# Information and Decision-Making Power: Explicating the Impact of Information Provision in the Conditional Cash Transfer Program on Food Consumption Share in the Philippines

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We studied the impact of distributing nutritional information in the conditional cash transfer program on intrahousehold food expenditure allocation in the Philippines. Using the original randomized controlled trials dataset, which was collected 2 months after a social experiment to teach nutrition information, we found that providing nutrition information improved mothers' nutrition knowledge, but no significant positive effects were found on the Engel coefficient. However, the provision of information to mothers with greater intrahousehold decision-making power tends to increase the consumption ratio of food. These results imply that not only raising awareness through information provision, but also female leadership and strong decision-making power within the household play an essential role in changing household budget allocations and improving child welfare.

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## I. Introduction

To solve the intergenerational transmission of poverty, conditional cash transfer (CCT) programs have been launched in developing countries as a social protection policy since the 1990s. CCTs offer grants to mothers in low-income families on the condition that they satisfy requirements related to childhood development, such as periodic check-ups, vaccinations, and more than 85% school attendance. CCT programs such as *PROGRESA* (renamed as *Oportunidades* and, currently, *Prospera*) in Mexico and *Familias en Acción* in Colombia have expanded to become among the most extensive social assistance programs in each country, covering millions of households to relieve the poverty gap and improve the human capital of children. CCTs have been shown to improve nutritional conditions and cognitive and physical skills among children (Fiszbein, Schady, and Ferreira 2009). Notably, CCT recipients increase the food expenditure share in their total expenditure (i.e., the Engel coefficient) relative to nonrecipients. Attanasio, Battistin, and Mesnard (2012) estimate that a 10% increase in total expenditure would generally lead to a 1% decrease in food expenditure in Colombia, and found that the CCT program, unlike other general increases in income, increases the food consumption share. Angelucci and Attanasio (2013) estimated the Engel coefficient for food and high-protein food of *PROGRESA* in Mexico, and the average intention to treat in the estimation implies an increase in the food share. Braido, Olinto, and Perrone (2012) suggest that a CCT program in Brazil, *Bolsa Família*, had a positive effect on household food expenditure by about 10%, though the gender of the grant recipients did not influence the consumption pattern. Additionally, the authors find that expenditure shares on high-nutrition foods, such as fruits and vegetables, increases. Some studies have estimated the impact of CCTs on food consumption positively (Schady and Rosero 2007, 2008 for Ecuador; Gitter and Barham 2008 for Nicaragua; Cruz and Ziegelhofer 2014 for Brazil and Armand et al. 2020 for Macedonia).

This is interesting because it is contrary to the standard prediction of the economic theory, which is that the share of food out of total consumption decreases when income per capita increases (i.e., Engel's law). The literature attributes this surprising result to the fact that mothers are the recipients of the grant, and women possess different preferences and consumption patterns for food than men

(Ward-Batts 2008, Doss 2013, Almås et al. 2018). Therefore, if women receive income or grants directly and determine the allocation of resources, the Engel coefficient will increase. In contrast, some studies note that information diffusion on nutrition, which is sometimes a single condition of CCT programs, affects resource allocation determination in households because they change the perception of food productivity to health by cultivating food knowledge and leading to the purchase of food that is more nutritious (Fitzsimons et al. 2016).

In this study, we empirically explicate the effects of the provision of nutrition knowledge in the CCT program on the Engel coefficient using household-level data based on randomized controlled trials (RCTs) in the Philippines. The practical success of CCTs in Latin America has prompted CCT programs to spread globally as national flagship social protection policy schemes to relieve poverty in different countries. Among them, the Philippines started the *Pantawid Pamilyang Pilipino Program* (4Ps) in 2008 and has since expanded its coverage nationwide. The 4Ps transfers the grants to mothers in poor households on the condition that they fulfill child development requirements, as in other CCT programs. One specific feature of the conditionality of 4Ps is that the grantees (mainly mothers) participate in Family Development Sessions (FDS), in which the beneficiary parents learn about caring for children. The 4Ps aims to reduce poverty and empower parental roles in family development via the transfer of cash and knowledge to mothers (Kim and Yoo 2015).

We conducted a field experiment and a survey to examine the effects of nutrition knowledge with the cooperation of the Department of Social Welfare and Development-Cordillera Administrative Region Office (DSWD-CAR), which operates the 4Ps in the Cordillera Administrative Region in the Philippines. We provided nutrition information by distributing flyers to mothers in a treatment group in the FDS based on the cluster-level RCT approach. We set two treatment groups to verify the differentiated effects of the volume of nutrition information. We provided basic information about food nutrition to one group (see Figure A1.1 of the Appendix for Treatment A) and delivered Treatment A's contents with additional information about nutrition and growth outcome to the other group (see Figure A1.2 of the Appendix for Treatment B). About 2 months after the experiment, we obtained sample data from 171 women. We estimated the impact of interventions on food knowledge and the Engel coefficients, carefully dealing with the inference of group-dependence within the cluster to estimate standard errors when the number of clusters is small by using G-1 degrees of freedom procedure and the wild-cluster bootstrap standard error procedure (Cameron, Gelbach, and Miller 2008; Cameron and Miller 2015). We found that information provided in the treatment will positively affect the acquisition of nutrition

knowledge; in particular, mothers who receive various types of information in the treatment gain more nutrition knowledge. The treatment itself does not positively affect the Engel coefficient at all; however, the results imply that treated mothers who are heads of households or have a significant influence on household income have a higher Engel coefficient. In this context, we conclude that the provision of nutrition knowledge and female leadership in the household are both crucial for improving nutrition intake among children.

