up survey.
H0: :βik=βcash shows p-values for a difference in means between Treatment effects for Cash and In-kind treatment groups.
Asterisk indicate coefficient is significantly different from zero.