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Testing Paternalism: Cash Versus In-kind Transfers in Rural Mexico

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Abstract

Welfare programs are often implemented in-kind to promote outcomes that might not be realized under cash transfers. This paper tests whether such paternalistically motivated transfers are justified compared to cash, using a Randomized Controlled Trial of Mexico's food assistance program. In relation to total food consumption, the in-kind transfer was infra-marginal and non-distorting. However, the transfer contained 10 food items, and there was a large variation in the extent to which individual foods were extra-marginal and distorting. Small differences in children's nutritional intake under in-kind transfers did not lead to meaningful differential improvements in child health compared to cash.

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1 Introduction

Welfare transfers are often made in kind rather than in cash. In fact, the governmental provision of health care, housing, child care, and food vastly dominate cash transfers in most countries, both developing or developed (Tabor 2002, Tesliuc 2006). Transfer recipients, however, weakly prefer an equal-valued cash transfer as it offers the same, if not more, budget choices. In light of this fact, many justifications for the use of in-kind transfers have been suggested. For example, transfers in kind may induce the non-poor to self-select out of welfare programs (Nichols and Zeckhauser, 1982; Bearse et al., 2000; Blomquist et al., 2010); or they may facilitate pecuniary redistribution that is not achievable through cash transfers (Coate et al. 1994); or they may be more politically feasible than cash transfers (de Janvry et al. 1991; Epple and Romano 1996b). Perhaps the most cited rationale for in-kind over cash transfers, however — and the one studied here — is paternalism (see Currie and Gahvari 2008 for a review of this literature).

A paternalistic government uses in-kind transfers precisely to encourage the consumption of transferred goods. For such transfers to be justified over cash, they must first affect consumption differently than would an equal-valued cash transfer; that is, they must be both extra-marginal and binding. If transfers are infra-marginal, the recipient would simply reduce market purchases one-for-one with the transferred good. If the government cannot force consumption of an extra-marginal transfer, the recipient will have an incentive to sell or trade it away. Thus, a simple model of consumer demand predicts that both infra-marginal transfers and non-binding extra-marginal transfers with costless resale will have no differential effects on behavior than would an equal-valued cash transfer (e.g., Southworth 1945).

The magnitude of the distorting effect of in-kind transfers is of fundamental importance for policy makers, yet little credible empirical evidence exists for in-kind programs. This lacuna of evidence arises from the simple fact that we can never simultaneously observe counterfactual behavior under an equal-valued cash transfer. In this paper, I take advantage of a unique policy experiment and demonstrate how the identification problem can be overcome through the use detailed survey data and a Randomized Controlled Trial in which recipients are assigned to receive either an in-kind transfer or an equal-valued cash transfer.

Specifically, comparing consumption choices under the cash transfer to how much would have been transferred in kind identifies the extent to which the in-kind transfer is extra-marginal; comparing consumption choices under the in-kind transfer to how much was actually transferred identifies the extent to which the in-kind transfer is binding; and comparing the extra-marginality of the transfer to the degree to which it is binding iden-

tifies the distorting effect of the in-kind transfer. Such comparisons would be extremely difficult to make without the random assignment of transfer type.

In this paper, I quantify the distorting effects of in-kind food transfers to the rural poor. The program I study is the Mexican government's food assistance program, the *Programa de Apoyo Alimentario* (PAL). The stated aim of PAL is a paternalistic one — to improve food security, nutritional intake, and health (Vázquez-Mota 2004). Participating households receive monthly transfers (trucked into the villages) consisting of 10 common food items, such as corn flour, beans, rice, oil, and powdered milk. Eligibility for the program was determined through a means test, and take-up amongst eligible households was virtually universal. Furthermore, program rules made it impossible for households to self-select into the program. These facts allow me to abstract from motivations for in-kind transfers, such as self-selection and tagging that can be important in other contexts (Akerlof, 1978; Moffitt, 1983).

The experiment included about 200 rural villages and was conducted during the roll-out of the program in 2003. The transfer type was randomized at the village level, and eligible households received either the in-kind food transfer, an unrestricted cash transfer, or no transfer (a control). When possible, a woman (the household head or spouse of the head) was designated the beneficiary within the household. The analysis uses detailed consumption and health data that was collected from participating households and individuals both pre- and post-treatment. Pre-treatment data confirm that the population is poor (per capita consumption is less than two dollars per day), the transfers are large (at about 12 percent of pre-transfer household consumption), and malnutrition is a serious concern (e.g., 18 percent of children are anemic); as such, either transfer type had the potential to improve welfare. I find that both in-kind and cash transfers lead to significant increases in food and non-food consumption compared to the control, confirming the results of the initial government evaluation (González-Cossio et al., 2006), and restated in Skoufias et al. (2008).

This paper extends these preliminary evaluations of the PAL experiment in several important ways. First, I account for the fact that the in-kind transfer was in practice worth more than the cash transfer when valued at local prices, allowing for an accurate test of the prediction that infra-marginal in-kind transfers will have no differential effects from equal-valued cash transfers. Doing so, I find that the PAL in-kind transfer was infra-marginal for all households in terms of total food consumption and — consistent with 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.

Second, I explore the extent to which the 10 individual items in the in-kind basket

distorted consumption. These items and transfer amounts were specifically chosen by the government in order to induce greater consumption of these goods, and information on the degree to which individual goods distort consumption (compared to cash) is necessary if we are to justify their use on paternalistic grounds. Indeed, I find a large variation in the extent to which food items are distorting. For example, beans are a commonly consumed food and in-kind bean transfers were small compared to consumption of beans under the cash transfer; thus, bean transfers were largely infra-marginal. In contrast, powdered milk was a sizable transfer relative to consumption under the cash transfer, and thus largely extra-marginal. Despite over-provision of some goods, there is evidence that the extra-marginal transfers were not fully binding for some households, as suggested by reported consumption amounts under the in-kind transfer that were lower than the transfer amount.

Finally, paternalistic policy makers must primarly be interested in outcomes that result from the consumption of the in-kind good, rather than consumption of the in-kind good in and of itself. For example, publicly provided labor market training programs are ultimately concerned with increasing productivity and employment, not classroom instruction time (the in-kind good) *per se*. Similarly, the paternalistic goal of in-kind food transfers is to change health outcomes, not necessarily to induce consumption of the particular transferred foods.

This is not a trivial distinction when transferred goods are substitutable with other non-transferred items, and those substitute goods affect the outcome of interest. That is, there is no reason to believe the specific transferred items (e.g., classroom instruction or powdered milk) are the only ones that can lead to the desired paternalistic outcomes (e.g., increased productivity or better health). In fact, a simple theory of consumer demand with multiple goods shows that recipients will reduce the consumption of substitutes of binding extra-marginal in-kind transfers (and increase the consumption of complements). These predictions were first formalized in the theory of rationing (Tobin and Houthakker, 1950; Neary and Roberts, 1980; Deaton, 1981), and this paper provides the first empirical test of the theoretical predictions in the context of in-kind transfers.[1] For PAL food transfers, I find evidence that binding, extra-marginal transfers induced households to substitute away from similar non-transferred foods.

Thus, the preferred measure of the paternalistic benefits of in-kind over cash transfers is their differential ability to improve outcomes of interest. For PAL, the main outcome of

[1]Neary and Roberts (1980) and Deaton (1981) independently generalize the Tobin-Houthakker (1950) model of rationed consumer goods. These papers study constraints on consumption from above (rationing), while distorting in-kind transfers are one example of such a constraint from below. Furthermore, these papers consider only the consequences of rations or transfers that are fully binding, while the discussion in this paper is the first to generalize their framework to allow for non-binding transfers or rations.

interest is health, in particular child health. Using precisely measured indicators of child sickness, height, weight, and anemia prevalence, I find minimal evidence of differential effects of in-kind and cash transfers after one year of receiving aid. Nonetheless, there is evidence that in-kind transfers led to greater intake of the essential micro-nutrients iron and zinc than did cash. This increase is most likely due to greater consumption of the iron- and zinc-fortified powdered milk included in the in-kind basket.

Independent of the questions surrounding in-kind transfers, a key finding of this paper is that households spend very little of the cash transfer on vices, such as alcohol, tobacco, and junk food, as is often feared by paternalistic program administrators. Rather, the majority of the cash transfer is spent on nutritious food items such as fruits and vegetables. This is important as it demonstrates that poor, rural households use unrestricted cash transfers in ways that are (objectively) both individually and socially beneficial.

If there are paternalistic benefits to in-kind transfers, sound public policy must weigh them against their costs. One cost of distorting in-kind transfers is born directly by the recipient: equal-valued cash transfers are weakly preferred to transfers in kind, and thus extra-marginal and binding in-kind transfers offer lower utility than does cash. A second cost is incurred in distributing the transfers: it is likely that in-kind goods are more costly to distribute than cash. For the PAL transfers, the in-kind basket costs at least 18 percent more to administer than the cash transfer.

This paper offers important lessons for public policy. First, it adds to the literature estimating the distorting effects of in-kind food transfers. Most of the existing evidence comes from the United States Food Stamp Program, which demonstrates that these food vouchers are infra-marginal for most recipients and thus treated like cash (Moffitt, 1989; Fraker et al., 1995; Hoynes and Schanzenbach, 2009; Whitmore, 2002). For those recipients whose consumption is distorted, Whitmore (2002) shows that they have access to a well-developed resale 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, and we know very little about the distorting effects of in-kind food transfer programs in low-income settings. Some evidence can be gleaned from the well-identified econometric evaluations of the consumption effects of cash transfer programs to the poor. Consistent with the findings of this paper, they largely demonstrate that cash is spent on nutritious foods (e.g., Hoddinott and Skoufias (2004) in Mexico, Attanasio and Mesnard (2006) in Colombia, Maluccio (2010) in Nicaragua). However, cash transfers are often conditional on school attendance and visits to health centers, or are coupled with in-kind nutritional supplements for young children (e.g., Attanasio et al., 2005; Behrman

and Hoddinott, 2005a). As such, conditional tranfer programs and hybrid in-kind/cash programs are less useful for fully separating out the effects of in-kind food versus cash transfers.

The paper proceeds as follows: Section 2 outlines the theoretical framework and policy implications. Section 3 describes the PAL transfer program and field experiment. Section 4 discusses identification of the empirical results, which are presented in Section 5. Section 6 details the differential distribution costs of the PAL in-kind and cash transfers. Section 7 concludes.

2 Cash versus paternalistic in-kind transfers

This section presents a simple model of consumer demand under in-kind and cash transfers which guides the empirical analysis, identifying the situations in which in-kind transfers will induce different choices than would an equal-valued cash transfer. It concludes with a discussion of how the potential for such distortions can motivate the use of in-kind transfers over cash by a paternalistic government.

2.1 A simple demand theory

Assume households have preferences over two goods, say, milk, q_M, and a composite good, q_F, and that they maximize a utility function $U(q_M, q_F)$, strictly increasing and concave in both arguments. Pre-transfer, the household budget is represented by $p_M q_M + p_F q_F \leq Y$; p_M and p_F are the market prices of milk and the composite good and Y is the household's endowment. Line $\overline{AB}$ in Figure 1 represents this budget constraint graphically. A cash transfer of T shifts the budget constraint up to $\overline{CE}$, while an equal-cost transfer of milk, $\overline{q}_M (= \frac{T}{p_M})$, leads to a kinked budget constraint that depends on the resale price of milk, $\overline{p}_M$:

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

If resale is frictionless, $p_M = \overline{p}_M$ and the in-kind transfer is equivalent to cash. However, it is reasonable to believe that most in-kind transfers are discounted from the market price, with $\overline{p}_M \in [0, p_M)$. This may reflect, for example, the search and transaction costs of finding a willing buyer.

Clearly, cash is weakly preferred to the transfer in kind. This can be seen by considering the two households in Figure 1, I and II. Household I is indifferent between transfer type, moving from indifference curve I to I' under either transfer. Household II, however,

is weakly worse off under the in-kind transfer, consuming at II' (the kink) if resale is unavailable and at II'' if resale is costly while it would have chosen II''' under the cash transfer.

When frictionless resale is unavailable, the in-kind transfer of $\overline{q}_M$ is *extra-marginal* for household II as it consumes more milk than it would have under the cash transfer. The in-kind transfer is *infra-marginal* for household I and is thus equivalent to cash. Note that extra-marginality is defined with respect to the post-cash transfer budget (rather than the pre-transfer budget), as a cash transfer may change demand for the in-kind good. This distinction is important in practice when measuring the extra-marginality of a transfer empirically. For example, suppose the in-kind good is normal and a transfer of $\overline{q}_M$ is larger than pre-transfer consumption. Compared to the pre-transfer budget, $\overline{q}_M$ would be extra-marginal. However, it is possible that the income elasticity is large enough to induce a post-cash transfer consumption of milk greater than $\overline{q}_M$, in which case the in-kind transfer would be infra-marginal.

The in-kind transfer is *non-binding* if the household consumes less of the good than it was provided, and *binding* otherwise. For example, the transfer is non-binding for household II when facing a strictly positive resale price (indifference curve II'').

It is simple to theoretically quantify the extent to which in-kind transfers are extra-marginal and non-binding: choices under the cash transfer, compared to the quantity that would have been provided in-kind, define the extra-marginality of the milk transfer, $EM_M(\overline{q}_M)$; choices under the in-kind transfer, compared to what was provided in-kind, define the amount of the transfer that was non-binding, $NB_M(\overline{q}_M)$. Letting 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, we have :

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

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

The *distortion effect* of the in-kind transfer, $D_M(\overline{q}_M)$, is defined as the difference between the amount of the in-kind transfer that is consumed, over and above what would have been consumed under a cash transfer:

$$D_M(\overline{q}_M) = EM_M(\overline{q}_M) - NB_M(\overline{q}_M) . \tag{3}$$

In general, it is difficult to empirically identify the distortion effect of an in-kind transfer

as we cannot simultaneously observe consumption choices under both the in-kind and an equal-valued cash transfer.