The following section describes the conceptual framework, including a literature review. Section III presents the CCT in the Philippines and our research design in detail. Section IV discusses the estimation strategy, and Section V explains the estimation results. Finally, Section VI presents our conclusion.

## II. Conceptual Framework

Although the intrahousehold consumption pattern varies across many components, we recognize that female ability to determine and negotiate intrahousehold resource allocation is crucial for outcomes in the development field (Doss 2013). Most CCTs aim to enhance female empowerment through financial support from grants provided to mothers and knowledge through maternal education (Angelucci and Attanasio 2013). Our study also focuses on the information input to women and the female decision-making power in the household to change their intrahousehold consumption allocation.

First, several studies prove that the information that a person receives will change their perception or tastes on the related goods, leading to the alternation of the consumption pattern of each household. Information is a crucial input for customers in choosing products and services, and economists have developed theories and methodologies on the imperfections of information (e.g., Nelson 1970, Stiglitz 2000). Although the methods of providing information vary (e.g., mass communication and one-on-one education), many development economists have empirically investigated the effects of information dissemination on consumption behavior of foods or health-related goods (Dupas 2011). Fitzsimons et al. (2016) estimate the impact of providing information about child nutrition without offering monetary grants in Malawi. The intervention was conducted through house-to-house visits, and they find that information provided not only increased mothers' nutrition knowledge but also modified the composition of consumption toward more healthy food items. Madajewicz et al. (2007) report that after providing the information that a

well's water contained arsenic, 37% of households changed to another well in Bangladesh within a year. Jalan and Somanathan (2008) also demonstrate that when information about water contamination was provided in India, the willingness to pay for home purification increased by 11%. Following the health production function theory presented by Fitzsimons et al. (2016) and Corman, Dave, and Reichman (2018), this study expects that the perceived productivity and consumption of food will also increase when information on nutrition benefits is provided. This study evaluates the effects of information inputs in our original experiment to distribute the flyers.

Many studies have explicated that women's decision-making power in each household may affect their consumption patterns. They demonstrate that the preferences and bargaining power of women and mothers have more positive effects on the consumption and management of related resources to improve child life outcomes than those of men based on collective models. Hoddinott and Haddad (1995) explain that raising women's share of cash income increases the consumption share of food and reduces the consumption of alcohol and cigarettes. Duflo (2003) finds that in South Africa, the health status of girls improved after the women received pension subsidies, although she did not observe such an effect when the recipients were men. Doss (2006) uses survey data in Ghana and shows that the share of women's assets affects some budget categories, such as increasing food and education expenditure and reducing alcohol consumption. Macours, Schady, and Vakis (2012) also suggest that cash transfers to women changed their intrahousehold allocation, such as spending more on nutrient-rich foods, and improved child development outcomes in Nicaragua. Furthermore, there is evidence of gender bias in household consumption and intrahousehold allocation in the Philippines. Pajaron (2016) evaluates the heterogeneity of intrahousehold allocation of international remittances, demonstrating that a female decision-maker spends more on items that improve children's welfare. In contrast, Estudillo, Quisumbing, and Otsuka (2001) did not find gender bias in expenditure patterns between females and males from panel data of Central Luzon and Panay Island. They also qualitatively explain gender equality in terms of the historical and social context in the country and conclude that these factors would affect expenditure patterns in Filipino households. Following the literature on female bargaining power, this study posits that mothers' intrahousehold bargaining or decision-making power influences household consumption decisions. In the CCT context, female decision-making power is measured by an exogenous increase in the nonlabor income of the mother (i.e., CCT

grants), but all respondents in our survey are CCT beneficiaries.[1] Thus, we focus on female leadership in households proxied by head status and the perceived volume of income contribution (Hoddinott and Haddad 1995; Schady and Rosero 2007; Braido, Olinto, and Perrone 2012). We note that these measurements of female leadership carry the potential risk of endogeneity because unobserved characteristics would be correlated with leadership in the household (Braido, Olinto, and Perrone 2012; Doss 2013).

