Cash, Conditions and Child Development: Experimental Evidence from a Cash Transfer in Honduras

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Abstract

We explore the effects of a randomly assigned conditional cash transfer in Honduras (*Bono 10000*) on early childhood development. We find significant impacts on cognitive development in children 0-60 months, with an average effect size of 0.13 SD. We show differential impacts by type of transfer: 0-5-year-old children from families receiving the "health" transfer, which targeted families with 0-5-year-old children only, benefited significantly from the program, whereas 0-5 year-olds in families receiving the "education" transfer, which targeted 6-18 year-olds, perceived no benefit. In comparison with other programs, the effect of this impact is sizeable (0.34 SD on average). Although the overall program appears to have slightly changed some behaviors that might affect children (i.e. decreased probability of maternal employment, and increased maternal self-esteem), we did not find heterogenous impacts of the *Bono* across these variables. Results are explained mainly by differences in conditions: while the "education" component imposed conditions only on children of schooling age, the "health" transfer required regular health checkups of 0-5 year old children. The "health" transfer families were more likely to attend health checkups, which may have induced behavior changes that improved children's health and cognitive development, including purchasing more nutritious food. These results imply that cash without well-targeted conditions attached, might not be as effective for the development of young children.

JEL codes: C93, J13, I25, I38

Keywords: Honduras, education, health, early childhood development, children, conditional cash transfers (CCTs), impact evaluation.

1. Introduction

Conditional cash transfer programs (CCTs) have been used in many settings to alleviate poverty and incentivize behavior changes in low income families. These behavioral changes mainly include increasing school attendance and improving medical services usage. Attaching conditions to the cash is intended to lower the opportunity cost of activities which promote human capital development as compared to labor, which ultimately increases the probability that households will grow out of poverty.

CCTs have been shown to have effects that extend beyond those directly implied by the conditions. The literature indicates that, in addition to affecting school attendance and frequency of health check-ups, CCTs impact other variables, such as adult labor supply, household consumption patterns, child nutrition, among others.

Nonetheless, debate remains about the direction of the effects, or lack thereof, and magnitude. In relation to child nutritional status, for example, evidence on the effects of CCTs is mixed (see Fiszbein and Schady 2009; Lagarde, Haines, and Palmer 2009; Araujo, Bosch and Schady 2016). The impact of CCT on other domains of child development (beyond nutrition) has been less studied. Changes, unintended or not, during sensitive and critical periods of early childhood will likely have a knock-on effect for the child later in their life. This study attempts to address this gap in the literature

There are many pathways through which cash transfers may impact child development. The improvements may be explained by an income effect - additional cash available to the household may allow parents to invest in a better home environment or to purchase goods that directly influence child development (i.e. more nutritious food, health care, books). A second mechanism may be that social marketing -which is sometimes part of the cash transfer program or conditions- may induce behavior change which results in better parenting practices, ultimately leading to improved child development. A third mechanism is that conditions pertaining to health or education depending on the age group may induce differing behavior. In this paper we study these hypotheses by analyzing the impact of a CCT implemented in Honduras - the Bono 10000 on child development. This program distributed cash to poor and extremely poor households.

We use data from the randomized evaluation of the program and show a significant improvement in younger children's human capital following the implementation of *Bono 10000*, as measured by scores on the Ages and Stages Questionnaire (ASQ) test administered to children under the age of 5. The program improves child development by 0.13 Standard Deviations (SD), mainly via an effect on communication skills (average effect of 0.18 SD). It also appears to have slightly changed certain behaviors that might affect children, such as decreased probability of maternal employment (Hil et al, 2005); and increased maternal self-esteem (Fernandez et al, 2008), although we did not find heterogenous impacts of the Bono across these variables. We did identify heterogeneous impact by type of transfer: the impact on children from families receiving the US$250 "health" transfer (targeting 0-5-year old without an older siblings and conditional on health check- ups) was 0.34 SD on average, with an even larger impact on the problem-solving domain (half a standard deviation). However, children from families receiving the US$500 "education" component of the transfer (targeting children between 6-18 years old and subject to school

attendance conditions) did not benefit at all. These differential results seem to be explained by differences in conditions. While the "education" component only imposed conditions on school-age children in the household, the "health" transfers required regular health checkups of the 0-5 years old children, for which we measured child development. The "health" transfer families were more likely to attend health checkups. This increased exposure to medical/paramedical advice may have encouraged healthy behavior, including a shift in spending towards more nutritious items, which may have contributed to the observed improvement in child health and cognitive development of 0.34 SD.

These results complement those presented in Benedetti et al. (2016), in which the authors analyzed the effects of *Bono 10000* on children between 6 and 17 years old, finding that the program resulted in increased school attendance of approximately four percent, while child labor participation slightly decreased. In line with our paper, the authors found that children between 0 and 5 years in the treatment group were more likely to be regularly weighed and attend checkups[1].

Our analysis builds upon and extends that of Benedetti et al. (2016) by further examining whether different conditionalities also affect young children's human capital outcomes. Benedetti et al. (2016) show that different household compositions reacted differently to the cash transfer, perhaps because the cash transfer was less binding in larger households due to the enforcement of the school conditions only for *one* 6-17-year-old in the household. Their analysis focuses only on intermediate outcomes such as school attendance, child labor and health services usage. A question not examined is whether the cash transfer has effects on human capital outcomes, particularly for younger children. We therefore extend the analysis to the younger children in the household (0-5 years of age) who received benefits *directly* through the cash transfer for health service usage or *indirectly* via the cash transfer subject to school attendance of their older eligible sibling. Our results also support the conclusion in Benedetti et al (2016) about the importance of conditions on program effectiveness.

The rest of the paper continues as follows. Section 2 presents the literature review, while section 3 presents the CCT program, the data in greater detail and the methodology that is used in the analysis. Section 4 presents the full results of the study with concluding remarks.

2. Literature review

As Bastegli et al. (2016) state in the most recent review of the literature, the evidence on the effect of cash transfers on child development is rather scarce and not particularly robust. Eight studies in Bastagli et al's meta-analysis reported on cognitive development outcomes. Out of these, only four papers reported a statistically significant effect: three focusing on Uganda and Nicaragua, where the authors found a positive and significant overall effect (see Table 7.7 in Bastagli et al, 2016), and one in Ecuador, where the transfer had positive effects only in a sub-group of children (infants and toddlers in rural areas). Given the heterogeneity in type of indicators used in each paper and the varying age groups on which they focus, it may be misleading to make comparisons of effect sizes.