Multiple goods and substitution

This model can easily be extended to cases when (i) multiple goods are transferred in-kind and (ii) multiple non-transferred goods are available; such a extension is similar to Neary and Roberts' (1980) and Deaton's (1981) analysis of the rationing of consumer goods. With multiple in-kind goods, we must aggregate in order to compare the in-kind bundle as a whole to an equal-valued cash transfer. One meaningful aggregation uses market prices as a norm.[2] 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), we have:

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

$$NB_{Total}(\overline{q}_1, \ldots, \overline{q}_N) = \sum_{n=1}^{N} p_n NB_n(\overline{q}_n)\ . \tag{5}$$

The total distortion effect, with prices as a norm, is thus:

$$D_{Total}(\overline{q}_1, \ldots, \overline{q}_N) = EM_{Total}(\overline{q}_1, \ldots, \overline{q}_N) - NB_{Total}(\overline{q}_1, \ldots, \overline{q}_N). \tag{6}$$

The presence of more than one non-transferred good which are substitutes or complements with transferred goods has important implications for the paternalistic benefits received from in-kind transfers. Specifically, households will substitute away from substitutes and towards complements of extra-marginal, binding in-kind transfers. For example, suppose that cheese and milk are substitutes, and a household receives an extra-marginal milk transfer which is binding: a simple demand model would predict that less cheese would be consumed than under an equal-valued cash transfer. If paternalistic benefits are derived from the total consumption of dairy products, not necessarily milk *per se*, transfers in-kind will become less attractive to the paternalistic donor in the presence of substitutes (and more attractive in the presence of complements).

Static versus dynamic consumption

Note that this simple model is time-independent, leaving resale as the only explanation for observed non-binding transfers. In practice, however, some in-kind items may be

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

stored temporarly or otherwise consumed in a lumpy manner.[3] If consumption is indeed lumpy and is only observed at one point in time (as in the empirical example studied in this paper), empirical estimates of non-binding transfers will only identify an upper bound on the extent of resale, and a lower bound on the quantity of the transfer that was not consumed.

2.2 Social welfare and policy objectives

Clearly, the ability of in-kind transfers to distort consumption can be a strong motivator for a paternalistic government to impose their preferences on households when social and individual preferences do not coincide. These preferences may not coincide for many reasons. One important example is when in-kind transfers target individual family members such as children or pregnant women, and cash transfers are given to a household head, who is often male. Another is if recipients have time-inconsistent preferences. In this case, in-kind transfers may be preferred by the household as a commitment mechanism if distorted present consumption leads to better long-run outcomes.

Regardless of the motivation, only extra-marginal and binding in-kind transfers can advance the paternalistic goals of changing consumption patterns differentially from an equal-valued cash transfer. Thus, a first stage of policy analysis should be to assess whether a given transfer will distort consumption.

However, distorted consumption in and of itself is not likely the end goal of public policy. Rather, it is more natural to believe that society is interested in changing outcomes that result from distorted consumption. With food transfers, we care about improvement in health rather than distorted food consumption *per se*. With public provision of education, we care about increased knowledge and productivity rather than increased instruction time or resource use. A second, and perhaps sufficient, stage of policy analysis should therefore be to measure whether distorting in-kind transfers influence the outcomes of interest differentially from cash.

If no distortion in outcomes is found, it will be difficult to justify the additional costs associated with in-kind transfers. If, however, an in-kind transfer is found to distort outcomes relative to cash, it becomes much harder to determine the optimal policy instrument, as we must know how much society is willing to pay for its paternalistic gains.

[3] In programs that are expected to continue indefinitely, perpetual storage and an accumulating amount of stored goods seems unlikely.

3 The transfer program, experiment, and data

3.1 The *Programa de Apoyo Alimentario*

PAL, which started in 2004 and is still active, operates in about 5,000 rural villages throughout Mexico. It is administered by the public/private company Diconsa, which maintains subsidized general stores in these areas. Monthly in-kind transfers contain seven basic items — enriched corn flour, rice, beans, dried pasta soup, biscuits, fortified milk powder, and vegetable oil — and two to four supplementary items (including canned sardines, canned tuna fish, dried lentils, chocolate, breakfast cereal, or corn starch). The contents were chosen by nutritionists to provide a balanced, nutritious diet of about 1,750 calories per day, per household (Campillo Garcia, 1998). All of the items are common Mexican brands that are not produced locally, but by and large are available in local stores.[4] The transfer is not conditional on family size, is delivered bimonthly (two food boxes at a time), and the wholesale cost to the government per box is about 150 pesos (approximately 15 U.S. dollars). Resale of in-kind food transfers is not prohibited.

A woman (the household head or spouse of the head) is designated the beneficiary within the household, if possible.[5] Transfers are intended to be conditional on attending monthly classes in health, nutrition, and hygiene, designed to promote healthy eating and food preparation practices. However, survey evidence suggests that this conditionality was not enforced, rendering the tranfers unconditional in practice.[6]

Program eligibility is defined using census data and proceeds in two stages, where first poor, rural villages are deemed eligible and then poor households within eligible villages are offered the program. 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 either *Liconsa*, a subsidized milk program, or *Oportunidades*, a conditional cash transfer program (formerly known as *Progresa*). As such, PAL villages are typically poorer and more rural than the widely-studied *Progresa*/*Oportunidades* villages.[7] Household eligibility is determined through a means test, in which observable

[4] I do not observe actual food production; however household survey data on consumption of own-produced foods shows that the only PAL good that is auto-consumed in any appreciable quantity is beans (10 percent of households consume own-produced beans at baseline).

[5] For example, in the working sample defined below, 74 percent of households in both in-kind and cash villages identify the recipient as female.

[6] Importantly, program administrators confirmed that neither cash nor in-kind transfers were ever withheld due to lack of attendance of educational classes.

[7] PAL villages were typically not incorporated in Progresa/Oportunidades because they did not have health facilities and/or schools in close enough proximity, as needed to fulfill the conditionality of Progressa/Oportunidades transfers.

characteristics are weighted to create a poverty index and households falling above a threshold are offered the program (Vázquez-Mota, 2004).

Food aid boxes are assembled in several warehouses throughout the country and then delivered to a central location in each village. Program villages are required to elect a three-member Committee of Beneficiaries whose responsibilities include receiving the aid packages from program administrators, disbursing them to participants, and teaching the educational classes. Each household must collect its own aid package from the committee and is required to present their PAL identification card in order 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 PAL-eligible villages in eight southern states to be included in a Randomized Controlled Trial.[8] These villages were randomized into four groups using a simple randomization algorithm. Eligible households in experimental villages would receive either (1) the in-kind transfer plus educational classes (the standard PAL treatment), (2) an in-kind transfer *without* the education classes, (3) a pure cash transfer of 150 pesos per month plus the education classes, or (4) no transfer nor any classes. All other aspects of the program (the role of the Committee of Beneficiaries, the timing and delivery of transfers, and eligibility requirements) were not manipulated by the experiment.

In practice, the randomization of the in-kind treatment into educational classes was confounded, as the Committee of Beneficiaries appears to have taught classes in villages that were selected to not receive clasess. Specifically, survey evidence shows that 63 percent of recipient households in the in-kind-without-education treatment arm in fact attended at least one class (compared to 75 percent of recipient households in the in-kind-with-education arm). It is not clear exactly what caused this departure from the experimental protocol, although one speculation is that committee members decided independently to teach some classes upon learning that classes were part of the standard PAL program.

Furthermore, very few classes were actually attended by recipients in in-kind and cash villages that were supposed to attend them (likewise, few classes were attended by those in-kind households that were *not* supposed to attend them). For example, survey evidence shows that only about four classes were attended over approximately 12 months of treatment, while program rules stipulate one class per month should be attended. Again, it is

[8]The eight states are Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, and Yucatán. Appendix Figure A.1 contains a map of experimental villages.

not clear why so few classes were attended, but the de-facto unconditionality of the aid transfers must certainly play a role. (For further details on the education treatment and receipt of classes across experimental groups, see Appendix A.)

For these reasons and to increase sample size, my analysis combines both in-kind treatment groups (and I demonstrate that results are robust to excluding the in-kind-without-education group).

3.3 Data

In each experimental village, a random sample of approximately 33 households were selected for inclusion in pre- and post-intervention surveys that were administered to the female head of the household, if possible. The surveys were administered by Mexic's National Institute of Public Health (*Instituto Nacional de Salud Publica (INSP)*), a different government agency than the one administering PAL. INSP was intentionally chosen to conduct the surveys so that respondents would not (mistakenly) think that their responses would affect the receipt of aid. The pre-intervention round was conducted between October 2003 and April 2004, before the means-test was applied in the cash and in-kind villages. The post-intervention round was conducted two years later in the final quarter of 2005. PAL began to phase-in aid delivery after the baseline surveys, completing coverage within a year.

Household food consumption is defined as the sum of expenditures on individual foods eaten within the home plus expenditures on food eaten away from the home. A seven-day recall on 61 food items was used to capture consumption of food eaten in the home, and I construct village median unit-values as measures of prices in order to aggregate across goods. A single question captured consumption expenditure on foods eaten away from home. Household non-food consumption was captured in 23 non-food categories designed to cover the extent of non-durable, non-food consumption. All household food and non-food variables are converted to monthly levels for ease of comparison with PAL transfers.[9]

At the individual level, I use data on child food consumption and health. Individual food consumption was measured with a rolling 24-hour recall module for children aged one to four in the baseline and aged two to six in the followup. Consumption quantities were converted by INSP into caloric and micro-nutrient content using standard conversion factors; unfortunately, I do not have data on the specific foods that were consumed

[9] Appendix B contains further details on the construction of unit-values and household consumption variables. Appendix Table A.2 lists all goods (PAL and non-PAL) used in the analysis..

by children. At times, I compare consumption to age-specific Recommended Dietary Allowances (RDAs) in order to assess the relative extent of under-nourishment.

Child health measures include height, weight, sickness, and anemia prevelance. Height and weight were measured by the survey team for children aged zero to four in the baseline and aged zero to six in the followup; the survey respondent was asked to report the number of sick days in the last month for all children in both waves; and hemoglobin blood tests (to detect anemia) were administered for children aged two to six, though only in the post-treatment wave.[10]

Table 1 summarizes the seven basic and three supplementary items - lentils, canned fish, and breakfast cereal - that were included in the PAL food basket at the time of the follow-up survey in late 2005.[11] All of the items are non-perishable as delivered and the distribution of caloric content suggests that the basket is the basis of a balanced diet, although notably absent are fruits and vegetables. At local pre-program prices, the PAL in-kind package is worth about 205 pesos. 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 (Barquera et al., 2001). The fortified items comprise about half the value of the box (92 pesos), a choice consistent with paternalistic preferences for greater micro-nutrient intake.

Note that the 150 peso cash transfer could only purchase about 73 percent of the in-kind basket. This discrepancy arose because the government set the cash transfer equal to their wholesale cost of purchasing the in-kind food basket, which was about 150 pesos per box. In order to make the policy-relevant comparison to equal-valued transfers, I extrapolate from observed program effects under cash transfers in the parametric analysis below (details to follow).

3.4 Eligibility and receipt of the aid

Information on the receipt of the program was self-reported by households in the post-intervention survey. Approximately 88 percent of surveyed households in cash and in-kind villages reported having received PAL transfers; one control household reported receiving the program.[12] On average, households report receiving about 12 months of aid

[10] 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 two to four, and 11.5 g/dL for ages five and six.

[11] It is unclear whether experimental households received canned tuna fish (weighing 0.35 kg) or canned sardines (weighing 0.8 kg). As the household food recall survey asks about these items jointly, I assume the mean weight and calories throughout.

[12] Unfortunately, program administrators do not have household-level records on eligibility for PAL or on the receipt of transfers during the roll-out of the program (the experimental years).

in between survey waves — an important factor in interpreting the cumulative effect of aid packages on child health.

While the main focus of this paper is comparisons between in-kind and cash transfers, comparisons with the counterfactual of receiving no transfer are also of interest. As I do not directly observe eligibility in the control group, I use a two-step process in order to identify the those households who would have been eligible for the program in experimental years.

First, I merge the survey data with administrative data identifying recipients of PAL transfers in control villages after the experiment concluded, in 2006. About 49 percent of control villages were incorporated into the program in 2006 and, importantly, control households were assigned to treatment using the same means test that determined eligibility for cash and in-kind households.[13]

Second, in the remaining 51 percent of control villages, I predict program eligibility using a matching procedure as follows: I first re-create the government's means test that was initially used to assign program eligibility. Specifically, I estimate a probit model that predicts observed program eligibility in the in-kind and cash treatment groups (combined) as a function of the same set of observable characteristics used in the government's means test (SEDESOL, 2001). I then use this fitted model to predict for each household in the remaining control villages the probability of being eligible for PAL. Finally, I assign the same percentage of control group households to treatment (88.4 percent) as are observed in the in-kind and cash groups. (Appendix Table A.3 contains the estimated marginal effects from the probit model and shows the characteristics used in the prediction exercise.)

In practice, the household characteristics poorly explain the receipt of PAL aid. The McFadden's adjusted R-squared of the probit model is 0.009, estimated marginal effects are economically small, and none are significantly different from zero. It appears as if the approximately 12 percent of ineligible households in in-kind and cash villages are indistinguishable from the eligible ones (this statement holds comparing other observable characteristics not used in the means test). It is beyond the scope of this paper to explain why the program is not well targeted in this population. One speculation is that the government eligibility index was created using the entire population of Mexico and thus does not predict poverty well for this sample, amongst the most disadvantaged and rural households. Regardless, I perform robustness analyses below and demonstrate that the choice of eligible control households does not affect any results, including the main comparisons of interest between cash and in-kind transfer groups.

[13] It is not clear why the other 51 percent were not incorporated into PAL in 2006. One possibility is that these villages became eligible to receive Progresa/Oportunidades instead.