## III. Contexts and Intervention

### A. Pantawid Pamilyang Pilipino Program

The Philippines is one of several countries that have introduced CCT programs. Despite its rapid economic growth in recent decades, the Philippines' poverty rate has not declined. Although the economy grew by approximately 5% on average between 2003 and 2012, the poverty rate increased during the same period.[2] Additionally, the Philippines has faced difficulties in achieving Sustainable Development Goals' targets such as universal primary education, reducing child mortality, promoting gender equality, and improving maternal health (Kim and Yoo 2015). Regarding nutrition conditions (Chaparro, Oot, and Sethuraman 2014; Food Nutrition Research Institute [FNRI] 2015), 34% of children younger than 5 years old were stunted, with 19.9% underweight and 7.9% wasting in the early 2010s. Moreover, the level of children overweight-for-height aged 0–5 years has increased. Almost half of the pregnant women and two-thirds of children aged 6–11 years suffer from chronic anemia. Additionally, the Global Hunger Index still indicates a serious level of hunger (von Grebmer et al. 2015).

To solve these issues and promote social assistance and social development, the DSWD launched the 4Ps in 2008 with support from the World Bank, the Asian Development Bank, and the Australian Agency for International Development. The program's objectives are to: (i) keep children in school, (ii) keep children healthy, and (iii) invest in the future of children (Chaudhury, Friedman, and Onishi 2013). The government sets the conditions for health and education grants to meet these objectives. As for health grants, low-income households with children aged 0–14 years

[1] At the time of the survey in 2015, more than 90% of the targeted poor households in the surveyed region had already received benefits, according to 4Ps.

[2] Table A1 of the Appendix shows the country's economic growth and poverty incidence for approximately 2 decades.

and pregnant women receive a lump sum of ₱500 per month to prompt healthy practices. The conditions for this grant are (i) visiting the health center or rural health unit regularly for children aged 0–5 years, (ii) attending FDS at least once a month (details given below), (iii) complying with the deworming protocol at schools for children aged 6–14 years, and (iv) attending the health center or rural health unit for pregnant women. The education grants were ₱300 per child per month for a maximum of three children per household. The conditions for this grant are enrollment in daycare or preschool for children younger than 5 years old or school for children aged 6–14 years, together with an attendance rate of more than 85%. The transfer of cash grants relies on compliance with the program's conditions. Schoolteachers, health facilities, and field staff make bimonthly checks on whether beneficiary mothers and children comply with these conditions (Fernandez and Olfindo 2011). The government has currently promoted 4Ps as the primary policy tool for poverty reduction (Kim and Yoo 2015). The program covers all 17 regions in the country, and the target age has expanded to include 18-year olds; thus, more than 10 million schoolchildren in about 4.5 million households were registered for the program in 2015 when we conducted our primary research (DSWD 2019).

Attending FDS is one condition for receiving the 4Ps' health grants; these sessions are a type of parenting course. FDS are held monthly in every family group (mostly 25–30 members) at the barangay level, which is the smallest administrative unit in the Philippines, or for a smaller cluster in each barangay. Grant beneficiaries must attend the FDS to satisfy the program's conditions. The monthly FDS are offered as an avenue to (i) provide fundamental knowledge about family behaviors, (ii) improve parental roles and responsibilities, and (iii) support beneficiaries in complying with the program conditions. To satisfy these objectives, the FDS cover childcare, including maternal healthcare, child development, and family planning. In addition to health knowledge, mothers obtain crucial knowledge for living, such as gender roles, development, and financial management. FDS participants are usually mothers, but the DSWD states that the FDS are open for all; thus, other relatives such as fathers can also attend them.

The 4Ps has been carefully designed to facilitate impact evaluation since program planning began, as it is the pioneer intervention of the social security net in the Philippines. Chaudhury, Friedman, and Onishi (2013) estimated the program impacts of the pilot stage of the 4Ps 2.5 years after the program's implementation began in 2008. The study finds that the 4Ps has increased enrollment among young children aged 3–11 years and attendance among children aged 6–17 years. Despite this early evaluation of the program's intervention, the 4Ps can reduce severe stunting

among poor children between 6 and 36 months old, and poor children can receive age-appropriate child health services. Additionally, the program increases aggregate investments by fulfilling the health and educational needs of children. However, the study finds that some challenges remain in the 4Ps. There is little effect on the overall increase in per capita consumption among the poor beneficiaries, but the households tend to increase savings as a result of the transfers. Furthermore, the 4Ps had little effect on the enrollment of children over the age of 15 years or on the preschool attendance of the youngest group (aged 3–5 years).

As preliminary research, we explicate the impact of this CCT program on the Engel coefficient using the same dataset as Chaudhury, Friedman, and Onishi (2013) (for details, see the Appendix). Our estimations show that receiving a 4Ps grant reduces the Engel coefficient significantly, contrary to our expectations. The gender of the household head is insignificant in determining the household consumption ratio. This result shows that the grantee's gender or female decision-making power is not firmly decisive in changing the household Engel coefficient in the Philippines.