Randomized evaluations from Ecuador and Nicaragua report robust estimates of the impact of cash transfer programs on child cognitive and language development. In Ecuador, the *unconditional Bono de Desarrollo Humano* (BDH) had a significant heterogeneous impact on cognitive and behavioral outcomes among children 36-59 months in the poorest households, with an effect size of 0.18 SD (Paxson and

[1] On the other hand, Benedetti et al. (2016) found no evidence that the treatment affected mothers' prenatal or postnatal use of health services.

Schady, 2010). For younger children treated at 12-35 months, the intervention resulted in more words being spoken at follow-up (Fernald and Hidrobo, 2011). In Nicaragua, the *Atención a Crisis* program improved the cognitive development, language, and behavior of children 0–5 years of age by 0.12 SD (Macours, Schady, and Vakis, 2012). *Red de Protección Social* (RPS), another CCT in Nicaragua, improved male children's achievement on cognitive assessments at age 10, but only if they were treated before turning one year old, as compared to those who were treated between 1 to 2 years old (Barham, Macours, and Maluccio, 2013). [2] Overall, the results on a positive impact of cash transfers on cognitive development outcomes are far from conclusive, which is perhaps to be expected as it is harder theoretically to link cash transfers to cognitive outcomes. Impacts will also heavily depend on the design of the transfers (amount of transfer, the target population, conditionalities and social marketing).

Particularly relevant to our findings, Benedetti et al. (2016) show that the program resulted in increased school attendance, while child labor participation slightly decreased. The authors found mixed results for health service use: children between 0 and 6 years in the treatment group were more likely to be regularly weighed and attend checkups, but the treatment did not seem to affect mothers' prenatal or postnatal use of health services.

3. Intervention, Data and Methodology

Bono 10000 was a CCT program introduced in Honduras in 2010. The aim of the program was to break the inter-generational cycle of poverty by promoting investments in the human capital of children in poor households. [3] Incentives were set to increase the usage of education and health services among these children.

The CCT was structured as two types of transfers: the educational transfer (*Bono Educacion*) provided a monetary transfer to eligible households with at least one child between the ages of 6 and 18 years old who had not completed ninth grade, only if she or he was enrolled in school. In households with two or more children in that age group, the program only required one of them to fulfil the condition in order to receive the transfer. The educational transfer amounted to 10,000 lempiras (US$500) per year, regardless of the number of eligible children in the household.[4] A typical household received per capita transfers equal to 18% of median per capita consumption (Glewwe and Olinto 2004; Galiani and McEwan 2013).

On the other hand, if a poor household was ineligible for this transfer (because there was no child between 6 and 18 years old in the household), it was entitled to the health transfer (*Bono Salud*), as long as there was a child aged 0 to 5-year-old in the household. The health component promoted demand for health services through an annual transfer of 5,000 lempiras (US$250), conditional on the child attending regular

[2] There were two studies in which no significant effect sizes were found for any measure of cognitive development, both of which evaluated the impact of the BDH unconditional cash transfer programme in Ecuador (Fernald and Hidrobo, 2011; Paxson and Schady, 2010). Fernald and Hidrobo (2011) find that while there were no significant effects of the programme on combining words and a language development test of the full sample, there was a statistically significant effect for infants and toddlers in rural areas on language development and ability to combine words. The authors suggest that this may be because of higher take-up in rural areas, or greater potential for impact of the educational elements of the program due to lower initial schooling levels of mothers. Parents of children in rural areas were also more likely to have ensured that their children received vitamin A or iron supplementation and were more likely to have bought their child a toy, all potential mechanisms that could explain the positive effect.

[3] Poor household was defined as one who (1) resided in a village declared as eligible by program administrators, based on poverty, and (2) were poor as defined by a proxy means test

[4] That means education conditions were not enforced for all eligible children in multi-children households

health check-ups, following Ministry of Health guidelines (at 1,2,3,6, 12 and 18 months and then once a year from age 2 onwards). As in the educational component, if there were two or more children in that age group in the household, only one of them had to fulfil the condition for the household to receive the transfer. The transfer amount for Bono Salud was independent of the number of children in the household who fell within the age group.

The *Bono 10000* was evaluated through an experimental design. The eligible units for the experimental evaluation consisted of 816 poor villages in Honduras where the government had not yet begun implementing the program. The evaluation sample was formed with 300 randomly selected villages, which were assigned to treatment and control groups (150 villages in each). A sample of households in each of those villages was randomly selected for a survey, but one village in the treatment group and three in the control group refused to participate. Thus, the final sample included 4,416 households in 296 villages (see Figure 1).

A baseline survey was conducted between January and June 2012, with a response rate of 96% (4,245 households). The questionnaire spanned a range of topics, including household assets, as well as individual characteristics of members such as education and labor market participation, and health of mothers and their children. A follow-up survey using the same questionnaire was conducted between March and June 2013, with a response rate of 89%. [5]

[Figure 1]

Table 1 presents the baseline treatment and control group mean for a set of household and individual characteristics. The first columns are calculated for the full sample, while in the last columns we restricted the sample to those households that were also present in the follow-up survey. As expected from the randomization process, treatment and control groups are balanced. Within the non-attritor subsample we only observe statistically significant differences in the proportion of dwellings with dirt floor, which is slightly larger in the control group (37% versus 34%), and in the number of members between 26 and 64 years old.

Households receiving the CCT have 5.2 members on average and a per capita income of 975 lempiras on average at baseline. In terms of access to services, 17% have access to piped water, 66% to electricity and 87% have a landline or a cell phone. The household head of treated households has on average 3.6 years of education. Children aged 5 to 18 living in the treated household have 3.9 years of education on average, and 73% were attending school during the baseline period.

[Table 1]

3.1. Child development measures

[5] Figure 1 shows selective attrition (89% for treatment villages vs. 85% for control). To assess whether nonrandom attrition introduced observed differences across treatment and control groups, Table A1 reports the marginal effects of a Probit regression of an indicator variable for attrition on a set of baseline observable characteristics. Apart from treatment status and the proportion of dwellings with dirt floor, estimates are not statistically significant and very close to zero, suggesting that attrition is uncorrelated to other observable characteristics of the household. Despite this, differential attrition raises the possibility of selection on unobservables. Therefore, and as a robustness check we estimated bounds based on a trimming procedure (Lee 2009); i.e., trimmed upper and lower bounds of the mean level in treatment and control groups. The bounds show positive, non-zero bounds, meaning that the interpretation of the results is not affected by attrition (results not reported but available upon request).

The Ages and Stages Questionnaire (ASQ-3) was applied to measure our outcomes of interest. ASQ-3 is a screening test that can be used for children between the ages of 1-66 months, with different questionnaires designed for each age bracket of the child. The ASQ is parent reported, and the 30 items can be completed by parents alone or administered by a trained assessor. The subscales measure skills in Communication, Gross Motor, Fine Motor, Personal-Social and Problem-Solving (similar to cognitive) domains. The questionnaires are divided into two- to three-month age intervals.