3.5 Sample and baseline balance

The analysis uses only PAL recipient households in cash and in-kind villages and eligible households in control villages (identified as described above). Of the original 208 experimental villages, two could not be re-surveyed due to concerns for enumerator safety and six more are excluded for various reasons: two were incorporated in PAL prior to the pre-treatment survey; two villages were deemed ineligible for the experiment because they were receiving the conditional cash transfer program, *Oportunidades*, contrary to PAL rules; and two villages are geographically contiguous, potentially violating the Stable Unit Treatment Value Assumption (SUTVA)[14]. Observable characteristics of excluded villages are balanced across treatment arms (results available upon request). Of the remaining 200 villages, three received the wrong treatment (one in-kind village did not receive the program, one cash village received both in-kind and cash transfers, and one control village received in-kind transfers). I include these villages and interpret estimates as intent-to-treat estimates.

Household attrition was low; however, it was significantly higher for the control group (17.4 percent) than for the in-kind and cash groups (11.6 and 12.0 percent, respectively).[15] I exclude a small number of households that were missing more than half of the consumption variables, were missing individual-level data, or reported preparing a special meal in the food recall window (together 0.3 percent of the sample). In the child-level analysis, I exclude several children who have inconsistent ages across waves or have extreme outliers in consumption (together 0.5 percent of the sample). Further details on the construction of this sample are available in Appendix B.

Table 2 contains means, by treatment group, of household and village characteristics and suggests that the randomization was successful. Baseline characteristics are for the most part balanced across groups. Three variables do display significant differences across groups: household heads in the cash group are slightly less educated then heads in the in-kind group and the control; the cash group has more households that raise animals or farm than does the control; and in-kind villages are more likely to have a Diconsa store than control villages. Note that for the primary comparison of interest — between cash and in-kind treatments — only one variable is unbalanced at baseline, and with a significance level above 0.05.

Table 2 also demonstrates the sample is poor: monthly total consumption (food plus

[14]The contiguous villages are named "Section 3 of Adalberto Tejada" and "Section 4 of Adalberto Tejada," so they appear to be part of the same administrative unit.

[15]The difference in attrition rates between the in-kind and cash groups is strongly insignificant. Note these attrition statistics necessarily include ineligible households, as household eligibility is not observed prior to treatment.

non-food) per capita is about 480 pesos per month, or about 48 U.S. dollars. Furthermore, the budget share of food out of total consumption expenditure is large, at about 60 percent.

Table 3 contains means, by treatment group, for child level demographics and outcomes; none of the variables are significantly different across groups at the 10 percent level or below, again suggesting that the randomization was successful.

It is difficult to make absolute statements about child health from the consumption data, as the 24-hour food recall module could over- or understate actual consumption. Nonetheless, comparing caloric and micro-nutrient intake to RDAs (not shown) suggests that most children consume too few calories and that for many, those calories do not contain enough essential micro-nutrients. Specifically, 88 percent of children consume fewer than the RDA of calories, and 32, 47, and 41 percent of children are not consuming the RDA of iron, vitamin C, and zinc, respectively.

In terms of mesured health, about 12 percent of children were sick in the last week. Comparing weight and height with age-specific reference groups implies nine percent are under-weight and 18 percent are stunted (both defined as being less than two standard deviations below the mean). Finally, anemia, predominately caused by iron deficiency, is highly prevalent (22 percent) among children in the control group post-treatment.

4 Identification and empirical strategy

Theory predicts that only extra-marginal and binding in-kind transfers will induce differential consumption compared to an equal-valued cash transfer, and it is precisely this distortion that is of interest to a paternalistic government. Therefore, I first estimate the distribution across households of the extra-marginality of the PAL in-kind transfers (EM_n and EM_{Total} in equations 1 and 4) by comparing consumption choices of in-kind foods under the cash transfer to what would have been provided in-kind. Then, I estimate the extent to which the PAL transfers were non-binding (NB_n and NB_{Total} in equations 2 and 5) by comparing the distribution of consumption choices under the in-kind transfer to amounts actually provided.

Subject to two caveats, randomization ensures that the difference in means between the distributions of extra-marginal and non-binding transfers identifies the distortion effect of the in-kind transfers (EM_n and EM_{Total} in equations 3 and 6). The first caveat is that while EM_n and EM_{Total} are correctly identified under an equal-valued cash transfer, in practice the cash transfer could only purchase about 73 percent of the in-kind basket. It is difficult to adjust for this unequal value of the cash and in-kind transfers non-parametrically (a task more suited to a parametric analysis). However, if the in-kind foods are normal goods, the distribution of extra-marginal transfers provides an upper bound on

the degree of extra-marginality of the PAL transfers.

The second caveat is that household consumption is only observed for a one-week period at some time between receipt of in-kind transfers. Therefore, it is difficult to separate between the resale of in-kind goods (which detracts from the paternalistic motive) and storage or otherwise lumpy consumption (which supports the paternalistic motive, in that the household will at some point consume the goods).[16,17]

Theory also predicts that households will substitute away from substitutes and towards complements of distorting in-kind transfers. Therefore, I next turn to a parametric analysis which allows for a more compact comparison of average treatment effects on consumption for various aggregations of PAL and non-PAL goods. This estimation framework also facilitates a straightforward comparison of equal-valued transfers, as described below. Finally, I use this parametric framework to look for differential effects of transfer type on child nutrition and health.

Equal-valued transfers

I estimate the effect of equal-valued transfers as follows: Let $ATT(Cash)$, $ATT(IK)$, and $ATT(IK\text{-}Cash)$ refer to the average treatment effects on the treated under the cash treatment relative to the control, the in-kind treatment relative to the control, and the in-kind relative to the cash treatment, respectively. $ATT(Cash)$ are thus identified through the exogenous income shock and are local estimates of the slopes of Engel curves. Therefore, a first-order approximation of the average treatment effects of equal-valued cash transfers are identified through $ATT^{EQ}(Cash) = ATT(Cash) * \frac{Mean\,Basket\,Value}{Cash\,Transfer\,Amount}$. Likewise, $ATT^{EQ}(IK\text{-}Cash) = ATT(IK) - ATT^{EQ}(Cash)$ identifies the differential effects of equal-valued cash and in-kind transfers.

Note that this linear extrapolation incorporats an assumption that goods are not local necessities or luxuries; however, the small size of the extrapolation (about 2.5 percent of baseline household consumption) limits the magnitude of potential biases if these assumptions fail.[18] While the assumptions justifying linear Engel curves for consumption goods are relatively benign, it is perhaps less plausible to assume that Engel curves for health outcomes are linear; doing so would require additional assumptions about the shape of health production functions. As such, I do not extrapolate treatment effects for child

[16]This caveat limits the extent to which this exercise measures the "stickiness" or "flypaper" effect of the transfers for the household as a whole (Jacoby 2002; Islam and Hoddinott 2009).

[17]The survey does not identify the temporal difference between the survey date and the receipt of the PAL transfer with enough precision to permit exploration of heterogeneous treatment effects along this dimension.

[18]In related ongoing work, I estimate flexible income elasticites for the goods in the data in the framework of a formal demand system, and find that Engel curves are by and large linear. See also Attanasio et al. (2009) for evidence that food items in Mexico are neither strong necessities nor luxuries.

height, weight, sickness, and anemia prevelance. To the extent that health outcomes are increasing in income, pure treatment effects serve as upper bounds on the equal-valued in-kind over cash effects.

Estimation of average treatment effects on the treated

To improve efficiency, treatment effects are estimated using a difference-in-differences regression estimator:[19]

$$Y_{ijt} = \alpha + \gamma POST_t + \sum_{g=1}^{2} \delta_g GROUP_{gj} + \sum_{g=1}^{2} \beta_g \left(GROUP_{gj} * POST_t \right) + \mathbf{X}_j \lambda + \varepsilon_{ijt} \quad (7)$$

Y_{ijt} is the outcome for household or individual i in village j at time t, $POST_t$ is an indicator for the post-intervention survey, $GROUP_{gj}, g \in \{1,2\}$ are cash and in-kind treatment group indicators, and X_j is a vector of pre-intervention village characteristics that show slight imbalance at baseline: indicators for the presence of a Diconsa store in the village and the month of the interview. The estimated parameters $\widehat{\beta_g}$ identify average treatment effects on the treated for in-kind and cash groups, $ATT(IK)$ and $ATT(Cash)$, while their difference identifies $ATT(IK\text{-}Cash)$.[20] Standard errors are clustered at the village level.

[19] As treatment data comes from self-reports, identification of treatment effects on the treated through equation 7 necessitates the assumption that eligibility determines take-up uniquely. Four 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 time would have to be rather large for a household to decline the program due to the time commitment involved. Second, adverse stigma effects associated with participation (as in Moffitt, 1983) are unlikely in this context where over 90 percent of households receive the program. Third, evidence from *Oportunidades*, with a similar population to the PAL villages, shows that the take-up rate among eligible households was above 97 percent (Angelucci and De Giorgi, 2009). Finally, households were required to present their identification cards to receive aid packages and villages were only delivered enough packages to cover incorporated households, making it unlikely that ineligible households in fact received aid.

[20] In-kind and cash transfers, injected into partially closed economies, may effect prices — cash transfers through an income effect, and in-kind transfers through both income and supply effects. Estimates from equation 7 include both the direct effect of transfers and any such pecuniary effects. In related work (Cunha et al., 2012), we show that the pecuniary effects for PAL transfers are small: prices did not increase under cash transfers, while in-kind transfers cause the prices of transferred goods to fall by 3 to 4 percent. Combining the effects on both PAL and non-PAL goods (which are potential substitutes of PAL goods), we find modest general equilibrium effects in both in-kind and cash villages of equal magnitude (equivalent to an additional 5 percent of the transfer value).

5 Results

5.1 Extra-marginal and non-binding in-kind transfers

Are PAL in-kind transfers extra-marginal? It is important to first note that in terms of total food consumption, the in-kind transfer is infra-marginal for virtually all households. That is, under the 150 peso cash transfer no household consumes fewer than 150 pesos of food per month, and 0.01 percent of the sample consumes fewer than 205 pesos of food per month, the local value of the in-kind basket. However, there appears to be considerable over-provision for some individual PAL goods.

The solid curves in Figure 2 are empirical CDFs of monthly quantities consumed of each PAL item by post-transfer cash households (note the different scales on the horizontal axes); the samples are top coded at the 95^{th} percentile for expositional convenience. 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, $EM_n(\overline{q}_n)$. Evidently, many households do not consume the in-kind foods at all, even after receiving a sizable cash transfer. For example, powdered milk and canned fish are not consumed by about 82 percent and 76 percent of households, respectively.

Integration of each CDF from zero to the vertical line would provide an estimate of the average quantity over-provided for the sample as a whole. The intersection of the CDF and the vertical line identifies the percentage of over-provided households, or the extensive margin of over-provision. Some items, such as beans and oil, are over-provided to only a few households (9.6 percent and 10.2 percent, respectively) while others, such as milk powder and lentils, are over-provided to most households (90.2 percent and 87.1 percent, respectively).

The aggregate value of extra-marginal transfers for each household is obtained as in equation 4, using village level prices. However, 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 — this distribution is plotted as the solid kernel density in Figure 3.[21] Over-provision is obviously not limited to a subset of households.[22] This density estimates the extent to which the PAL in-kind food basket would distort consumption, if it was perfectly binding

[21] Algebraically, this 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 $\{p_{n,j}\}$.

[22] Aggregating by the number of items which are extra-marginal leads to a similar conclusion: 99.6 percent of households were over-provided with at least one good, while 53.3 percent were over-provided with five or more goods.

(that is, the entire transfer was consumed). On average, 62.3 percent of the transfer was extra-marginal (the solid vertical line). However, note that the variance across households is large implying the burden of over-provision varies across the population.

Are PAL in-kind transfers consumed? The paternalistic benefits of in-kind transfers are lessened to the extent that households do not consume what was provided. Subject to the caveat concerning the lumpiness of consumption throughout the month, the dashed CDFs in Figure 2 estimate the extent to which in-kind transfers were non-binding, plotting monthly post-transfer household consumption of in-kind goods by households in the in-kind group. Transfers are non-binding for households to the left of the vertical line, $\overline{q}_n$.

Infra-marginal transfers are by definition binding, so it is not surprising that the most infra-marginal items are those commonly consumed in large quantities, such as beans and oil. The three supplementary items, lentils, canned fish, and breakfast cereal are non-binding for most households (61 percent, 52 percent and 70 percent, respectively). Transfers of these items were small in quantity, suggesting that this lack of observed consumption may be a result of lumpy consumption over time; however, there is no way to rule out that the lack of consumption is due to inter-household transfers.

Aggregating across goods, $NB_{Total}(\overline{q}_1, \ldots, \overline{q}_{10})$, valued using village prices, is divided by the total village price of the basket and plotted as the dashed kernel density in Figure 3. At the mean, 34.5 percent of the transfer is non-binding. However, there is a large variance and the distribution is skewed left: 29.8 percent of the transfer is non-binding for the median household.

The distorting effect of PAL in-kind transfers. Aggregate distortion effects for individual food items are represented by the area between the solid and dashed CDFs in Figure 2. For example, the most distorting item is quite clearly milk powder, while the least distorting item is beans. Rice and oil appear to be rather non-distorting, while corn flour, cookies, canned fish, and lentils are somewhat more distorting.

The aggregate distortion effect of the in-kind basket is represented by the difference in means of the distributions in Figure 3; this difference is 27.9 percent of the value of the basket.[23] In level terms, in-kind PAL transfers forced households to consume on average 57.2 pesos (205.1×0.279) more of the 10 PAL food items than did the 150 peso cash transfer. This distortion is not trivial in magnitude, but neither is it as complete as perhaps would be ideal from the paternalistic donor's point of view.

[23] Note that randomization only identifies mean differences between the cash and in-kind groups; without stronger assumptions, we cannot match the distributions to answer the question of what would be consumed under a cash transfer by those who were most distorted by the transfer in kind.

5.2 Treatment effects on consumption

I now turn to examine how in-kind and cash transfers influenced household consumption of all consumer goods, both PAL and non-PAL.

5.2.1 Aggregate consumption

Table 4 contains estimates from equation 7 for four household-level outcomes, measured per capita: total consumption (food plus non-food), food consumption only, aggregate consumption of the 10 PAL foods, and non-food consumption only. The bottom half of Table 4 contains several extra statistics: the differential effect of in-kind and cash transfers as implemented, along with p-values from F-tests of their significant difference; estimates of $ATT^{EQ}(Cash)$; the predicted effects of a 205 peso cash transfer, and their standard errors; and the differential effects of equal valued in-kind and cash transfers, along with p-values from tests of their significant difference.