## B. The Intervention

### 1. Study Site

To explore the effects of nutrition information diffusion in more detail, we designed an original RCT, in which mothers in the treatment groups received flyers on nutrition in the FDS. We collected follow-up data in Benguet province in 2015. Although the government has expanded the 4Ps to the national level, we chose Benguet province, located in the northern Philippines, as the site for this study for the following reasons. First, we had professional contact with DSWD-CAR in June 2015, and they officially offered cooperation with this study in July 2015. Second, Benguet province in the CAR comprises both urban and rural municipalities, and income levels vary among municipalities. Hence, we judged that Benguet province could be an appropriate sample area for the country in this survey. To include both rural and urban areas, we chose the FDS clusters in Tuba (urban) and Kapangan (rural) municipalities.[3] Tuba is in the southern part of Benguet province, approximately 30–60 minutes from Baguio, the urban center of the region, by automobile. According to the Philippine Statistics Authority (2015), Tuba is in the first income class among the six classes defined by the government based on residents' average annual income

[3]Lipoeto et al. (2013) show a significant difference in food habits between rural and urban areas in Southeast Asian countries, including the Philippines.

over the previous 4 years. In contrast, Kapangan is the northernmost municipality in Benguet province, approximately 3–4 hours away from Baguio by automobile. Kapangan is in the fourth income class.

## 2. Randomized Controlled Trials

For the experiment, we provided nutrition information by distributing a flyer to a treatment group during the FDS (see the Appendix for a reproduction of the flyer used in the experiment). The FDS are held at the cluster level in each barangay, and we selected the target clusters randomly in the sample municipalities based on the RCT approach. As our treatment is information dissemination, which is relatively easy to spill over, we randomized samples at the FDS cluster level. Among the FDS clusters in Tuba and Kapangan municipalities, we chose 11 FDS clusters and assigned Treatment A to four FDS clusters (67 households), Treatment B to three FDS clusters (66 households), and the control to four clusters (91 households), totaling 224 households in the sample selection. We ensured that FDS about any nutrition topic had not been conducted in the past for any of these clusters. After pre-research with the DSWD-CAR in August 2015, the intervention was conducted from 11 to 13 September 2015 during the monthly FDS in each cluster.

In the context of Filipino nutrition, stunting, underweight, obesity, and anemia are severe issues (Chaparro, Oot, and Sethuraman 2014; FNRI 2015). Therefore, we prepared flyers to offer solutions to these issues. In Treatment A, we provided each mother with a flyer containing basic nutrition knowledge (i.e., nutrition guide pyramid edited by FNRI 2015) and information about nutritious foods containing protein, vitamin A, and iron, which are crucial nutrients for child growth. We also note how each nutrition function affects child growth. In the flyer of Treatment B, we provided almost the same information as Treatment A; however, we posted a much clearer message on the direct effects of good practice for food intake on school performance. Furthermore, we emphasize the risks associated with the overconsumption of soft drinks.[4] Therefore, the flyers in Treatment B offer more detailed content of nutrition knowledge than those of Treatment A. When the flyers were distributed during the FDS, the 4Ps field staff explained each flyer's content to the mothers in detail during the session, ensuring that each participant understood the content. We then asked them to attach the flyer to the wall or refrigerator to review it every day.

[4]We designed the flyers based on Worsley (2002); Kleinman et al. (2002); Florence, Asbridge, and Veugelers (2008); Maluccio et al. (2009); Rausch (2013); and FNRI (2015). Additionally, we referred to Parmenter and Wardle (1999), Wardle et al. (2000), and Gibson et al. (2015) to design the questionnaires.

## 3. Data

About 2 months after our intervention, we conducted a follow-up survey in both treated and control areas from 8 to 13 November 2015, during the FDS, and collected sample data from 11 FDS clusters. In our questionnaire, we included socioeconomic characteristics and questions that measured the respondents' knowledge level or behavior. We referred to Dickson-Spillmann, Siegrist, and Keller (2011) for developing this small nutrition exam and employed the exam score (maximum 15 points) as the indicator of the respondent's nutrition knowledge. Of the 15 questions, 10 were related to the contents of the flyer. For the food expenditure ratio to total expenditures, we asked for the monthly consumption of food, fuel, light, water, transportation, communication, household operations, personal care and effects, clothing, footwear and other recreation wear, medical care, nondurable furnishings, gifts, and contributions for the last month.[5] For annual expenditure, respondents provided information on fees for education, durable furnishings, taxes, house maintenance and repair, special occasions and other expenditures (e.g., life insurance), and savings during the past year. We then used these responses to estimate monthly spending ratios.[6]

For this survey, we obtained household roster data in the targeted area from DSWD-CAR before the intervention; we initially planned to conduct interviews with 224 grantees during the FDS (Treatment A: 67; Treatment B: 66; Control: 91). However, 10 beneficiaries did not attend the FDS in September (i.e., they did not receive the flyer), and 29 households did not attend the FDS in November because of sickness or having moved to another residence. Moreover, for 19 households, other male family members, such as the father or the son, attended November's FDS. As our study aims to evaluate how the female grantee's knowledge will contribute to intrahousehold allocation, we excluded these 19 households from our sample. In contrast, six female respondents who were not listed in our household roster data participated in November's session, and we confirmed that five of them had attended September's FDS. Thus, we included these samples and ultimately kept 171