There are three possible responses for each item on the test: if children *always* exhibit a behavior as described in the questionnaire (i.e. "when playing with sounds, does your baby make low-pitched noises?") they score 10 points, while 5 points are scored if the child *sometimes* exhibits or performs the described behavior. If a child *never* exhibits the behavior expected in the item, he or she will score 0. Consequently, the maximum raw score is 60 for each subscale. Since fine motor skills were not measured in our survey, the maximum score is 240. Table 2 shows baseline scores by age and domain. Samples are balanced, the only statistically significant difference was in the problem-solving domain and the total scores for children between 36 and 47 months, and problem solving for 24-36 months old. On average, children in the treated households had a total score of 191.6 at baseline. Figures A1 show the raw ASQ score distribution by treatment status, while Figure A2 shows the same information by dimension. Figure A2 shows that deficits are largest in the problem-resolution scale, which is aligned with the international literature. For our regression, ASQ test scores were standardized using international standards.

[Table 2]

3.2. Methodology

The experimental nature of the data provides a credible identification strategy. Given the randomization at the village level, the treatment assignment is orthogonal to baseline observable and unobservable characteristics that may affect the outcomes. Therefore, we first present the mean difference in the follow-up period between control and treatment. In equation (1), Y_{ihj} represents the standardized outcome of child *i* in household *h* and village *j* measured at the follow-up period and T_j is a dummy indicator of whether the child lives in a treatment village. We also include a vector X_{ih} of individual and household characteristics at baseline.

$$Y_{ihj} = \alpha_0 + \alpha_1 T_j + \alpha_2 \mathrm{X_{ih}} + \varepsilon_{\mathrm{ij}} \quad (1)$$

To exploit baseline characteristics in some specifications, the sample is restricted to the panel of children aged 0 to 5 in households that were interviewed both in the baseline and follow-up surveys. Apart from average impacts, we also explore the presence of heterogeneous effects in different sub-groups of the population, by the interaction of treatment dummy and other individual and household level variables.

In each estimation, we report both original p-values and Romano and Wolf's (2005) stepdown adjusted p-values robust to multiple hypothesis testing.

4. Results

Our results indicate that the program has, on average, a positive effect on child development. According to the estimates presented in Table 3, once we control for multiple hypothesis testing*, Bono 10000* significantly increased ASQ scores by 0.13 SD (adjusted p-value=0.099) for 0-5-year-old children living in a treatment village (that is, either receiving the *Bono Education* or the *Bono Salud*) in relation to children

living in a control village. This effect was mainly driven by the communication domain: on average, the program increased the standardized scores in this domain by 0.18 SD (p-value=0.057). After adjusting p-values, we do not find significant impacts on any of the other domains (gross motor, personal-social skills or problem solving), which is consistent with the literature showing that language is one of strongest predictors of long term outcomes as well as one of the domains most sensitive to early childhood policy investment (Berlinski and Schady, 2015).

[Table 3]

We might consider three potential hypotheses to explain our results. Firstly, an income effect: the additional cash available to the household may have allowed parents to invest more in child-development enhancing activities and goods. Besides the material investments that the transfer allowed parents to make, an increase in their endowment may have reduced their levels of stress which, in turn, may have increased their time, willingness and capacity to interact with their children in an age-appropriate manner. However, after testing this hypothesis, as much as the program appears to have slightly changed some behaviors that might affect children (i.e. decreased probability of maternal employment, and increased maternal self-esteem, Table A2), we did not find heterogenous impacts of the Bono across these variables (Table A3). Moreover, we do not find impacts on other relevant material investments for children either (i.e. the *Bono* did not affect either health/education expenditures nor the consumption of certain types of nutritious foods -not reported). We do however discuss in section 4.2 how the Bono did change the consumption of certain types of nutritious foods for the "health transfer".

Secondly, behavioral change may have happened as a result of the social marketing associated with the transfers. If the program encouraged positive changes in parent behavior (buying books, buying playing material, etc.), we would expect these improvements in parenting practices should lead to enhanced child development outcomes. However, because there was no social marketing whatsoever, we can rule out this effect as well.

Thirdly, the two components of the Bono have different conditionalities and different target populations. Differing conditions imposed on families -*ceteris paribus*- will have accordingly differing effects on child development. Due to the presence of older children, households in the "education" arm received their transfer without any requirement to take specific actions with regards to their 0-5-year-old (i.e. the health conditions did not apply, nor were they mentioned to recipients). This could be a channel for the lack of impact of the "education" cash transfer on the outcomes of the 0-5-year-old children, as compared to those in the "health" arm. We explore this channel in sub-section 4.2.

4.1. Heterogeneous effects

To further explore possible heterogeneous effects of treatment by child characteristics, Table 4 presents the interactions between treatment status and type of transfer, age and gender. To facilitate reading, we only present the estimates, standard deviation and Romano Wolf p-value for the interaction terms.

[Table 4]

We do not find evidence of different impacts by gender, age group or household size.

4.2. How different types of transfers affect child development

As households could only receive one of the transfers – "Health" or "Education" (and were automatically disqualified for the lesser amount if they had an older child), an interesting discussion is which of the two transfers had higher effects on the 0-5 children. For instance, Benedetti et al. (2016) showed that health service usage was unchanged for children in households which received the "education" transfer. In Table 5, we find different effects for the different type of transfers. Firstly, the impact on children from families receiving the health transfer was 0.34 SD on average. All domains of development (except gross motor skills) were positively and significantly affected, with the largest impact on the problem-solving domain (half a standard deviation), even after controlling for multiple hypothesis testing. There are no significant effects associated with the "education" component of the transfer. [6] These two components differ on several dimensions: first, the subsidy amount is US$250 for households eligible for the health transfer, while it is double that amount for the education transfer. Second, they mandate different conditions - the conditions in the health component refer specifically to health controls of 0-5 years old children without older siblings, while conditions for the education component are related to school-age children. This difference in conditions is pivotal for this paper because as a consequence of these differing conditions, the "education" component would only affect small children *indirectly*.