It is clear from column 1 that, as delivered, both cash and in-kind transfers significantly increased total consumption relative to no transfer, and that effect sizes are indistinguishable from one another (p-value = 0.77). Moreover, the increases in consumption would still be statistically indistinguishable if the cash transfer had been of equal monetary value to the in-kind basket. In-kind transfers increased total consumption by 60.7 pesos per capita, while an equal-valued cash transfer would have increased consumption by 73 pesos per capita.

Disaggregating, column 2 shows that we cannot reject the hypothesis that food consumption increased by the same amount under equal-valued transfer types: the difference between $ATT(IK)$ and $ATT^{EQ}(Cash)$ is a statistically insignificant four pesos. Importantly, however, households under both transfer types devoted the majority of their increased purchasing power towards food. Comparing across columns 1 and 2, food comprised 82 percent of the increase in total consumption for in-kind households and 63 percent of the increase for cash households.

Column 3 reiterates the results from the non-parametric analysis in the previous section. The increase in consumption of the 10 PAL foods (over the control) was significantly higher under the in-kind transfer than under the cash transfer (both as implemented and if they had been of equal value). Specifically, in-kind transfers induced an extra 48.8 pesos of consumption of in-kind foods per capita, while the cash transfer only induced an 8.7 peso per capita increase. The ratio of estimates in columns 2 and 3 is the percentage of the increase in food consumption that were on PAL foods: fully 99 percent of food increases for in-kind households were on in-kind goods, compared to about a quarter of that percentage, or 26 percent, under equal-valued cash transfers.

Column 4 shows that neither in-kind nor equal-valued cash transfers induced significant increases in non-food consumption compared to the control, although both point estimates are economically large. Comparing across treatments, the point estimates are not significantly different from one another (p-value = 0.36).

It is worth noting that treatment effects are relatively large compared to the value of the transfers. Scaling per-capita treatment effects in Table 4 up to the household level implies multiplier effects for total consumption of 1.28 (with a standard error of 0.59) and 1.53 (with a standard error of 0.93) for the in-kind and cash treatments, respectively. These large multipliers are not, in fact, surprising in light of similarly large multipliers from other transfer programs in Latin America.[24] One explanation (amongst many) for this multiplying effect is that households made profitable investments in physical capital not previously chosen due to either a lack of credit or a risk aversion profile that is declining in income. Furthermore, the large standard errors associated with both multipliers imply that I cannot reject the hypothesis that either is equal to unity.

Robustness of main results

The results above suggest that in-kind and cash transfers led to large increases in aggregate consumption of similar magnitude relative to the control. The majority of transfers were spent on food under both transfer types, and importantly, in-kind transfers did not induce significantly more food consumption than did an equal-valued cash transfer. I check the robustness of these main results in several ways.

First, the estimates of the absolute effects of receiving cash or in-kind transfers may be biased if the group of eligible control households I have identified and use in the analysis above are in fact ineligible. Guided by the fact that Table A.3 suggests that eligibility for PAL within a village appears as-if randomly assigned, I re-run the main analyses using all control households as the counterfactual for eligible cash and in-kind households; results are displayed in columns 1 through 4 in Table 5. Perhaps not surprisingly, absolute consumption growth under in-kind and cash transfers is virtually the same as in when the matched eligible control group is used in Table 4.

Second, I show that the main results are not sensitive to excluding the in-kind group that was randomized out of receiving educational classes (yet in fact received the same number of classes as the group that was randomized in to receiving classes). Columns 5 through 8 of Table 5 contain the main results comparing only eligible in-kind plus

[24]For example, Gertler et al. (2012) 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 et al. (2001) find multipliers ranging from 1.5 to 2.6 from the Mexican cash transfer program to farmers, *Procampo*.

education households to cash plus education households and the matched-eligible control group, and again all point estimates change very little compared to Table 4.

5.2.2 Disaggregate consumption

Disaggregating further to individual food items allows me to explore whether the increase in consumption under 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 induced substitution amongst similar non-transferred goods.

Table 6 presents estimates of $ATT^{EQ}(Cash)$ and $ATT(IK)$ from equation 7, along with p-values from tests of their equality, for eight main consumption categories and several sub-categories. Tne main categories are mutually exclusive and exhaustive of the 61 food and 23 non-food categories included in the analysis, while the sub-categories are mutually exclusive and exhaustive of each main category. The categories are largely self-explanatory except for several "other" categories, which contain items that are consumed infrequently, if at all, by most households.[25] I discuss these categories in turn.

Fruits, Vegetables. Fruits and vegetables increased markedly under both transfer types, and the increases of 9.6 pesos per capita under the in-kind transfer and 18.1 pesos per capita under the equal-valued cash transfer are marginally distinguishable from each other at the 10 percent level. In fact, fruits and vegetables comprised a significant portion of the increase in food: about 19 and 25 percent under the in-kind and cash transfers, respectively. To the extent that fruits and vegetables improve health, this is certainly evidence against the paternalistic justification for in-kind transfers.

Grains, Pulses. Five of the 10 PAL goods are grain based (corn flour, rice, pasta, biscuits, and cereal) and Table 6 shows that consumption of each was significantly higher under in-kind transfers compared to both no transfer and to an equal-valued cash transfer. However, increases in *overall* grain consumption under both transfers types are similar in magnitude (p-value = 0.25), at 16.5 and 10.8 pesos per capita under in-kind transfer and equal-valued cash transfers, respectively. This is evidence that the in-kind transfers induced households to substitute away from other types of grains towards PAL in-kind grains, leading to only a slight distorting effect of the in-kind transfers for grains overall.

Two PAL goods are pulses, beans and lentils (the only pulses included in the food recall survey). Lentil consumption increased significantly under the in-kind transfer and

[25] "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 (pastelillos), fried chips (frituras), chocolate, and sweets (dulces). "Sweet drinks" includes soda, bottled fruit drinks, and fruit drink powder.

not at all under the cash tranfer. The small and insignificant increase in bean consumption reflects the earlier finding that bean transfers were largely infra-marginal.

Dairy, Animal, Fats. In-kind transfers of milk powder led to almost five times greater consumption of milk powder than what would have been consumed under an equal-valued cash transfer: 25.2 pesos versus 4.9 pesos per capita. At the same time, milk powder transfers induced households to substitute away from liquid milk, as evidenced by the 12.6 peso per capita decrease in liquid milk consumption. Overall, dairy consumption was about two times higher under the in-kind transfer compared to cash. If we believe dairy is an important determinant of child health, this evidence again suggests that we must examine program effects on health in order to justify transfers in-kind rather than in cash.

There is more evidence of substitution induced by the in-kind transfers amongst animal-derived foods and fats. In-kind canned fish transfers increased canned fish consumption by 4.7 pesos per capita relative to cash, but these households would have consumed more of other types of seafood under a cash transfer ($ATT^{EQ}(Cash)$ for seafood is 3.3 pesos, although not statistically significant). Fats are disaggregated to the PAL in-kind good oil and common oil substitutes, mayonnaise and lard. While the effects are small in economic magnitude, it appears that in-kind households substituted away from consumption of mayonaise and lard towards the oil they received in-kind.

Other food - Alcohol, Junk food. Paternalistic food transfers are often motivated by the fear that unconstrained cash transfers will be spent on vices, such as unhealthy food and drink, alcohol, and tobacco. The evidence in Table 6 suggests this fear is unfounded for the PAL cash transfers. The "Junk food and Sweet drinks" category contains candies, fried chips, soda, sweet cakes, and sweet fruit juices. There was very little increase in consumption of these goods under both in-kind and equal-valued cash tranfered, about 2 pesos per capita under each.

Neither transfer type induced significant increases in alcohol consumption. However, only five percent of households report consuming any alcohol at all and reported consumption is likely an underestimate of true alcohol consumption as the food-recall survey was usually answered by female head of the households who might not be aware of all alcohol purchases by other family members. Importantly, the size of any unmeasured program effects on alcohol consumption is limited by the fact that (more than) the entire transfer is already accounted for in other purchases.

Non-food goods - Tobacco, Medicine, Transportation. The large (although statistically

insignificant) increase in non-food consumption under the cash treatment, compared to the in-kind treatment, is concentrated in purchases of schooling inputs, medicine and hygiene products, and transportation. For example, increases in spending on medicine and hygiene products, which includes medicine, medical fees, and personal hygiene products, are of about the same magnitude as increases in consumption of fruits and vegetables. Tobacco, a non-food vice, is not significantly effected by either transfer type, although the noisy negative point estimates surprisingly suggest a negative income elasticity for tobacco.

5.3 Treatment effects on child nutrition and health

The final empirical analysis explores whether the small observed differences in consumption across transfer type led to meaningful changes in the health and nutrition of children. For each outcome other than anemia prevalance, I estimate equation 7 at the child-level. For anemia prevalence, I use a single-differenced version of 7 as data was only available post-treatment. All child-level models control for the gender of the child and including age fixed effects.

Nutrition. The Panel A of Table 7 presents $ATT(IK)$, $ATT^{EQ}(Cash)$, and p-values from tests of their equality for the levels of calories and micro-nutrients. Both in-kind and cash transfers increased caloric intake over the control, but the effects are not significantly different from one another (p-value = 0.45).

Despite modest increases in caloric intake, it appears the in-kind transfer, and to some extent the cash transfer, increased the intake of important nutrients amongst young children. The in-kind transfer significantly increased iron, vitamin C, and zinc consumption compared to the control. Equal-valued cash tranfers induced increases of similar magnitude (and even larger magnitude for vitamin C), however point estimates are imprecisely estimated. Comparing treatments, there are no significant differences between in-kind and equal-valued cash transfers on level increases in micro-nutrient consumption amongst children.

In order to assess the economic meaningfulness of the increases in nutrient intake, I consider as outcomes in Panel B indicators of whether a child consumed above the RDA. As the equal-valued extrapolation is not well-defined for the distribution of treatment effects, I report instead the observed treatment effects, $ATT(Cash)$; these estimates can be considered a lower bound on the effects of equal-valued transfers. The in-kind versus cash difference in percentage of children above the RDA for vitamin C is large (eight percentage points) and of marginal significance. Eleven and nine percentage points more children consumed above the RDA of iron and zinc, respectively, under the in-kind than

the cash transfer, and both differences are statistically significant.

This evidence suggests that paternalistic goal of in-kind transfers was fulfilled, at least in part. In-kind milk powder and corn flour were fortified with vitamin C, iron, and zinc, and children consumed more of these nutrients (although we do not know whether the nutrients came from the specific foods that were transferred in-kind). This evidence also suggests that cash transfers led to meaningful, albeit smaller, improvements in child nutrient intake. Comparing the two transfer types, however, the evidence is mixed. On one hand, we can not reject that equal-valued cash and in-kind transfers increased nutrient intake of the same amount. On the other, the increases under in-kind tranfers appear to be more meaningful, as measured by moving children's intake above the RDA; however, this last conclusion must be qualified by the fact that relative-to-RDA consumption comparisons compare un-equal valued transfers.

Health. Finally, I explore program effects on child health. Public policy should ultimately be concerned with changing the welfare of program recipients, not simply changing their consumption as an intermediate step. In the case of the PAL food transfers, the main welfare measures of interest are children's health. Column 1 in Table 8 pools all children and presents treatment effects for weight, height, sickness, and anemia; column 2 contains estimates for the youngest children, aged zero and one years old, for whom we may expect the health effects to be the greatest. As for relative-to-RDA consumption indicators, I do not extrapolate cash treatment effects for these outcomes: if health is increasing in income, $ATT(Cash)$ is likely a lower bound, and any positive effect of in-kind over cash is likely an upper bound.

As implemented, it does not appear that either the in-kind or cash transfer affected the weight of children. Relative to the control, point estimates of weight increases are small and insignificant both statistically and economically. For example, the positive point estimate of 0.1 kg for children of all ages under the in-kind transfer increases represent an increase of less than 1 percent over baseline weight. This result holds comparing all children (column 1) and only the youngest children (column 2).

Considering height for the entire sample of children, in-kind tranfers appear to have caused larger gains over cash: the difference between $ATT(IK)$ and $ATT(Cash)$ is 0.66 cm, significant at the 6 percent level. However, this increase is small in economic terms, representing only about a 1 percent increase over baseline. Further, it appears that the differential increase in height is concentrated amongst children aged two through six. For the youngest children, the in-kind and cash transfers lead to virtually the same increase in height of 0.58 cm.

The likelihood of being sick in the last month for all children decreased by 6 and 7 percentage points for in-kind and cash transfers, respectively. These decreases are not statistically significant, nor are they statistically different from one another, but they are economically significant, reflecting an approximately 15 percent decrease in sickness from baseline. The decreased sickness may be a result of the increased vitamin C intake, which has been shown to improve immune system function (Hemila, 1992). As with weight and height, similar and noisier estimates result for zero and one year olds.

Finally, while not statistically significant, the point estimates suggest that anemia prevalence was reduced by a similar amount under both treatments compared to the control (a 2 percent decrease under in-kind and a 4 percent decrease under cash); these are decreases in the prevalance of amenia of approximately 14 percent compared to the control. (This conclusion is robust to using blood hemoglobin levels, rather than anemia prevalence, as an outcome.) It appears that the rather large increase in the percentage of children that consumed above the RDA for iron under in-kind transfers (13 percentage points) did not translate into lower rates of anemia.

Taken as a whole, this evidence suggests that there is little differential effect on precisely measured indicators of child health after one year of treatment between PAL in-kind and cash transfers as implemented.