[5]Foods include cereal and cereal preparations (e.g., rice, corn, and bread); roots and tubers (e.g., potato, cassava, and gabi); fruits and vegetables (e.g., green beans, coconut, and peanuts); meat and meat preparations (e.g., fresh chicken, beef, and chorizo); dairy products and eggs (e.g., milk, ice cream, and butter); fish and marine products (e.g., fish, shrimp, squid); beverages (e.g., coffee, orange juice, and soft drinks); others (e.g., sugar products, sauces, and oil); and eating outside.

[6]According to Gibson and Kim (2010) and Beegle et al. (2012), the monthly recall survey about expenditure carries the risk of underreporting compared to a daily diary or weekly recall, or may suffer from measurement error, depending on the heterogeneity such as family size. However, because of the high variable costs of implementing the detailed survey, we employ the aggregate recall survey in our research.

respondents for an overall attrition rate of 25.6% (Treatment A: 50 [28.4%]; Treatment B: 48 [28.8%]; Control: 73 [22.0%]). As the attrition rate of this experiment was relatively high, we tested whether it affected our randomization, which will be the basis of our impact evaluation. As shown in Panel A of Table 1, we do not observe any significant difference between the maintained samples and the attritted samples based on the variables in the roster data. Moreover, the probit model analysis represents the insignificant effects of the treatments on attrition (Panel B in Table 1). Based on these results, we believe that our randomized treatment was not affected by attrition bias. Furthermore, we implement the balanced test in Table 2, although there

Table 1. **Attrition Check**

| | **Keep ($N$ = 171)** | | **Attrition ($N$ = 59)** | | |
|---|---|---|---|---|---|
| ***Panel A: T-test*** | **Average** | **SD** | **Average** | **SD** | ***p*-value** |
| Treatment A | 0.292 | 0.456 | 0.322 | 0.471 | 0.670 |
| Treatment B | 0.281 | 0.451 | 0.322 | 0.471 | 0.549 |
| Control | 0.427 | 0.496 | 0.356 | 0.483 | 0.341 |
| Number of children aged 5–9 years | 0.795 | 0.789 | 0.780 | 0.948 | 0.901 |
| Number of children aged 10–14 years | 1.123 | 0.902 | 1.169 | 0.950 | 0.736 |
| Number of children aged 15–19 years | 1.135 | 1.034 | 1.051 | 0.860 | 0.577 |
| Age of the mother | 46.614 | 10.853 | 46.949 | 11.057 | 0.839 |
| Education of the mother (years) | 8.287 | 3.652 | 7.475 | 3.923 | 0.150 |
| Number of household members | 6.889 | 2.132 | 6.797 | 2.265 | 0.778 |
| Solo parent dummy (Solo = 1) | 0.170 | 0.376 | 0.169 | 0.378 | 0.999 |
| Living in urban area (Urban = 1) | 0.480 | 0.501 | 0.593 | 0.495 | 0.133 |

| | **= 1 if attritted** | |
|---|---|---|
| ***Panel B: Probit model*** | **(1)** | **(2)** |
| Treatment A | 0.1641 | 0.14 |
| | (0.1598) | (0.1664) |
| | [0.3340] | [0.5320] |
| Treatment B | 0.1885 | 0.1866 |
| | (0.1762) | (0.1423) |
| | [0.3330] | [0.2370] |
| Control variables | No | Yes |
| Observations | 230 | 230 |

SD = standard deviation.

Notes: FDS cluster-level clustered robust standard errors in parentheses and wild-cluster bootstrap standard error $p$-values in brackets in Panel B. Number of children aged 5–9 years, number of children aged 10–14 years, number of children aged 15–19 years, age of the mother, education of the mother, number of household members, solo parent dummy, and living in urban area (urban = 1) are included for Column (2) in Panel B. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' calculations.