Regarding the difference in terms of transfer amount, the question is whether households with older siblings are also much larger and therefore, even if the education component is larger, per capita income is smaller. The data rejects this hypothesis (Table A4): even if average household size for the education component households is 5.6, while for families with 0-5 years old it is 3.7, in per capita terms the education transfer is 33% larger (89.3 USD vs. 67.4 USD per capita for the health one).[7] We argue that positive correlations between the number of children and poverty rates effectively stack the deck against finding larger effects among children with no 6-18-year-olds siblings (i.e. in smaller families). In Honduras and elsewhere, the literature typically finds larger effects among poor households (Fiszbein and Schady, 2009; Galiani and McEwan, 2013). However, cash only seems to play a role when it is contingent on conditions. In Table A5, we compared the effect of the transfer on various types of items (food, health and education expenditures). The health transfer families are indeed purchasing more nutritious food, (such as milk and butter) and buying less harmful items (such as beer). Milk, for instance, is precisely the types of item that nurses, or doctors might recommend to buy to parents of young children in the checkup visits (the sole condition of the health component).

Table A4 also shows that families eligible for each version of the program are not similar either, not only in terms of household size, but also in terms of household composition and educational attainment. Abetted by the design of the intervention, the education component beneficiaries have on average 2.5 children aged 6-18, while those in the health component have none. This might organically have a direct impact on parent's time spent with each child. Additionally, 0-5-year-olds children in the health component are mostly first-borns, while 0-5-year-old children in the education component will not be.

[6] Running a pooled regression (not reported) with an interaction between treatment status and the "education" component shows us that first; both components have significantly different effects (with the interaction being very significant); and secondly, that the education interaction with treatment has a *sizable* negative significant effect, making clear that the results in Table 3 are being "commanded" by the majority of beneficiaries from the education component, and hence, the small average effects.

[7] Still, we have addressed this issue by including fixed effects for household sizes and children ages in Table 4, and then interacting continuous household size and age terms with the (heterogeneous) treatment effects (lines not reported in the table for the sake of clarity).

Unfortunately, there is neither time use nor home environment data for us to directly test these hypotheses (i.e. treatment generating more time spent with children due to fewer children in household and/or more time spent with first-order children). Years of education are also slightly different: the head of the household in the health component families has 1.1 more years of education than household heads in the other component. While years of education for the spouse of the health component is 1.4 more years of education than spouses in the education component.

We also looked at whether maternal employment status and maternal self-esteem indicators collected in the survey could possibly be channels for the impact in the health transfer. We found no effect of maternal employment in either of the two samples, neither for the health nor the education component. [8]

The different conditions attached to both interventions seem to provide the more plausible explanation. Conditions imposed specifically on health checks induced parents of younger children to increase their health care usage. Benedetti et al. (2016) show that the only statistically significant effects on health-service use occur in households with no children over the age of 5. In such households, the treatment increased the probability that a young child's last visit to a health center was a checkup by 7 percentage points, while the point estimate was smaller and statistically insignificant in households with one older child. [9] This increased access to health professionals may have influenced behaviors such as the spending shift towards more nutritious items, as well as other behaviors that could have resulted in healthier children and improved child cognitive development.

The aforementioned results could be generated by the differential application of conditionalities, however it is also plausible that simply labeling it a "health" transfer nudged households to seek medical care: for instance, a "labeled" cash transfer in Morocco—promoted as an education support program—produced large gains in attendance that were mostly unaffected by added conditions (Benhassine et al., 2015). Additionally, the education transfer might have pushed parents' attention to comply with the condition of the older child and, as a result, concentrate more attention on them rather than in the 0-5 siblings. The latter is consistent with the hypothesis of limited bandwidth of parents (Kalil, 2018).

5. Concluding remarks

Rigorous evidence on the effects of CCTs on child development is scarce. In this paper, by exploiting the original RCT design of the *Bono 10000* impact evaluation, we estimated the impact of living in a program village on the development of young children. This question was also left unexamined by previous literature on this specific CCT (Benedetti et al. [2016] and the papers therein).

We found an overall positive effect of the CCT, mainly driven by the improvements in the communication subscale of the ASQ-3 test. The magnitude of the overall impact is in line with previous research (Macours,

[8] After controlling for multiple hypothesis testing, we did find a positive effect of the health component in one of the items of the Rosemberg test of self-steem (the item was "do you feel you have some good qualities?"). Still, because the Rosemberg test had many missing observations, we do not have a comparable sample (N= 140 in this regression vis a vis 314 in the rest); and therefore, cannot attribute this to the transfer.

[9] Even so, note that the household transfer sharply increases from 5,000 to 10,000 with the addition of just one child 6 to 18 who enrolls in grades 1 to 9. This is hopelessly collinear with the application of the health condition, but we note that it dramatically stacks the deck against finding effects of stronger health conditions (presuming that demand for health services increases with income).

Schady, and Vakis, 2012), and the fact that communication is the most easily influenced domain is also aligned with research from Fernald and Hidrobo (2011).

The program appears to have slightly changed some behaviors that might affect children (i.e. decreased probability of maternal employment, and increased maternal self-esteem), however we did not find heterogenous impacts of the Bono across these variables.

Importantly, we found substantial differences by type of transfer, with no effect on the group receiving the "education" component, and a large effect on the ASQ-3 of the group receiving the "health" transfer. Problem-solving (the cognitive domain) was the main driver of the effect in the health group, pointing to an established fact in the literature: areas where children present the largest deficits are where the impacts are usually the greatest. This is also the domain with the largest variance at baseline (Fig A2).

The eligibility criteria of Bono 10000 introduced variation across households in the likelihood that children were subject to education or health conditions. Households with any number of children eligible for the "education" component received the transfer if at least one child was enrolled. Therefore, school-aged children in larger families had a smaller chance of being subject to a binding enrollment condition, while 0-5-year-olds did not have conditions imposed on them. Households with younger children were subject to the health conditions *in the absence of children eligible for the education transfer*. In a household with children under five and over five, none of the conditionalities of the transfer required any action to be taken with regards to the welfare of the 0-5-year-old, be it a 'health' label being promoted to the parent, or a condition mandating visits to the health center. The two types of subsidies encouraged different actions depending on the terms of the conditionalities, which may explain why we found differing effects on child development. On the one hand, the education condition may have caused parents to concentrate more on complying with the schooling condition instead of focusing on the youngest sibling in the household. On the other hand, it is a well-established fact in the literature that important outcomes, such as educational attainment, decline with birth order (Hotz and Pantano, 2013).

The relatively large impact on the "health" group could have also been due to tighter health check enforcement or a result of an increased attention to health care brought about by the "health" label of the transfer. Both explanations are consistent with the results of Benedetti et al. (2016), who show that children in this group were more likely to be regularly weighed and to attend checkups. In conclusion, the education component, with a larger per capita cash transfer but without conditions for the studied age group in this paper, did not improve child development, but the treatment offering less per capita but attaching age-specific conditions did. This paper's main contribution to Benedetti et al. (2016) analysis is two-fold: firstly, our paper focuses on human capital outcomes, as opposed to the intermediate outcomes they investigate (i.e. school attendance, child labor and health services usage). Secondly, we concentrate on the most relevant age period for human capital formation, that is, we look at the impacts on child development of very young children. Beyond evaluating the impact of a CCT on a rarely evaluated outcome (child development), this paper contributes to the literature on the positive relationship between the strength of conditions and final outcomes (Baird et al. , 2014).