6 Distribution costs

While the main focus of this paper is to test whether the paternalistic motivation for transfers is justified, it is instructive to examine the differential distribution costs between cash and in-kind PAL transfers. Any paternalistic benefits of in-kind transfers must be compared to all differential costs, and high distribution costs of in-kind transfers is an oft-cited rationale for the use of cash.[26]

In-kind transfers, when goods are provided rather than vouchers, necessitate extra procurement, storage, and transportation costs, relative to cash. For PAL transfers during the experimental intervention, it proves difficult to account for non-distribution costs, such as salaries for staff to assemble the packages and operation costs for warehouses where the packages were made and stored, as these costs were borne by PAL's parent organization, Diconsa. Regardless, pure distribution costs of moving the goods to villages from Diconsa warehouses have been estimated to be about 30 pesos per box (Yarahuán,

[26]Corruption is another potential cost, and in-kind and cash transfers are certainly susceptible to different types of corruption, and to varying degrees. While I have no evidence on corruption under either PAL transfer type, discussions with program administrators suggest that corruption is not a large concern in this particular setting.

2006) — or 20 percent of the wholesale cost of the transfer to the government.

For similar reasons relating to the interconnectedness of PAL and Diconsa, specific information on the distribution costs of cash transfers is not available. However, PAL cash transfers were distributed in the same manner as Mexico's flagship cash transfer program, *Progresa/Oportunidades*, and we do have good evidence on distribution costs from this program. Specifically, Caldés et al. (2006) report that it costs 2.4 percent of the transfer amount in order to deliver cash to recipients (*Progresa/Oportunidades* transfer amounts are roughly similar in magnitude to PAL cash transfers). Applying this estimate to PAL implies a lower-bound on the extra distribution cost of in-kind over cash transfers of 17.6 percent of the transfer amount.

Importantly, small cash distribution costs and large in-kind distribution costs are not unique in the developing world. For example, Caldés et al. (2006) also report that large government cash transfer programs in Honduras and Nicaragua have distribution costs of about five percent of transfer amounts, while Ahmed et al. (2007) report that government cash and in-kind food transfers in rural Bangladesh about cost about 0.15 and 20 percent of transfer amounts, respectively. Regardless of any benefits of in-kind over cash transfers, these differences in distribution costs are too large to be ignored.

7 Conclusion

Transfers to the poor play an important role in the economies of developed countries; as lower-income countries develop, pressure for such redistributive transfers will likely increase. This paper highlights important issues in program design when policy-makers are concerned that unrestricted cash transfers will not be spent in a manner consistent with their paternalistic preferences. In the context of the Mexican government's food assistance program to the rural poor, the Programa de Apoyo Alimentario (PAL), I demonstrate how these issues can be examined through the use of detailed surveys of recipients and a properly designed experiment that randomly assigns in-kind and cash transfers.

For one, it is important to consider that in-kind transfers, compared to cash, may be a blunt policy instrument. First, in-kind transfers can be infra-marginal and thus have no effect on consumption; further, if transfers happen to be extra-marginal, recipients have an incentive to sell or trade away the overprovided goods; and even if extra-marginal transfers are consumed, recipients have an incentive to substitute away from similar non-transferred items.

I find that the PAL in-kind transfers have minimal differential effects on consumption compared to equal-valued cash transfers. In terms of overall food consumption, there was no differential effect between transfer types. For individual PAL foods, some were

extra-marginal and binding (such as powdered milk), but most were for the large part inframarginal (such as vegetable oil or rice). However, there is evidence that recipients, in the face of distorting transfers, substituted away from similar non-transferred foods.

Furthermore, it is imporant to consider that paternalistic preferences are most likely defined over outcomes other than the consumption of the in-kind goods *per se*, and that households may find it more efficient to achieve those outcomes through consumption of non-transferred goods. In the case of food transfers, policy-makers are most likely concerned with health outcomes, not the specific foods they supply. For PAL recipients, I find that cash was largely spent on nutritious foods such as fruits and vegetables, and on essential non-food goods such as medicine. It would be difficult to argue that these goods do not further the paternalistic preferences that drove in-kind provision.

Comparing child nutrition and health outcomes under in-kind and cash transfers, I find that after receiving tranfers for one year, the in-kind transfer did lead children to consume more iron and zinc, most likely as a result of greater consumption of the fortified powdered milk they received. However, there is little evidence that the increased consumption of iron and zinc let to differential short-term effects of cash and in-kind transfers on child health. The health effects of increased micronutrient consumption could appear in the longer run, however, I leave this question for future work since the available data do not allow for such an analysis.

Finally, it is clear that these poor, rural households did not indulge in vices (such as alcohol or tobacco) or non-nutritious foods upon receipt of unrestricted cash transfers. While it is unclear whether this finding generalizes to a setting with a greater supply of vices (say, in urban areas), this is an important finding that offers specific evidence to paternalistic policy-makers who fear such adverse effects of cash tranfsers.

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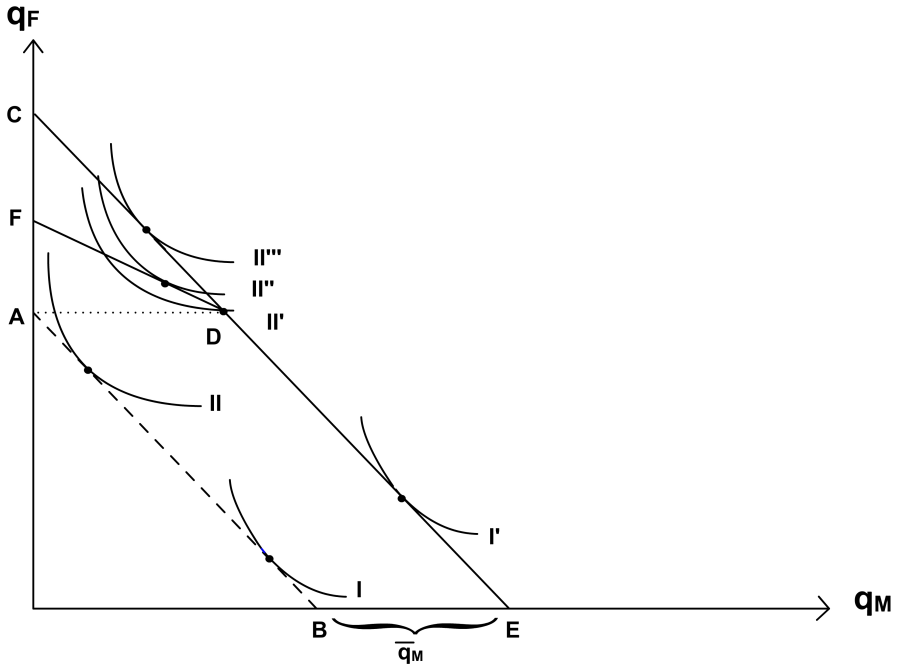
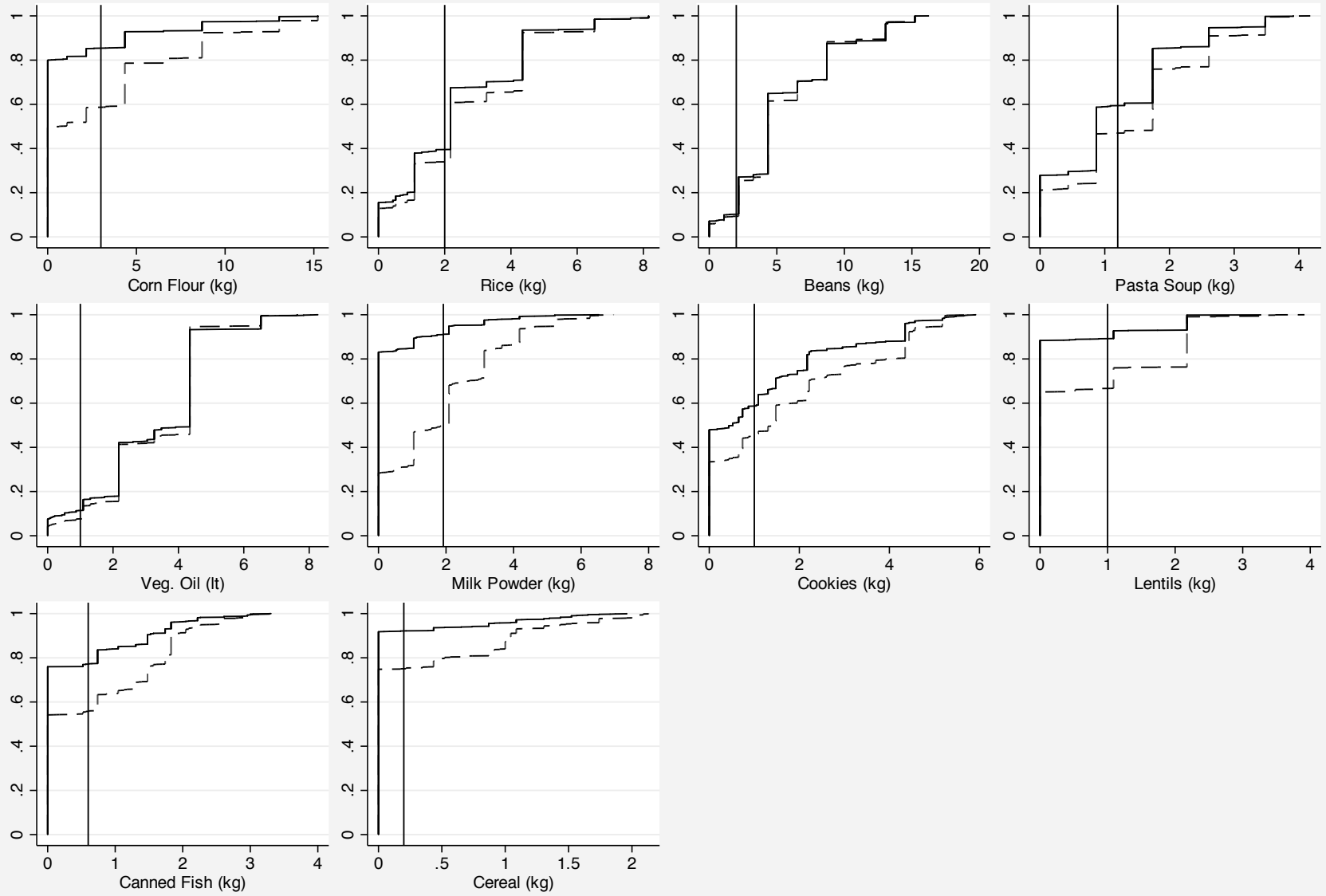
Figure 1: In-kind milk versus an equal-valued cash transfer.



In-kind transfers will only distort consumption, compared to an equal valued cash transfer, if the transfer is extra-marginal and resale is costly or prohibited.

Figure 2: CDFs of monthly household consumption quantities of PAL in-kind foods. [Solid = Cash households, Dashed = In-kind households]



Notes: Vertical lines denote in-kind transfer quantities. Data is actual consumption from treated, post-transfer households. The distribution of each good is truncated at the 95th percentile.

Figure 3: Kernel densities of monthly household consumption of the 10 PAL food items as a percentage of the monetary value of the basket. [Solid = Cash households, Dashed = In-kind households]

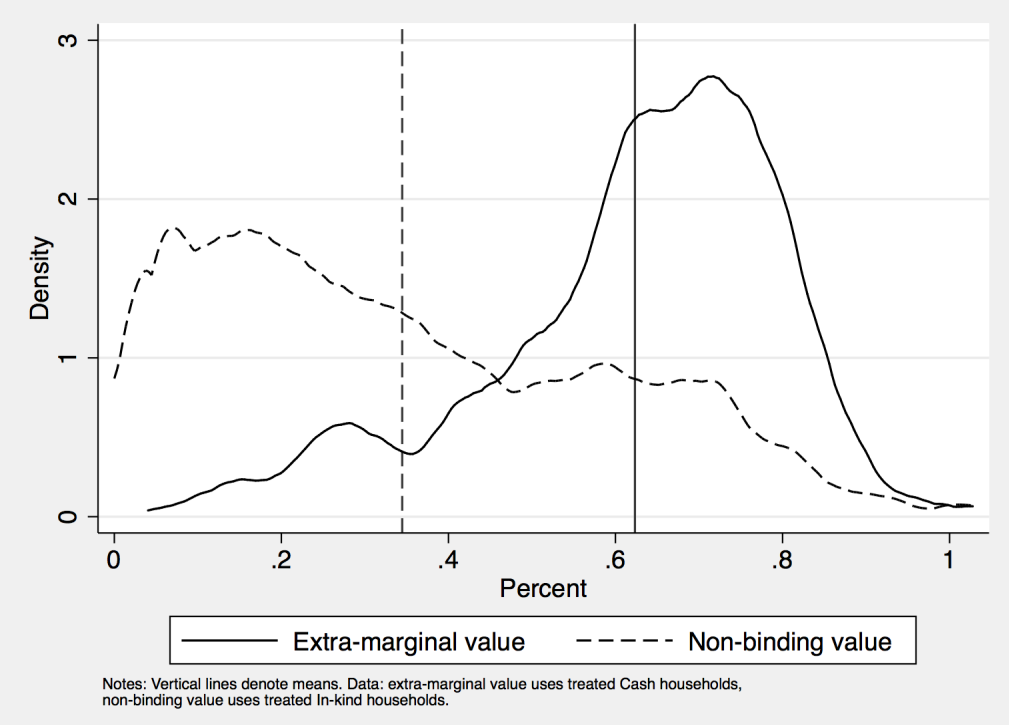


Table 1: Summary of PAL in-kind food box

Item	Type	Amount per box (kg)	Value per box (pre-program, in pesos)	Calories, as % of total box
	(1)	(2)	(3)	(4)
Corn flour	basic	3	15.5	20%
Rice	basic	2	12.8	12%
Beans	basic	2	20.8	13%
Fortified powdered milk	basic	1.92	76.2	17%
Dried pasta soup	basic	1.2	16.2	8%
Vegetable oil	basic	1 (lt)	10.5	16%
Biscuits	basic	1	18.8	8%
Lentils	supplementary	1	10.4	2%
Canned fish	supplementary	0.6	14.7	2%
Cereal	supplementary	0.2	9.3	1%
Total	--	--	205.1	100%

Notes:
(1) Value is calculated as the across village average of pre-treatment village-level median unit values. 200 villages included. 10 pesos ≈ 1 USD.
(2) It is unclear whether a household received canned tuna fish (0.35kg) or canned sardines (0.8kg); the analysis assumes the mean weight and calories throughout.