Table 2. **Balance Test**

| | Treatment A | Treatment B | Control | *p* (TA-C) | *p* (TB-C) | *p* (TA-TB) |
|---|---|---|---|---|---|---|
| **Panel A: Balance test at sample selection** | | | | | | |
| Number of children aged 5–9 years | 0.791 | 0.758 | 0.791 | 0.999 | 0.791 | 0.828 |
| Number of children aged 10–14 years | 1.209 | 1.061 | 1.165 | 0.768 | 0.476 | 0.354 |
| Number of children aged 15–19 years | 1.239 | 1.152 | 1.011 | 0.155 | 0.384 | 0.612 |
| Age of the mother | 46.940 | 47.712 | 45.396 | 0.350 | 0.211 | 0.674 |
| Education of the mother (years) | 8.254 | 8.318 | 7.681 | 0.324 | 0.325 | 0.920 |
| Number of household members | 6.955 | 6.894 | 6.813 | 0.689 | 0.825 | 0.865 |
| Solo parent dummy (Solo = 1) | 0.104 | 0.091 | 0.044 | 0.141 | 0.237 | 0.794 |
| Living in urban area (Urban = 1) | 0.627 | 0.545 | 0.385 | 0.0024*** | 0.0460** | 0.344 |
| Observations | 67 | 66 | 91 | | | |
| **Panel B: Balance test at data collection** | | | | | | |
| Number of children aged 0–4 years | 0.38 | 0.56 | 0.53 | 0.271 | 0.847 | 0.298 |
| Number of children aged 5–9 years | 0.76 | 0.85 | 1.00 | 0.159 | 0.412 | 0.600 |
| Number of children aged 10–14 years | 1.06 | 1.06 | 1.04 | 0.906 | 0.896 | 0.989 |
| Number of children aged 15–19 years | 1.00 | 0.88 | 0.74 | 0.118 | 0.408 | 0.481 |
| Number of household members | 6.12 | 6.69 | 6.05 | 0.841 | 0.053 | 0.141 |
| Living in urban area (Urban = 1) | 0.62 | 0.48 | 0.38 | 0.0097*** | 0.301 | 0.165 |
| Head of gender (Female = 1) | 0.18 | 0.27 | 0.14 | 0.521 | 0.067 | 0.286 |
| Solo parent dummy (Solo = 1) | 0.16 | 0.25 | 0.12 | 0.566 | 0.073 | 0.274 |
| Education of the mother (years) | 8.30 | 9.00 | 8.64 | 0.564 | 0.571 | 0.287 |
| Age of the mother | 45.56 | 46.46 | 44.41 | 0.553 | 0.334 | 0.672 |
| Engage in farming (= 1) | 0.64 | 0.77 | 0.90 | 0.0003*** | 0.0443** | 0.159 |
| Observations | 50 | 48 | 73 | | | |

$p$(TA-C) = $p$-value from the $t$-test between Treatment A group and control group, $p$(TB-C) = $p$-value from the $t$-test between Treatment B group and control group, $p$(TA-TB) = $p$-value from the $t$-test between Treatment A group and Treatment B group.
Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

is little room for either self-selection bias among FDS participants or possible endogeneity of the treatment variable because the FDS attendance is a condition of the 4Ps, and we randomly assigned treatment to each FDS cluster. At the time of sample selection, we understand that most of the treated samples live in urban areas, as Panel A in Table 2 shows, because our RCT is conducted at the cluster level. Even after the sample attrition because of the reasons mentioned, we observe some systematic differences between groups in the urban and farmer dummy variable categories (Panel B in Table 2). Therefore, we tested the model by controlling for covariates in the estimation.

## IV. Estimation Method

This study estimates the impact of knowledge diffusion of nutrition through a CCT program on outcomes, including the food consumption ratio. In this study, we obtain the following equation:[7]

$$Y_j = \alpha_0 + \alpha_1 \ln C_j + \alpha_2 (\ln C_j)^2 + \alpha_3 x_j + \alpha_4 T + \mu_j, \quad (1)$$

where $Y_j$ includes $w_j$ and $k_j$. $w_j$ stands for the share of food out of total household expenditure in the $j$th household (%). $k_j$ is the knowledge test score of the respondent in the $j$th household. $\ln C_j$ is the log of the total consumption of each household (in Philippine pesos). $x$ denotes the characteristics of each household, that is, whether living in an urban area, farmer dummy, log of family size;[8] as well as the number of children in each targeted age cohort in the household (0–4, 5–9, 10–14, and 15–19 years old) to control for the biased variables in the balance test and household traits.[9] $T$ is the treatment of receiving the flyers ($T = 1$ if treatment; $T = 0$ if control). Moreover, we add price effects using the barangay dummy variables to estimate the food consumption ratio.[10] In our estimation, we also show the results of the treatment effect model excluding the other covariates, which is common in the RCT analysis. As

[7]We basically follow the specification from Attanasio, Battistin, and Mesnard (2012), which conceptualizes both Quadratic Almost Ideal Demand System and the collective model, for our model setting. We strongly assume that total consumption $C_j$ is uncorrelated with the residual term $\mu_j$, as Attanasio, Battistin, and Mesnard (2012) do.

[8]As Deaton and Paxson (1998) and Estudillo, Quisumbing, and Otsuka (2001) suggest, the Engel coefficient of a larger household will tend to decrease the food consumption ratio because of scale economies.

[9]According to Tsakloglou (1991), the number of children in each age group affects the Engel coefficient because older children require more significant amounts of food than younger children.