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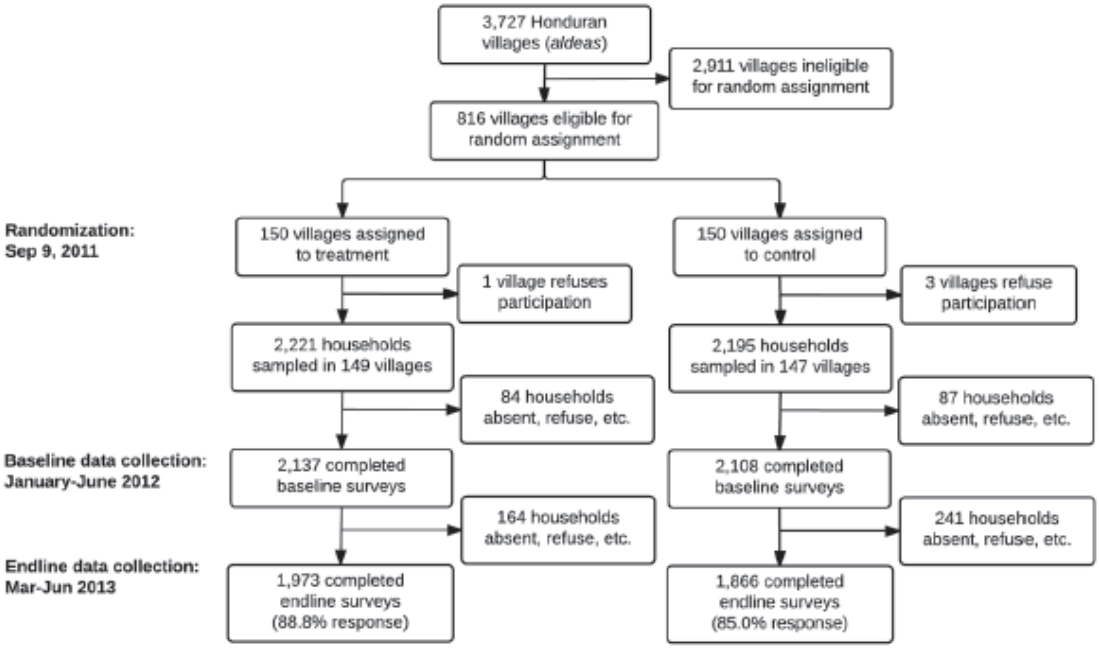
Tables and Figures

Figure 1: Bono 10,000 experimental design



Source: Benedetti et al (2016).

Table 1: Baseline characteristics of treatment and control groups:

	Households in baseline survey			Households in panel (i.e. baseline and follow-up surveys)			
	Mean control	Mean treatment	Diff.	Mean control	Mean treatment	Diff.	
N Households	2,098	2,134		1,767	2,000		
N Individuals	13,055	13,408		11,340	12,689		
% HH receiving education transfer	-	79.8		-	79.7		
HH characteristics							
Household size	5.29	5.22	-0.06	5.32	5.22	-0.10	
Number of members 0-5	0.84	0.82	-0.01	0.84	0.82	-0.02	
Number of members 6 to 18	1.99	1.98	-0.01	2.01	1.98	-0.03	
Number of members 19 to 25	0.61	0.62	0.01	0.62	0.63	0.01	
Number of members 26 to 64	1.72	1.68	-0.04	1.73	1.67	-0.05	*
Number of members older than 64	0.19	0.19	-0.01	0.19	0.19	0.00	
Years of education HH head	3.58	3.66	0.07	3.55	3.68	0.13	
Years of education spouse	4.00	4.05	0.05	4.00	4.03	0.03	
Dirt floor in dwelling (yes=1)	0.35	0.34	-0.01	0.37	0.34	-0.03	**
Piped water in dwelling (yes=1)	0.18	0.17	-0.02	0.18	0.17	-0.02	
Dwelling has bathroom or letrine (yes=1)	0.76	0.78	0.02	0.77	0.78	0.01	
Landline or cell phone access (yes=1)	0.85	0.87	0.02	0.85	0.87	0.01	
Individual characteristics (children 5-18)							
Male=1	0.52	0.52	0.01	0.52	0.52	0.01	
Age (in years)	14.91	14.32	-0.59	14.91	14.32	-0.59	
Literate=1	0.78	0.78	0.00	0.78	0.78	0.00	
Attends school=1	0.74	0.74	0.00	0.74	0.74	0.00	
Years of education	4.48	4.53	0.05	4.48	4.53	0.05	

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Mean ASQ-3 score and standard deviation at baseline: by age group and treatment status

Domains	Control	Treat.	Diff.	Control	Treat.	Diff.	Control	Treat.	Diff.
	0 to 11 months			12 to 23 months			24 to 35 months		
Communication	50.93	52.16		40.89	40.64		48.53	48.02	
	(12.61)	(10.22)		(14.38)	(15.13)		(11.81)	(13.03)	
Gross Motor	48.06	47.5		51.21	50.26		50.6	51.47	
	(13.28)	(14.1)		(12.74)	(13.48)		(12.75)	(12.36)	
Problem-solving	49.09	49.88		40.84	41.59		43.83	40.27	*
	(15.49)	(15.12)		(15.43)	(15.66)		(14.83)	(16.49)	
Personal-social	49.98	50.78		49.41	49.6		44.84	46.22	
	(11.62)	(10.5)		(11.55)	(10.97)		(13.01)	(12.19)	
ASQ	198.09	200.52		181.6	184.24		190.63	186.9	
	(38.97)	(35.35)		(40.01)	(40.43)		(40.72)	(41.24)	
Domains	Control	Treat.	Diff.	Control	Treat.	Diff.	Control	Treat.	Diff.
	36 to 47 months			48 to 60 months			0 to 60 months		
Communication	52.5	52.39		51.96	53.56		49.06	49.57	
	(10.17)	(9.18)		(11.17)	(9.85)		(12.88)	(12.52)	
Gross Motor	52.1	51.26		52.62	53.43		50.6	50.57	
	(11.11)	(10.66)		(11.73)	(10.84)		(12.67)	(12.63)	
Problem-solving	42.81	37.9	**	33.66	35.3		41.12	41.45	
	(15.59)	(18)		(15.67)	(17.62)		(16.77)	(17.12)	
Personal-social	46.48	46.52		48.19	47.36		47.79	48.2	
	(12.61)	(11.74)		(11.86)	(12.43)		(12.25)	(11.72)	
ASQ	200.04	189.11	**	188.71	189.51		188.63	190	
	(34.02)	(38.23)		(37.41)	(37.48)		(39.30)	(37.78)	