Table 2: Pre-treatment characteristics by treatment group

	Control	In-kind	Cash	Obs.	(1)=(2) p-value	(1)=(3) p-value	(2)=(3) p-value
	(1)	(2)	(3)		(4)	(5)	(6)
Household Characteristics							
Number of household members	4.68	4.59	4.53	4,706	0.57	0.39	0.70
	(0.12)	(0.10)	(0.12)				
Years of education of household head	4.50	4.35	3.96	4,703	0.53	0.03**	0.07*
	(0.18)	(0.14)	(0.16)				
House has a dirt floor	0.30	0.29	0.31	4,706	0.88	0.86	0.71
	(0.04)	(0.03)	(0.03)				
Indigenous household	0.19	0.17	0.13	4,706	0.75	0.33	0.38
	(0.06)	(0.03)	(0.04)				
Household raises animals or farms	0.30	0.37	0.43	4,706	0.13	0.01**	0.17
	(0.04)	(0.03)	(0.04)				
Village Characterictics							
Diconsa store in the village	0.30	0.45	0.40	4,706	0.09*	0.33	0.57
	(0.07)	(0.05)	(0.07)				
Local value of PAL in-kind basket	203.55	207.34	203.58	4,690	0.64	1.00	0.68
	(5.82)	(5.71)	(7.03)				
Household Consumption (monthly per capita)							
In-home food consumption	308.32	292.78	292.59	4,706	0.37	0.38	0.99
	(14.14)	(9.90)	(11.15)				
Non-food consumption	179.73	169.53	175.05	4,706	0.50	0.78	0.69
	(12.40)	(8.34)	(11.23)				
Out-of-home food consumption	14.91	12.47	11.56	4,706	0.29	0.21	0.68
	(1.94)	(1.26)	(1.80)				
Consumption of PAL in-kind foods	45.66	45.30	45.59	4,706	0.89	0.98	0.88
	(2.33)	(1.21)	(1.54)				

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) Includes treated households in in-kind and cash groups, and matched-eligible households in the control group (see text). Standard errors in parentheses are clustered at the village level, p-values in columns 4-6 are from F-tests of the equality of means.

(2) A household is defined as indigenous if at least one member speaks an indigenous language.

(3) Household consumption variables and the value of the PAL in-kind basket are in pesos.

(4) Food consumption is defined as the aggregate value of consumption of 61 food items, valued using village median unit-values.

(5) Non-food consumption is defined as the aggregate value of consumption of 23 non-food, non-durable goods.

(6) PAL in-kind food items include: corn flour, rice, beans, pasta soup, powdered milk, vegetable oil, biscuits, lentils, canned fish, and breakfast cereal.

Table 3: Pre-treatment child level characteristics by treatment group

	Control	In-kind	Cash	Obs.	(1)=(2) p-value	(1)=(3) p-value	(2)=(3) p-value
	(1)	(2)	(3)		(4)	(5)	(6)
Child demographics							
Age	2.99	3.07	3.08	3,280	0.28	0.35	0.91
	(0.06)	(0.04)	(0.08)				
Male	0.51	0.52	0.49	3,279	0.8	0.44	0.27
	(0.02)	(0.01)	(0.02)				
Child consumption							
Caloric intake, daily	864.84	840.43	827.55	1,711	0.45	0.3	0.66
	(26.69)	(17.50)	(23.98)				
Vitamin C consumption, mg daily	33.12	30.75	37.70	1,711	0.48	0.36	0.12
	(2.85)	(1.69)	(4.11)				
Iron consumption, mg daily	5.30	5.14	5.07	1,711	0.55	0.44	0.79
	(0.23)	(0.15)	(0.19)				
Zinc consumption, mg daily	4.01	3.88	3.66	1,711	0.67	0.27	0.23
	(0.04)	(0.03)	(0.04)				
Child health							
Weight (kg)	12.19	12.52	12.45	2,237	0.22	0.41	0.78
	(0.22)	(0.14)	(0.21)				
Height (cm)	84.95	85.89	85.65	2,189	0.29	0.51	0.79
	(0.72)	(0.51)	(0.77)				
Number of days sick in last four weeks	0.35	0.38	0.38	3,244	0.45	0.42	0.85
	(0.03)	(0.02)	(0.03)				
Sick in last four weeks	0.14	0.10	0.10	1,711	0.17	0.15	0.77
	(0.02)	(0.01)	(0.02)				
Hemoglobin level (g/dL)	2.38	--	--	3,244	--	--	--
	(0.26)						
Anemic	0.22	--	--	475	--	--	--
	(0.02)						

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) Includes children in treated households in in-kind and cash groups, and matched-eligible households in the control group (see text). Standard errors in parentheses are clustered at the village level, p-values in columns 4-6 are from F-tests of the equality of means.

(2) Child demographics: Sample includes ages zero to six.

(3) Child consumption: Sample includes ages one to four. Calories and micro-nutrients are converted from food intakes amounts collected in a 24-hour food recall, using a conversion table suggested by the Mexican government.

(4) Child weight and height: Sample includes ages zero to four.

(5) Child sickness: Sample includes ages zero to six. Sickness is self-reported by the survey respondent.

(6) Child hemoglobin level and anemia: Sample includes ages one to six in the post-treatment control group; data was not collected pre-treatment. Hemoglobin levels were measured from blood samples; they are altitude adjusted. A child is defined as anemic if altitude-adjusted hemoglobin levels are less than 11g/dL for ages two to four, and less than 11.5g/dL for ages five to six.

Table 4: Average treatment effects on treated households for aggregated consumption categories

Outcome =	Total consumption (food + non-food) per capita	Food consumption per capita	Consumption of PAL in-kind food items per capita	Non-food consumption per capita
	(1)	(2)	(3)	(4)
In-Kind	-30.97	-19.41	-1.87	-11.56
	(29.15)	(16.77)	(2.59)	(14.02)
Cash	-9.59	-13.43	-1.02	3.84
	(31.81)	(17.88)	(2.92)	(16.17)
POST	188.66***	79.74***	6.11***	108.92***
	(27.19)	(15.89)	(2.06)	(13.75)
In-kind x POST: ATT(IK)	60.71**	49.57***	48.83***	11.14
	(28.05)	(16.70)	(4.08)	(14.25)
Cash x POST: ATT(Cash)	53.76*	33.60*	8.65***	20.16
	(32.48)	(19.63)	(2.91)	(17.20)
Observations	9,553	9,553	9,553	9,553
Differential effect: ATT(IK) - ATT(Cash)	6.96	15.97	40.19***	-9.01
H_0: ATT(IK) = ATT(Cash), p-value	0.77	0.30	0.00	0.50
ATT^{EQ}(Cash)	72.96**	45.60**	11.74**	27.36
	(44.08)	(26.65)	(3.94)	(23.34)
***Differential effect:* ATT(IK) - ATT^{EQ}(Cash)**	**-12.24**	**3.97**	**37.10*** **	**-16.21**
H_0: ATT(IK) = ATT^{EQ}(Cash), p-value	**0.70**	**0.84**	**0.00**	**0.36**

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) All dependent variables vary at the household level and are measured in pesos. Standard errors in parentheses are clustered at the village level.

(2) All regressions include as village level controls an indicator for the presence of a Diconsa store in the village pre-treatment and indicators for the month of the interview.

(3) ATT^{EQ}(Cash) is defined as ATT(Cash) multiplied by ratio of the local value of the in-kind transfer to the cash transfer (see text).

(4) Column 2: Food consumption is defined as in-home food consumption of 61 food items, valued using village median unit-values, plus out-of-home food consumption.

(5) Column 3: PAL In-kind food items include: corn flour, rice, beans, pasta soup, vegetable oil, milk powder, biscuits, lentils, canned fish, and breakfast cereal.

(6) Column 4: Non-food consumption is defined as the value of aggregate consumption of 23 non-food, non-durable good.

Table 5: Average treatment effects, robustness to the use of alternative samples

	Sample: All control households, eligible in-kind households, eligible cash households				**Sample: Eligible in-kind plus education households, eligible cash households, matched-eligible control households**			
Outcome = Consumption per capita of	Food + non-food	Food	PAL food items	Non-food	Food + non-food	Food	PAL food items	Non-food
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
In-Kind	-31.78	-19.68	-1.36	-12.10	-21.85	-13.09	-1.78	-8.76
	(28.66)	(16.36)	(2.45)	(13.74)	(31.68)	(19.16)	(2.90)	(14.70)
Cash	-8.90	-12.82	-0.43	3.92	-10.21	-13.19	-1.13	2.99
	(31.06)	(17.32)	(2.80)	(15.79)	(31.66)	(17.75)	(2.91)	(16.15)
POST	195.95***	83.43***	7.11***	112.52***	197.18***	85.64***	6.10***	111.54***
	(27.63)	(16.94)	(2.18)	(13.05)	(29.11)	(17.02)	(2.20)	(14.67)
In-kind x POST: ATT(IK)	57.75**	48.17***	47.95***	9.58	73.25**	51.24**	46.50***	22.01
	(28.22)	(17.51)	(4.13)	(13.65)	(33.21)	(20.49)	(5.78)	(16.62)
Cash x POST: ATT(Cash)	49.38	31.39	7.62**	17.98	57.24*	34.00*	8.79***	23.23
	(32.72)	(20.42)	(2.96)	(16.67)	(33.89)	(20.42)	(2.92)	(17.81)
Observations	10,006	10,006	10,006	10,006	7,041	7,041	7,041	7,041
Differential effect: ATT(IK) - ATT(Cash)	8.37	16.77	40.33***	-8.40	16.01	17.23	37.71***	-1.23
H_0: ATT(IK) = ATT(Cash), p-value	0.73	0.28	0.00	0.53	0.59	0.36	0.00	0.94
ATT^{EQ}(Cash)	67.02**	42.61**	10.35**	24.41	77.68*	46.15**	11.93***	31.53
	(44.41)	(27.71)	(4.01)	(22.63)	(46)	(27.71)	(3.96)	(24.17)
***Differential effect:* ATT(IK) - ATT^{EQ}(Cash)**	**-9.27**	**5.56**	**37.61*** **	**-14.83**	**-4.44**	**5.09**	**34.58*** **	**-9.52**
H_0: ATT(IK) = ATT^{EQ}(Cash), p-value	**0.77**	**0.78**	**0.00**	**0.40**	**0.91**	**0.83**	**0.00**	**0.64**

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) All dependent variables vary at the household level and are measured in pesos. Standard errors in parentheses are clustered at the village level.

(2) All regressions include as village level controls an indicator for the presence of a Diconsa store in the village pre-treatment and indicators for the month of the interview.

(3) ATT^{EQ}(Cash) is defined as ATT(Cash) multiplied by ratio of the local value of the in-kind transfer to the cash transfer (see text).

(4) For outcome variable definitions, see notes to Table 5.

Table 6: Average treatment effects on treated households for disaggregated consumption categories

	Main category	Sub-categories						
	Fruit & Vegetables	Fruit	Vegetables					
ATT(IK)	9.61**	5.51**	4.12**					
	(3.91)	(2.56)	(1.89)					
ATT^{EQ}(Cash)	18.10**	9.52**	8.58***					
	(6.46)	(4.37)	(2.96)					
ATT(IK) = ATT^{EQ}(Cash), p-value	0.08*	0.23	0.05*					
	Grains	Corn flour†	Corn kernels & Tortillas	Rice†	Pasta†	Biscuits†	Cereal†	Other grains
ATT(IK)	16.50***	2.77***	-0.08	0.83**	1.80***	6.90***	4.14***	0.21
	(3.55)	(0.67)	(2.09)	(0.32)	(0.34)	(0.93)	(0.84)	(1.07)
ATT^{EQ}(Cash)	10.78*	0.16	5.13	-0.23	-0.05	4.53***	0.15	1.04
	(5.65)	(0.91)	(4.03)	(0.48)	(0.47)	(1.16)	(0.82)	(1.63)
ATT(IK) = ATT^{EQ}(Cash), p-value	0.25	0.00***	0.15	0.00***	0.00***	0.02**	0.00***	0.52
	Pulses	Beans†	Lentils†					
ATT(IK)	2.41***	0.27	2.06***					
	(0.78)	(0.73)	(0.22)					
ATT^{EQ}(Cash)	0.90	0.65	0.14					
	(1.07)	(1.02)	(0.24)					
ATT(IK) = ATT^{EQ}(Cash), p-value	0.08*	0.63	0.00***					
	Dairy	Milk powder†	Liquid milk	Cheese & Yogurt				
ATT(IK)	12.59***	25.16***	-12.64***	0.63				
	(3.96)	(2.46)	(2.68)	(1.36)				
ATT^{EQ}(Cash)	5.94	4.90***	-0.89	2.25				
	(5.80)	(1.44)	(4.19)	(2.28)				
ATT(IK) = ATT^{EQ}(Cash), p-value	0.16	0.00***	0.00***	0.36				
	Animal	Chicken	Beef & Pork	Seafood	Canned fish†	Eggs	Other animal	
ATT(IK)	4.32	-0.99	2.27	-0.55	4.71***	-0.92	0.26	
	(4.51)	(2.04)	(1.50)	(1.88)	(0.63)	(0.60)	(3.51)	
ATT^{EQ}(Cash)	5.61	0.81	1.53	3.34	1.64*	-1.15	0.77	
	(7.12)	(3.15)	(2.38)	(3.61)	(0.84)	(0.94)	(5.49)	
ATT(IK) = ATT^{EQ}(Cash), p-value	0.82	0.51	0.69	0.21	0.00***	0.77	0.91	
	Fats	Oil†	Mayonnaise & Lard					
ATT(IK)	0.45	0.82	-0.36					
	(0.73)	(0.57)	(0.36)					
ATT^{EQ}(Cash)	0.59	-0.14	0.72					
	(1.13)	(0.78)	(0.61)					
ATT(IK) = ATT^{EQ}(Cash), p-value	0.87	0.08*	0.04**					
	Other food	Other starch	Alcohol	Coffee	Sugar	Junk food & Sweet drinks		
ATT(IK)	1.78	0.97**	1.31	-2.20*	-0.05	2.24		
	(4.68)	(0.46)	(1.51)	(1.23)	(0.56)	(3.13)		
ATT^{EQ}(Cash)	0.42	1.49**	1.99	-4.60**	0.40	2.53		
	(7.01)	(0.70)	(2.35)	(1.87)	(0.89)	(4.76)		
ATT(IK) = ATT^{EQ}(Cash), p-value	0.79	0.35	0.71	0.12	0.50	0.93		
	Non-food	School	Medicine & Hygiene	Transpor-tation	Clothes	Household items	Tobacco	Toys
ATT(IK)	11.14	3.21	5.68	-1.34	0.31	3.30	-0.53	0.48*
	(14.25)	(3.70)	(5.27)	(5.42)	(1.93)	(4.72)	(0.51)	(0.28)
ATT^{EQ}(Cash)	27.36	7.69	14.60	1.06	0.72	4.30	-1.29	0.33
	(23.34)	(6.14)	(10.06)	(8.41)	(2.94)	(7.30)	(0.82)	(0.42)
ATT(IK) = ATT^{EQ}(Cash), p-value	0.36	0.35	0.30	0.68	0.85	0.85	0.21	0.59

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) ATT(IK) are from OLS estimation of Equation 7; ATTEQ(Cash) is from a linear extrapolation of ATT(Cash) (see text). Dependent variables are expenditure per capita in the given category, they vary at the household level, and they are measured in pesos. All regressions include as village level controls an indicator for the presence of a Diconsa store in the village pre-treatment and indicators for the month of the interview.