[10]From our field observation, the price of the daily commodities including food was almost the same within each municipality and barangay when we conducted the survey.

mentioned in Section II, female decision-making power or leadership in each household may also affect the consumption pattern, reflecting the prior literature (e.g., Doss 2013). Thus, we tested the effect of female decision-making power and its interaction effect with treatment. We asked the respondents the household head's gender and the extent of the mother's contribution to household income in the questionnaire. Among households headed by women, 10 beneficiaries had husbands, and 22 were single-parent families. As for the self-contribution to income, not only labor income but also the nonlabor income of the mother (i.e., CCT grants) or the profit from farming is included in the survey. We create a dummy variable for mothers' higher income contribution: 1 if the mother contributes more than 50% and 0 otherwise.

As our dataset is RCT-based, we conduct analyses based on ordinary least squares (OLS) regressions. To address heteroscedasticity due to the use of micro-level data, we employ a cluster-robust standard error procedure. In terms of statistical inference, the asymptotic justification for the cluster-robust standard error provides the downward-bias correction estimates if the number of clusters is small. As there are only 11 FDS clusters in our dataset, this leads to the production of a biased standard error. According to Cameron and Miller (2015), one solution to this issue is to use much fewer degrees of freedom than the number of clusters, *G*, proposed for small-sample correction. Our study uses G-1 degrees of freedom for t-tests and F-tests to obtain valid inferences.[11] Moreover, we employed a wild-cluster bootstrapping standard error procedure (see, for example, Cameron, Gelbach, and Miller 2008) to check the robustness and reduce bias.[12] Furthermore, we address multiple hypothesis-testing issues because we distributed two types of flyers in the experiments and conducted a heterogeneous analysis for female bargaining power, so we display the sharpened false discovery rate *q*-values in the results (see, for example, Anderson 2008).

## V. Results

Table 3 reports the results for the impact evaluation of the treatment. We find that information provision improved maternal knowledge about nutrition. In columns (1) and (2), the treatment variable is positive and statistically significant at the 5% and 10% levels in the OLS model. The ratio of food expenditure after the treatment is also

[11] We exploit STATA 15 for our regression analysis.

[12] We replicate 1,000 times for wild-cluster bootstrap estimations using the STATA command "*boottest*."

Table 3. **Impact of Information Provision on Outcomes**

| | **Knowledge** | | **Expenditure** | |
|---|---|---|---|---|
| | **Total Score (Max 15 points)** | | **Engel Coefficient (%)** | |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| Treatment | 0.439* | 0.375** | −9.032*** | −1.523 |
| | (0.203) | (0.166) | (2.759) | (1.370) |
| | [0.1000] | [0.0910] | [0.0120] | [0.4480] |
| | {0.084} | {0.084} | {0.034} | {0.14} |
| Observations | 171 | 171 | 171 | 171 |
| Control Variables | No | Yes | No | Yes |
| *R*-squared | 0.009 | 0.068 | 0.060 | 0.267 |

Notes: FDS cluster-level clustered robust standard errors in parentheses, wild-cluster bootstrap standard error *p*-values in brackets, and the sharpened false discovery rate *q*-values in braces. Columns (2) and (4) include control variables for logarithmic total expenditure, squared logarithmic total expenditure, urban dummy, farmer dummy, log of number of family members, and number of the children divided by the age cohort (0–4, 5–9, 10–14, and 15–19 years old). For column (4), a barangay-fixed effects dummy is included to control for the price effects. All regressions are estimated by ordinary least squares. ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.
Source: Authors' calculations.

investigated in columns (3) and (4). While we expected that the information provided affects the Engel coefficient positively, the result is negative and statistically significant. Even if controlling with covariates, the results are negative but insignificant. Taken together, the treatment of information provision itself does not affect increasing food consumption as a whole, although it affects knowledge cultivation positively.

To understand the impacts of information distribution in more detail, we estimate the heterogeneous effects of treatment with female decision-making power on the Engel coefficient (Table 4). When we include the gender head dummy (female head = 1), it shows a significant negative effect in both estimations. Meanwhile, the interaction effects with the treatment present a 10.8% increase (though not significant at the 10% level) in column (1) and a 14.8% increase at the 5.0% significance level in column (2) for the Engel coefficient. For column (2), the total effect of the treatment is positive ($-4.5 + 14.8$), indicating that the treated households headed by women increased food consumption after the intervention. Moreover, we add the mother's contribution to household income as gender effects in columns (3) and (4). We observe that the interaction effect shows positive coefficients, and they are statistically significant (9.1% and 10.3% increase, but the robustness check cannot reject the null