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Average impacts of Bono 10,000

	(1)	(2)	(3)	(4)	(5)
	ASQ	Communication	Gross Motor	Personal-Social	Problem-solving
Treatment	0.128 *	0.177*	0.047	0.12	0.165
	(0.056)	(0.069)	(0.078)	(0.063)	(0.081)
Control variables	Yes	Yes	Yes	Yes	Yes
Original p-value	0.024	0.01	0.55	0.058	0.042
Romano Wolf p-value	0.099	0.057	0.567	0.114	0.114
Observations	1,702	1,702	1,702	1,702	1,702
R-squared	0.054	0.041	0.014	0.044	0.148

Note: Control variables include sex, age groups (in months), household size, and dummy variables for the following dwelling characteristics: piped water, bathroom or letrine, electricity, landline or cell phone access, and dirt floor. All controls are measured at baseline. Treatment is whether the 0-5 child lives in a treatment village. Robust standard errors adjusted for clustering within villages. Bootstrap replications: 1,500. Note 2: *** p<0.01, ** p<0.05, * p<0.1

Table 4: Heterogenous effects of Bono 10,000

	Gender					Age				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	ASQ	Comm.	Gross-motor	Personal-social	Problem resolution	ASQ	Comm.	Gross-motor	Personal-social	Problem resolution
Treatment	0.118	0.185	-0.003	0.096	0.187	0.024	0.041	0.107	0.121	-0.143
	(0.071)	(0.087)	(0.099)	(0.085)	(0.110)	(0.119)	(0.149)	(0.174)	(0.151)	(0.229)
Treatment x gender (male=1)	0.022	-0.002	0.090	0.053	-0.046	-	-	-	-	-
	(0.078)	(0.094)	(0.120)	(0.102)	(0.135)	-	-	-	-	-
Treatment x age (in months)	-	-	-	-	-	0.003	0.004	-0.002	0.000	0.009
	-	-	-	-	-	(0.003)	(0.004)	(0.004)	(0.004)	(0.006)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Original p-value (treatment)	0.136	0.029	0.951	0.308	0.211	0.842	0.782	0.538	0.424	0.531
Romano Wolf p-value (treatment)	0.434	0.139	0.951	0.510	0.504	0.948	0.948	0.948	0.931	0.948
Original p-value (interaction)	0.7765	0.981	0.456	0.6046	0.731	0.308	0.305	0.66	0.9835	0.14
Romano Wolf p-value (interaction)	0.9853	0.985	0.960	0.9773	0.985	0.764	0.764	0.875	0.98	0.526
Observations	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702
	Household Size									
Treatment	0.113	0.255	0.035	0.093	0.050					
	(0.105)	(0.124)	(0.157)	(0.139)	(0.170)					
Treatment x HH size	0.003	-0.013	0.002	0.006	0.021					
	(0.018)	(0.021)	(0.025)	(0.024)	(0.029)					
Control variables	Yes	Yes	Yes	Yes	Yes					
Original p-value (treatment)	0.190	0.049	0.920	0.409	0.412					
Romano Wolf p-value (treatment)	0.563	0.217	0.923	0.794	0.794					
Original p-value (interaction)	0.861	0.533	0.95	0.8087	0.465					
Romano Wolf p-value (interaction)	0.9947	0.953	0.995	0.9947	0.953					
Observations	1702	1702	1702	1702	1702					

Note: Control variables include sex and age (in months) of the ASQ child, household size, birth order and dummy variables for the following dwelling characteristics: piped water, bathroom or letrine, electricity, landline or cell phone access, and dirt floor. It also includes indicators for levels of each variable in the triple interaction. All controls are measured at baseline. Robust standard errors adjusted for clustering within villages. Bootstrap replications: 1,500.

Table 5: Effects of Bono 10,000 by type of transfer

	Educational component				
	ASQ	Communication	Gross Motor	Personal-Social	Problem-solving
Treatment	0.082	0.141	0.022	0.076	0.082
	(0.060)	(0.072)	(0.080)	(0.071)	(0.087)
Control variables	Yes	Yes	Yes	Yes	Yes
Original p-value	0.246	0.074	0.889	0.356	0.438
Romano Wolf p-value	0.573	0.258	0.883	0.727	0.762
Observations	1388	1388	1388	1388	1388
	Health Component				
	ASQ	Communication	Gross Motor	Personal-Social	Problem-solving
Treatment	0.336***	0.362***	0.127	0.351***	0.519***
	(0.098)	(0.120)	(0.154)	(0.118)	(0.161)
Control variables	Yes	Yes	Yes	Yes	Yes
Original p-value	0.000	0.002	0.371	0.004	0.001
Romano Wolf p-value	0.001	0.007	0.358	0.005	0.008
Observations	314	314	314	314	314

Note: Control variables include sex and age (in months) of the ASQ child, household size, birth order and dummy variables for the following dwelling characteristics: piped water, bathroom or letrine, electricity, landline or cell phone access, and dirt floor. It also includes indicators for levels of each variable in the triple interaction. All controls are measured at baseline. Robust standard errors adjusted for clustering within villages. Bootstrap replications: 1,500.

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Appendix

Figures

Figure A1: Raw ASQ-3 scores distribution by treatment status. At baseline.