(2) The seven main categories of food are mutually exclusive and exhaustive subsets of the 61 food variables collected in the seven-day food recall. Sub-categories are mutually exclusive and exhaustive subsets the respective main category.

(3) Standard errors in parentheses are clustered at the village level. Sample sizes range from 9,363 to 9,553. † indicates in-kind item.

Table 7: Average treatment effects on child caloric and nutritional intake

	Panel A			*Panel B*	
	Outcomes = Daily consumption			*Outcomes* = 1[Consumption is greater than RDA]	
Calories	ATT(IK)	103.16**	**Calories**	ATT(IK)	0.05*
		(43.53)	(> RDA)		(0.03)
	ATT^{EQ}(Cash)	61.40		ATT(Cash)	0.04
		(71.09)			(0.03)
	H_0:ATT(IK)=ATT^{EQ}(Cash), p-value	0.45		H_0:ATT(IK)=ATT(Cash), p-value	0.35
Vitamin C	ATT(IK)	22.15***	**Vitamin C**	ATT(IK)	0.24***
(mg)		(4.66)	(> RDA)		(0.04)
	ATT^{EQ}(Cash)	35.51		ATT(Cash)	0.16***
		(12.87)			(0.05)
	H_0:ATT(IK)=ATT^{EQ}(Cash), p-value	0.29		H_0:ATT(IK)=ATT(Cash), p-value	0.11
Iron	ATT(IK)	1.61***	**Iron**	ATT(IK)	0.13***
(mg)		(0.42)	(> RDA)		(0.04)
	ATT^{EQ}(Cash)	1.10		ATT(Cash)	0.02
		(0.65)			(0.05)
	H_0:ATT(IK)=ATT^{EQ}(Cash), p-value	0.34		H_0:ATT(IK)=ATT(Cash), p-value	0.01**
Zinc	ATT(IK)	1.40***	**Zinc**	ATT(IK)	0.16***
(mg)		(0.36)	(> RDA)		(0.06)
	ATT^{EQ}(Cash)	1.14		ATT(Cash)	0.07
		(0.49)			(0.06)
	H_0:ATT(IK)=ATT^{EQ}(Cash), p-value	0.47		H_0:ATT(IK)=ATT(Cash), p-value	0.08*

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) Sample includes children aged one to four in the baseline, and two to six in the followup. Data is from the 24-hour food recall module.

(2) Panel A: The independent variables are consumption levels. The effect of equal-valued cash transfers is reported. Sample sizes range from 3,177 to 3,208.

(3) Panel B: The independent variables are indicators of whether consumption is above the Recommended Dietary Allowance (RDA). No extrapolation is made to compare equal-valued transfers. All sample sizes equal 3,239.

(4) ATT(IK) and ATT(Cash) are from OLS estimation of Equation 7; ATT^{EQ}(Cash) is from a linear extrapolation of ATT(Cash) (see text).

(5) All regressions include baseline village level controls (the presense of a Diconsa store and month of interview indicators), age dummies, and a gender dummy. Standard errors in parentheses are clustered at the village level.

Table 8: Average treatment effects on child health

		Sample	
		All ages	Ages 0 and 1
Outcome		(1)	(2)
Weight (kg)	ATT(IK)	0.10	-0.02
		(0.16)	(0.24)
	ATT(Cash)	-0.06	0.07
		(0.17)	(0.25)
	H_0:ATT(IK)=ATT(Cash), p-value	0.27	0.67
	Observations	5,277	1,606
Height (cm)	ATT(IK)	0.51	0.58
		(0.36)	(0.89)
	ATT(Cash)	-0.15	0.58
		(0.43)	(1.01)
	H_0:ATT(IK)=ATT(Cash), p-value	0.06*	0.99
	Observations	5,190	1,569
Sick in last month	ATT(IK)	-0.06	-0.03
		(0.05)	(0.06)
	ATT(Cash)	-0.07	-0.06
		(0.05)	(0.08)
	H_0:ATT(IK)=ATT(Cash), p-value	0.68	0.71
	Observations	6,435	1,678
Anemic	ATT(IK)	-0.02	--
		(0.03)	
	ATT(Cash)	-0.04	--
		(0.04)	
	H_0:ATT(IK)=ATT(Cash), p-value	0.68	
	Observations	2,139	--

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) Weight and Height: Sample includes children aged zero to four in the baseline, and zero to six in the followup.

(2) Sick in last month: Sample includes all children aged zero to six in both survey waves.

(3) Anemic: Sample includes only post-treatment data for children aged one to six; blood samples were not collected pre-treatment.

(4) All regressions: ATT(IK) and ATT(Cash) are from OLS estimation of Equation 7 (see text). Standard errors in parentheses are clustered at the village level.

(5) All regressions include baseline village level controls (the presense of a Diconsa store and month of interview indicators), age dummies, and a gender dummy.

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A The education treatment

This appendix details the unsuccessful randomization of PAL experimental villages into educational classes. The treatment was motivated by a desire to test if information on nutrition, hygiene, and health is complementary to the receipt of in-kind food transfers. In practice, the education treatment was contaminated as many households in the "no education" in-kind treatment group did in fact receive classes.

Data on class attendance was collected in the post-treatment survey; no administrative attendance data is available. 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 four themes from the choices of: organization of PAL, nutrition, health, and hygiene. Table A.1 contains attendance rates on the extensive and intensive margins, by treatment group. Columns 2 and 4 exclude attendance at introductory classes on the organization and operation of PAL, as every experimental village, regardless of treatment group, was instructed to hold these classes.

Several departures from the experimental design are of note. First, among households in the in-kind group that were not supposed to attend educational classes, 63 percent did in fact attend non-organizational classes (column 2). Second, of the households in the in-kind-plus-education and cash-plus-education groups that were supposed to receive educational classes, 25 and 33 percent, respectively, did not receive any non-organizational classes (again, column 2). Qualitative evidence from non-experimental regions in Mexico suggests that non-compliance with the educational component of PAL was not unique to the experimental villages (Rodríguez Herrero, 2005).

Third, column 3 shows that conditional on attendance to at least one class, the mean classes attended per household- between four and five classes - were insignificantly different across groups. This attendance pattern 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, it represents an attendance rate of about 40 percent. Column 4 shows that attendance is even lower - around four classes - upon excluding organizational classes.

Unfortunately, it is not possible to isolate why households did not attend more classes: whether they decided to not attend classes that were actually offered, or whether the classes were in fact not held by the Committee of Beneficiaries. In either case, the evidence strongly suggests that randomization into educational classes was not successful,

greatly reducing the usefulness of this part of the experimental design for causal inference.

B Sample and data

B.1 Sample

Excluding incomplete surveys and split-off households, the entire surveyed sample (including treated and untreated households) contains 6,706 baseline and 5,851 follow-up households in 208 villages. Excluding the eight villages as described in the paper drops an additional 306 baseline and 216 follow-up households. Thirty-five 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, 143 baseline households report that a meal was prepared in the last week for a special event. As this does not reflect normal consumption patterns, I exclude these baseline observations from all analyses.

Further excluding untreated households in the in-kind and cash groups and ineligible households in the control group (as described above) leaves 5,028 baseline and 4,923 follow-up households. I do not use data from any attrited households. About 10 percent of the remaining households are missing information on one or more food items and thus various empirical exercises use fewer observations.

The sample of children is formed from all included households, and includes 4,550 baseline and 4,129 follow-up children aged zero to six years old. 200 children have reported ages that are inconsistent across survey waves; they are dropped. When nutritional and caloric intake are used as outcomes, 363 children are dropped who consumed more than 2000 or less than 200 calories in the past 24 hours. When weight and height are used as outcome variables, 10 children are dropped who decrease weight or height across survey waves, and one child is dropped with an extreme weight outlier.

B.2 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). Thus, 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 and micro-nutrients consumed using a separate conversion table from the INSP.[27]

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. Households purchased an average of 15 items out of the 61 items asked about in the survey. The village level price is defined as the median observed unit-value in the village. Consumption values are thus the product of the quantity consumed and the village price. If I observe unit-values for fewer than 20 percent of households in a village, I use the municipality median unit-value to value consumption. If I do not observe a municipality unit value, I use the state median. Consumption in the follow-up is valued using baseline village unit-values.

B.3 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 convert 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 cannot value the informal rental agreements that are likely to be present in these rural villages. Furthermore, only one percent 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 by the fact that fewer than five percent of households report consumption on these items.

[27] 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.

Figure A.1: Villages in the PAL experiment

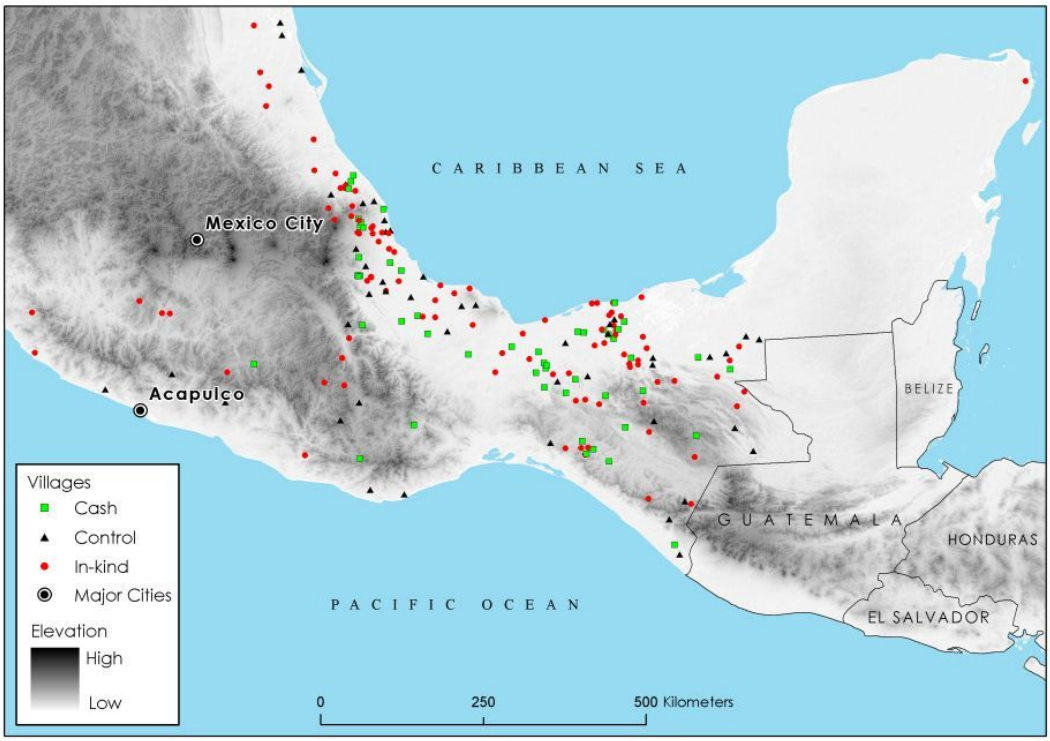

Table A.1: Receipt of education classes by treatment group

	Extensive margin		Intensive margin	
	Percent of housholds that attended one or more classes		Average number of classes attended, conditional on attending at least one class	
	Including Organizational Classes	Excluding Organizational Class	Including Organizational Classes	Excluding Organizational Class
Treatment Group	(1)	(2)	(3)	(4)
In-kind	0.76	0.63	4.16	3.73
	(0.03)	(0.04)	(0.43)	(0.43)
In-kind plus Education	0.85	0.75	5.03	4.63
	(0.02)	(0.02)	(0.33)	(0.34)
Cash plus Education	0.79	0.67	4.37	3.98
	(0.04)	(0.04)	(0.41)	(0.40)
Observations	3,785	3,785	3,549	3,549
***H_0:* In-kind = In-kind plus education, p-value**	**0.03****	**0.01****	**0.11**	**0.11**
***H_0:* In-kind = Cash plus education, p-value**	**0.59**	**0.44**	**0.73**	**0.68**
***H_0:* In-kind plus education = Cash plus education, p-value**	**0.16**	**0.10**	**0.21**	**0.22**

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) Sample includes all treated households in cash and in-kind villages.

(2) Class attendance is from self-reports collected in the post-treatment survey. Any household that reported receiving PAL aid (either cash or in-kind) was asked the total number of PAL classes attended. They were then asked to list up to four themes that were covered in those classes from the choices of: organization of PAL, health, hygiene, and nutrition.

(3) Columns 1 and 3 include all classes regardless of theme.

(4) In columns 2 and 4, one class is subtracted from the total number of classes attended if a household listed "organization" as a theme covered in classes; the in-kind only treatment group was supposed to attend organizational classes.

(5) Standard errors in parentheses are clustered at the village level.

Table A.2: Food and non-food goods used in the analysis, indicating PAL in-kind goods

	Goods used in analysis	PAL good
Fruit and Vegetables		
	Vegetables	
1	tomato	
2	onion	
3	potato	
4	carrot	
5	leafy greens	
6	squash	
7	chayote	
8	nopale (cactus)	
9	fresh chili	
10	tomato paste	
11	canned chilis	
	Fruit	
12	guava	
13	mandarin	
14	papaya	
15	oranges	
16	plantains	
17	apple	
18	lime	
19	watermelon	
Grains		
20	corn tortillas	
21	corn kernels	
22	corn flour	x
23	loaf of bread	
24	bread rolls	
25	sweet bread	
26	wheat flour	
27	dry pasta soup	x
28	wheat tortillas	
29	rice	x
30	biscuits (cookies)	x
31	breakfast cereal	x
Pulses		
32	beans	x
33	lentils	x
Dairy		
34	fortified powdered milk	x
35	milk (liquid)	
36	cheese	
37	yogurt	
Animal		
38	chicken	
39	beef and pork	
40	seafood (fresh)	
41	canned tuna / sardines	x
42	eggs	
	Other animal	
43	goat and lamb	
44	processed meats	
45	consome (broth)	
Fats		
46	vegetable oil	x
47	mayonnaise	
48	lard	
Other food		
49	alcohol	
50	coffee	
51	sugar	
	Other starch	
52	oats	
53	soy	
54	atole (corn based drink)	
	Junk food and drink	
55	pastelillo (snack cakes)	
56	corn or potato chips	
57	chocolate	
58	candy	
59	soft drinks	
60	fruit drinks	
61	powdered fruit drinks	
Non-food		
1	transportation	
2	toys	
3	tobacco	
	School	
4	school transportation	
5	school tuition	
6	school uniforms	
7	school shoes	
8	school supplies	
9	school fees	
	Clothing	
10	children's clothes	
11	children's shoes	
12	women's clothes	
13	women's shoes	
14	men's clothes	
15	men's shoes	
	Medicine and hygiene	
16	Medicine	
17	Doctor's fees	
18	Personal hygiene products	
	Household items	
19	Cleaning supplies	
20	Combustables (gas,wood, oil)	
21	electricity	
22	cookware	
23	linens	

Table A.3: Probit model predicting receipt of PAL aid in the in-kind and cash treatment groups as a function of pre-treatment characteristics

	In-kind and Cash treatment groups, pre-treatment	
Outcome =	Household received PAL aid	
	Marginal Effect	(s.e.)
Has dirt floor	-0.012	(0.015)
Has toilet inside the house	0.018	(0.015)
Household head has no education	-0.022	(0.024)
Household head has 1 to 5 years of education	0.001	(0.021)
Household head has 6 to 8 years of education	0.015	(0.019)
Age of household head	-0.001	(0.000)
Dependency ratio	0.004	(0.009)
Crowding index	-0.007	(0.005)
Has VCR	-0.022	(0.020)
Has a gas stove	0.024	(0.015)
Has a refrigerator	0.011	(0.014)
Has a washing machine	0.015	(0.016)
Has a car or motorcycle	0.005	(0.025)
Household head is male	0.010	(0.016)
Any household member receives Social Security	0.029	(0.038)
Number of children aged 5 to 15 not in school	0.011	(0.009)
Number of children under 12 years old	-0.011	(0.007)
Observations	4,280	
McFadden's Adjusted R-squared	0.009	
Sample probability of receiving PAL aid	88.4	

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) The included covariates are identical to those used by the Mexican government to assign eligibility for social programs.

(2) Sample includes all cash and in-kind households pre-treatment. Standard errors clustered at the village level.

(3) Reciept of PAL aid is self-reproted in the post-treatment survey.

(4) The dependency ratio is defined as the number of household members below 15 and above 65 years of age divided by the number of members between 15 and 65 years of age.

(5) The crowding index is defined as the number of household members divided by the number of rooms in the house (excluding hallways and bathrooms).

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B.1 Sample

Excluding incomplete surveys and split-off households, the entire surveyed sample (including treated and untreated households) contains 6,706 baseline and 5,851 follow-up households in 208 villages. Excluding the eight villages as described in the paper drops an additional 306 baseline and 216 follow-up households. Thirty-five 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, 143 baseline households report that a meal was prepared in the last week for a special event. As this does not reflect normal consumption patterns, I exclude these baseline observations from all analyses.

Further excluding untreated households in the in-kind and cash groups and ineligible households in the control group (as described above) leaves 5,028 baseline and 4,923 follow-up households. I do not use data from any attrited households. About 10 percent of the remaining households are missing information on one or more food items and thus various empirical exercises use fewer observations.

The sample of children is formed from all included households, and includes 4,550 baseline and 4,129 follow-up children aged zero to six years old. 200 children have reported ages that are inconsistent across survey waves; they are dropped. When nutritional and caloric intake are used as outcomes, 363 children are dropped who consumed more than 2000 or less than 200 calories in the past 24 hours. When weight and height are used as outcome variables, 10 children are dropped who decrease weight or height across survey waves, and one child is dropped with an extreme weight outlier.

B.2 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). Thus, 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 and micro-nutrients consumed using a separate conversion table from the INSP.[27]

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. Households purchased an average of 15 items out of the 61 items asked about in the survey. The village level price is defined as the median observed unit-value in the village. Consumption values are thus the product of the quantity consumed and the village price. If I observe unit-values for fewer than 20 percent of households in a village, I use the municipality median unit-value to value consumption. If I do not observe a municipality unit value, I use the state median. Consumption in the follow-up is valued using baseline village unit-values.

B.3 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 convert 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 cannot value the informal rental agreements that are likely to be present in these rural villages. Furthermore, only one percent 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 by the fact that fewer than five percent of households report consumption on these items.

[27] 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.

Figure A.1: Villages in the PAL experiment

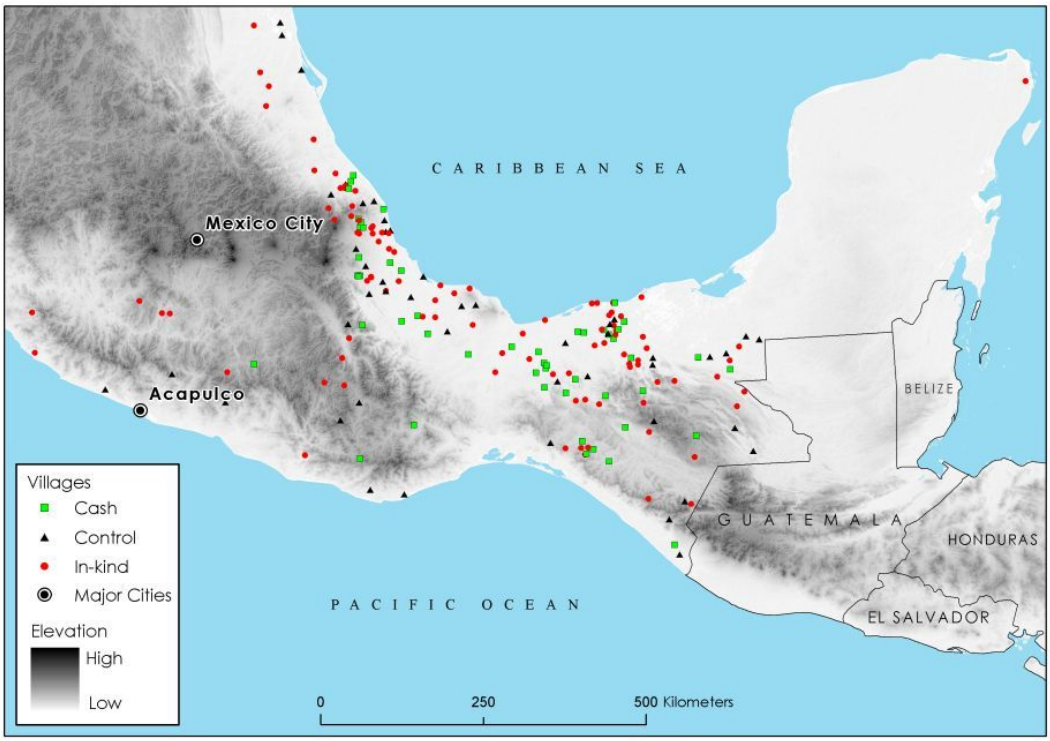

Table A.1: Receipt of education classes by treatment group

	Extensive margin		Intensive margin	
	Percent of housholds that attended one or more classes		Average number of classes attended, conditional on attending at least one class	
	Including Organizational Classes	Excluding Organizational Class	Including Organizational Classes	Excluding Organizational Class
Treatment Group	(1)	(2)	(3)	(4)
In-kind	0.76	0.63	4.16	3.73
	(0.03)	(0.04)	(0.43)	(0.43)
In-kind plus Education	0.85	0.75	5.03	4.63
	(0.02)	(0.02)	(0.33)	(0.34)
Cash plus Education	0.79	0.67	4.37	3.98
	(0.04)	(0.04)	(0.41)	(0.40)
Observations	3,785	3,785	3,549	3,549
***H_0:* In-kind = In-kind plus education, p-value**	**0.03****	**0.01****	**0.11**	**0.11**
***H_0:* In-kind = Cash plus education, p-value**	**0.59**	**0.44**	**0.73**	**0.68**
***H_0:* In-kind plus education = Cash plus education, p-value**	**0.16**	**0.10**	**0.21**	**0.22**

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) Sample includes all treated households in cash and in-kind villages.

(2) Class attendance is from self-reports collected in the post-treatment survey. Any household that reported receiving PAL aid (either cash or in-kind) was asked the total number of PAL classes attended. They were then asked to list up to four themes that were covered in those classes from the choices of: organization of PAL, health, hygiene, and nutrition.

(3) Columns 1 and 3 include all classes regardless of theme.

(4) In columns 2 and 4, one class is subtracted from the total number of classes attended if a household listed "organization" as a theme covered in classes; the in-kind only treatment group was supposed to attend organizational classes.

(5) Standard errors in parentheses are clustered at the village level.

Table A.2: Food and non-food goods used in the analysis, indicating PAL in-kind goods

	Goods used in analysis	PAL good
Fruit and Vegetables		
	Vegetables	
1	tomato	
2	onion	
3	potato	
4	carrot	
5	leafy greens	
6	squash	
7	chayote	
8	nopale (cactus)	
9	fresh chili	
10	tomato paste	
11	canned chilis	
	Fruit	
12	guava	
13	mandarin	
14	papaya	
15	oranges	
16	plantains	
17	apple	
18	lime	
19	watermelon	
Grains		
20	corn tortillas	
21	corn kernels	
22	corn flour	x
23	loaf of bread	
24	bread rolls	
25	sweet bread	
26	wheat flour	
27	dry pasta soup	x
28	wheat tortillas	
29	rice	x
30	biscuits (cookies)	x
31	breakfast cereal	x
Pulses		
32	beans	x
33	lentils	x
Dairy		
34	fortified powdered milk	x
35	milk (liquid)	
36	cheese	
37	yogurt	
Animal		
38	chicken	
39	beef and pork	
40	seafood (fresh)	
41	canned tuna / sardines	x
42	eggs	
	Other animal	
43	goat and lamb	
44	processed meats	
45	consome (broth)	
Fats		
46	vegetable oil	x
47	mayonnaise	
48	lard	
Other food		
49	alcohol	
50	coffee	
51	sugar	
	Other starch	
52	oats	
53	soy	
54	atole (corn based drink)	
	Junk food and drink	
55	pastelillo (snack cakes)	
56	corn or potato chips	
57	chocolate	
58	candy	
59	soft drinks	
60	fruit drinks	
61	powdered fruit drinks	
Non-food		
1	transportation	
2	toys	
3	tobacco	
	School	
4	school transportation	
5	school tuition	
6	school uniforms	
7	school shoes	
8	school supplies	
9	school fees	
	Clothing	
10	children's clothes	
11	children's shoes	
12	women's clothes	
13	women's shoes	
14	men's clothes	
15	men's shoes	
	Medicine and hygiene	
16	Medicine	
17	Doctor's fees	
18	Personal hygiene products	
	Household items	
19	Cleaning supplies	
20	Combustables (gas,wood, oil)	
21	electricity	
22	cookware	
23	linens	

Table A.3: Probit model predicting receipt of PAL aid in the in-kind and cash treatment groups as a function of pre-treatment characteristics

	In-kind and Cash treatment groups, pre-treatment	
Outcome =	Household received PAL aid	
	Marginal Effect	(s.e.)
Has dirt floor	-0.012	(0.015)
Has toilet inside the house	0.018	(0.015)
Household head has no education	-0.022	(0.024)
Household head has 1 to 5 years of education	0.001	(0.021)
Household head has 6 to 8 years of education	0.015	(0.019)
Age of household head	-0.001	(0.000)
Dependency ratio	0.004	(0.009)
Crowding index	-0.007	(0.005)
Has VCR	-0.022	(0.020)
Has a gas stove	0.024	(0.015)
Has a refrigerator	0.011	(0.014)
Has a washing machine	0.015	(0.016)
Has a car or motorcycle	0.005	(0.025)
Household head is male	0.010	(0.016)
Any household member receives Social Security	0.029	(0.038)
Number of children aged 5 to 15 not in school	0.011	(0.009)
Number of children under 12 years old	-0.011	(0.007)
Observations	4,280	
McFadden's Adjusted R-squared	0.009	
Sample probability of receiving PAL aid	88.4	

Notes: ***p<0.01, ** p<0.05, * p<0.1

(1) The included covariates are identical to those used by the Mexican government to assign eligibility for social programs.

(2) Sample includes all cash and in-kind households pre-treatment. Standard errors clustered at the village level.

(3) Reciept of PAL aid is self-reproted in the post-treatment survey.

(4) The dependency ratio is defined as the number of household members below 15 and above 65 years of age divided by the number of members between 15 and 65 years of age.

(5) The crowding index is defined as the number of household members divided by the number of rooms in the house (excluding hallways and bathrooms).