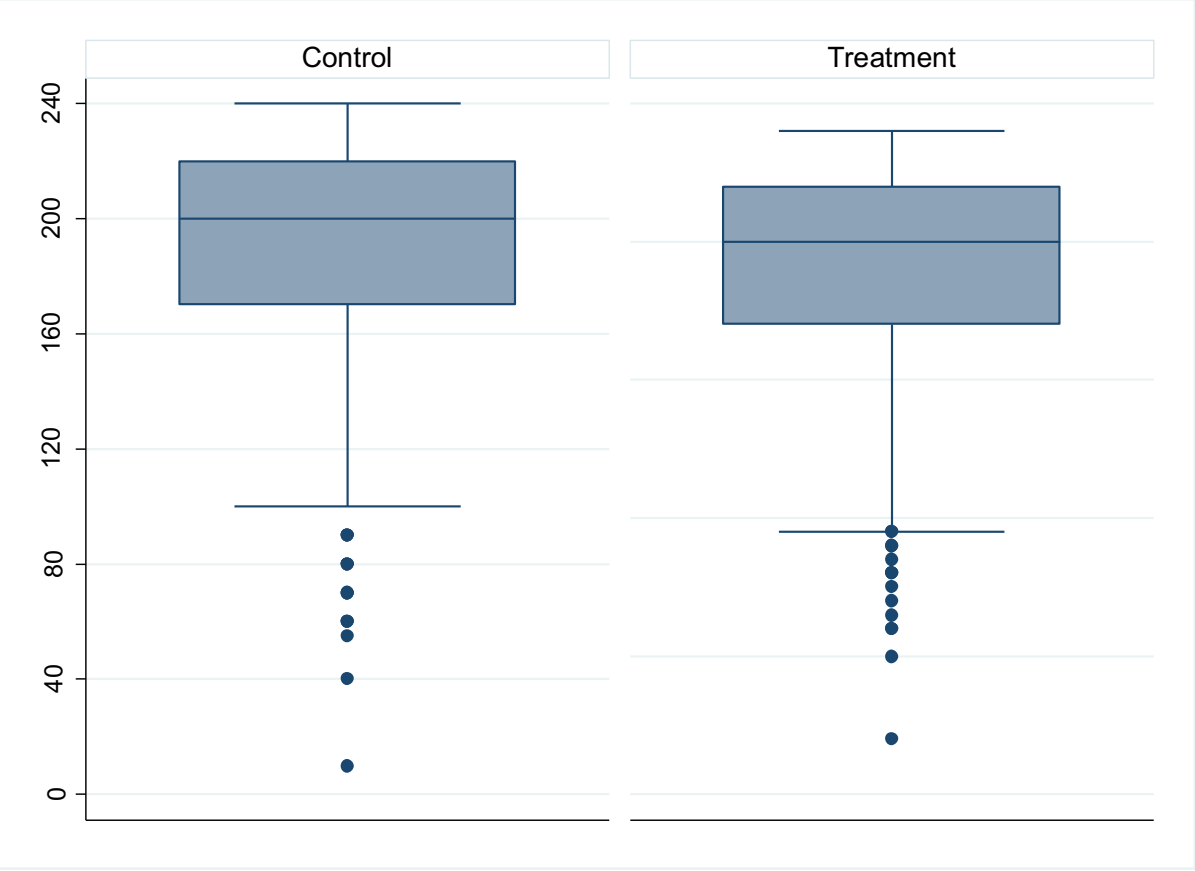
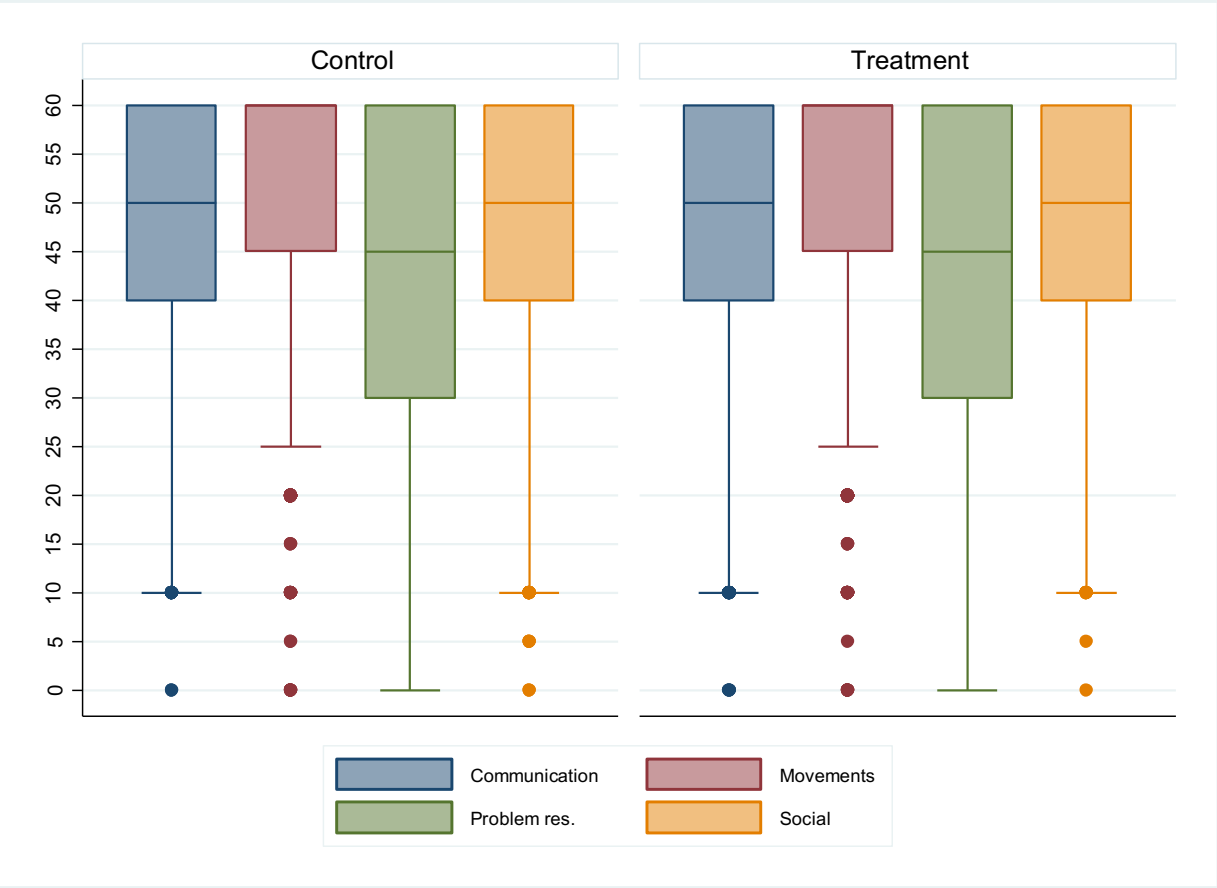


Figure A2: Raw ASQ-3 scores distribution: by dimension and treatment status. At baseline.



Tables

Table A1: Model for the probability of remaining in the sample. Marginal Effects at means.

	dy/dx
Treatment group (yes=1)	-0.086***
	(0.011)
Household size	-0.005
	(0.015)
Number of members 0-5	0.009
	(0.016)
Number of members 6 to 18	0.004
	(0.015)
Number of members 19 to 25	0.002
	(0.016)
Number of members 26 to 64	-0.001
	(0.015)
Number of members older than 64	-0.002
	(0.017)
Years of education HH head	-0.002
	(0.002)
Years of education spouse	0.001
	(0.002)
Dirt floor in dwelling (yes=1)	-0.022*
	(0.012)
Pipied water in dwelling (yes=1)	-0.022
	(0.015)
Dwelling has bathroom or letrine (yes=1)	-0.014
	(0.013)
Landline or cell phone access (yes=1)	-0.008
	(0.015)

Table A2: Impact of Bono 10,000 on the mother's probability of employment and on mother's self esteem

	Employed=1	Employed=1	49	50	51	52	53	54	55	56	57	58
Treatment	-0.052*	-0.047*	0.070*	-0.088	0.015	-0.047	-0.133	-0.095	0.081	0.061	0.053	0.130*
	(0.028)	(0.027)	(0.041)	(0.088)	(0.054)	(0.059)	(0.100)	(0.095)	(0.070)	(0.088)	(0.092)	(0.068)
Original p-value	0.062	0.084	0.085									0.057
Romano Wolf p-value	0.059	0.080	0.083									0.062
Controls	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Observations	1,657	1,651	791	776	785	787	778	772	783	781	780	780

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Rosenberg test questions: 49 - ¿en general estas satisfecho(a) contigo mismo(a)? 50 - ¿En algunas ocasiones piensas que no eres bueno(a) para nada? 51 - ¿Sientes que tienes algunas buenas cualidades? 52 - ¿Eres capaz de hacer las cosas tan bien como la mayoría de la gente? 53 - ¿Sientes que no tienes mucho de que sentirte orgulloso(a)? 54 - ¿De seguro que algunas veces te sientes inútil? 55 - ¿Sientes que eres una persona de valor al igual que otras? 56 - ¿Te gustaría tener más respeto contigo mismo(a)? 57 - ¿Te sientes inclinado(a) a pensar que eres un(a) fracasado(a) en todo? 58 - ¿Tienes una actitud positiva hacia tu persona?

Table A3: Heterogenous effects of Bono 10,000

	(1) ASQ		(2) Communication		(3) Gross Motor		(4) Personal-social		(5) Problem solving	
Treatment	0.186***	0.181	0.220***	0.090	0.121	0.376	0.203**	0.720	0.211**	-0.462
	(0.068)	(0.564)	(0.084)	(0.552)	(0.096)	(0.459)	(0.083)	(0.648)	(0.106)	(0.790)
Treatment x mother employed (yes=1)	-0.114		-0.058		-0.172		-0.142		-0.115	
	(0.079)		(0.099)		(0.111)		(0.113)		(0.137)	
Treatment x mother satisfied (same=1)		-0.135		0.008		-0.474		-0.628		0.541
		(0.569)		(0.552)		(0.468)		(0.655)		(0.799)
Original p-value (interaction)	0.150	0.812	0.560	0.989	0.123	0.311	0.208	0.338	0.403	0.499
Romano Wolf p-value (interaction)	0.465	0.955	0.633	0.986	0.465	0.837	0.486	0.837	0.633	0.861
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,628	756	1,628	756	1,628	756	1,628	756	1,628	756

*p< 0.10, **p< 0.05, ***p< 0.01

Table A4: Baseline characteristics of households receiving each transfer

	Mean education component	Mean Health component	Diff.	
N Households	1,707	430	1,277	
N Individuals	11,104	2,304	8,800	
HH characteristics				
Household size	5.60	3.71	1.89	***
Number of members 0-5	0.73	1.18	-0.44	***
Number of members 6 to 18	2.42	0.27	2.15	***
Number of members 19 to 25	0.53	0.98	-0.44	***
Number of members 26 to 64	1.80	1.19	0.62	***
Number of members older than 64	0.19	0.18	0.01	
Years of education HH head	3.44	4.52	-1.08	***
Years of education spouse	3.76	5.12	-1.36	***
Dirt floor in dwelling (yes=1)	0.34	0.34	0.00	
Pipied water in dwelling (yes=1)	0.17	0.16	0.00	
Dwelling has bathroom or letrine (yes=1)	0.79	0.74	0.04	*
Electricity in dwelling (yes=1)	0.67	0.65	0.02	
Landline or cell phone access (yes=1)	0.87	0.85	0.03	

Table A5: Impact of Bono 1000 in other outcomes

	Educational component	Health component
Clothes	3038.97	-668.384
	(2815.93)	(9015.433)
School Supplies	1547.24	147.579
	(2454.982)	(103.809)
Tuition	-48.265	12337.3
	(36.562)	(8517.051)
Hospitalization	8.428	-234.624
	(44.844)	(172.701)
Other health expenditures	-2953.46	-13269
	(2064.481)	(13218.081)
Appliances and furniture	-4,513.212*	6195
	(2526.285)	(6128.636)
Vegetables	1944.52	-699.34
	(1993.651)	(1114.949)
Drinks	-1039.89	-53.956
	(767.449)	(904.031)
Water	-0.169	-1.359
	(0.514)	(1.610)
Flour	-2782.17	352.897
	(1811.602)	(2592.506)
Beans	-5.806	-665.406
	(403.453)	(660.533)
Eggs	-436.088*	-659.704
	(249.504)	(665.353)
Chicken	-1,308.661**	-658.162
	(611.231)	(665.194)
Milk	-291.554	3.708***
	(204.721)	(1.352)
Cheese	-285.149	-649.655
	(206.133)	(665.316)
Banana	140.861	0.86
	(142.119)	(1.149)
Oranges	284.008	614.085
	(200.96)	(609.341)
Rice	-589.876	-47.944
	(563.577)	(907.02)
Flour	-154.444	-0.442
	(378.689)	(3.498)
Bread	0.33	612.181
	(0.458)	(616.97)
Pan_dulce	-3.136	1.969*
	(203.144)	(1.169)
Corn_flakes	-1,025.200*	-45.775
	(619.478)	(895.956)
Spaghetti	-631.915	516.71
	(1067.088)	(1643.654)
Milk powder	139.477	44.748
	(428.841)	(31.348)
Butter	272.676	6.135*
	(632.363)	(3.599)
Beef	-297.225	-43.466
	(354.734)	(899.504)
Pork	-729.447	-1324.17
	(514.712)	(934.895)

Tomato	276.396	5.589
	(489.249)	(3.588)
Onions	992.680**	-47.47
	(502.063)	(907.349)
Potato	124.566	3.012
	(675.968)	(2.118)
Cabbage	272.443	2.706**
	(631.791)	(1.300)
Yuca	283.313	-663.177
	(199.836)	(656.492)
Canned Juice	-4.328	-659.996
	(203.049)	(660.946)
Soft drinks	-436.323*	612.447
	(249.936)	(616.865)
Tomato sauce	-444.484	-45.645
	(379.194)	(898.203)
sal	700.203	1841.22
	(543.126)	(1360.549)
Beer	-7.125	-2.185*
	(349.658)	(1.257)
Cigarettes	-4.04	-662.826
	(202.624)	(660.973)
Obs	1394	314