Table 4. **Interaction Effect of Information Provision on Food Consumption Share**

| | **X = Head: Female** | | **X = Mother's Income > 50%** | |
|---|---|---|---|---|
| | **Engel Coefficient (%)** | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| Treatment | −10.62*** | −4.475* | −11.47*** | −7.456*** |
| | (2.808) | (2.119) | (2.700) | (1.818) |
| | [0.0040] | [0.2090] | [0.0020] | [0.1380] |
| | {0.024} | {0.085} | {0.017} | {0.018} |
| X | −9.495** | −8.375* | 0.656 | 2.082 |
| | (4.196) | (3.822) | (4.009) | (4.515) |
| | [0.0840] | [0.0920] | [0.7720] | [0.6780] |
| | {0.084} | {0.084} | {0.282} | {0.227} |
| Treatment × X | 10.76 | 14.79** | 9.127* | 10.33* |
| | (7.295) | (5.888) | (4.855) | (5.155) |
| | [0.2110] | [0.0770] | [0.1740] | [0.1330] |
| | {0.121} | {0.079} | {0.102} | {0.090} |
| Observations | 171 | 171 | 171 | 171 |
| Control variables | No | Yes | No | Yes |
| *p*-value joint significance test | 0.0039 | 0.0594 | 0.0005 | 0.0003 |
| *R*-squared | 0.074 | 0.288 | 0.092 | 0.312 |

Notes: FDS cluster-level clustered robust standard errors in parentheses, wild-cluster bootstrap standard error *p*-values in brackets, and the sharpened false discovery rate *q*-values in braces. Columns (2) and (4) include control variables for logarithmic total expenditure, squared logarithmic total expenditure, urban dummy, farmer dummy, log of number of family members, and number of the children divided by the age cohort (0–4, 5–9, 10–14, and 15–19 years) and barangay-fixed effects dummy. The *p*-value of joint significance test is for the displayed variables in the table. All regressions are estimated by ordinary least squares. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

hypothesis). The total effects of the treatment variables remain positive in column (4). This interaction effect of female intrahousehold decision-making power and treatment on the Engel coefficient is also found in Schady and Rosero (2007), who concluded that a cash transfer increases the food share in the household by affecting the female intrahousehold bargaining power. While our intervention is information provision, it is interesting to see how the decision-making power of households headed by women. These results imply that the mother's financial contribution to the household and information provision to the mother are both crucial components in changing the resource allocation of households.

Moreover, we investigate how the volume of information (difference in the flyer) affects food consumption. First, we evaluated different types of information provision

Table 5. **Impacts of Different Types of Information Provision on Outcomes**

| | Knowledge | | Expenditure | |
|---|---|---|---|---|
| | Total Score (max 15 pts.) | | Engel Coefficient (%) | |
| | (1) | (2) | (3) | (4) |
| Treatment A | 0.320 | 0.267 | −11.27*** | −9.792** |
| | (0.257) | (0.263) | (2.444) | (3.582) |
| | [0.4080] | [0.4360] | [0.0130] | [0.0480] |
| | {0.129} | {0.143} | {0.017} | {0.061} |
| Treatment B | 0.563** | 0.475** | −6.702* | −1.523 |
| | (0.242) | (0.192) | (3.602) | (1.370) |
| | [0.0400] | [0.0570] | [0.2240] | [0.4480] |
| | {0.084} | {0.079} | {0.102} | {0.14} |
| Observations | 171 | 171 | 171 | 171 |
| Control vars. | No | Yes | No | Yes |
| *p*-value joint sig. test | 0.1114 | 0.0735 | 0.0032 | 0.0498 |
| *R*-squared | 0.011 | 0.069 | 0.069 | 0.267 |

Notes: FDS cluster-level clustered robust standard errors in parentheses, wild-cluster bootstrap standard error *p*-values in brackets, and the sharpened false discovery rate *q*-values in braces. Columns (2) and (4) include control variables for logarithmic total expenditure, squared logarithmic total expenditure, urban dummy, farmer dummy, log of number of family members, and the number of children divided by the age cohort (0–4, 5–9, 10–14, and 15–19 years). For column (4), barangay-fixed effects dummy is included, controlling for the price effects. The *p*-value of joint significance test is for the displayed variables in the table. All regressions are estimated by ordinary least squares. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

on knowledge cultivation. As Table 5 shows, we find a significant positive effect of Treatment B, who were provided with more a copious amount of nutrition information (columns [1] and [2]). We estimate the Engel coefficient for each treatment group (columns [3] and [4]), and the treatment model showed significant negative results in both groups. As for the model with covariates, Treatment A still showed significantly negative results. We did not find a significant difference in the effects of the amount of knowledge provided on the food consumption ratio.

However, as Table 6 shows, decomposing the treatment effects based on the proxies for the bargaining power of mothers in the household reveals the difference. We find that while both Treatment A and Treatment B variables show negative signs, which are statistically significant, the interaction terms between these treatment variables and dummies for households headed by women are positive on the Engel coefficient (columns [1] and [2]). Above all, the interaction effects with Treatment B show significant positive effects, and their magnitudes are larger than the magnitudes

Table 6. **Interaction Effects of Different Types of Information Provision on Food Consumption Share**

| | **X = Head: Female** | | **X = Mother's Income > 50%** | |
|---|---|---|---|---|
| | **Engel Coefficient (%)** | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| Treatment A | −11.34*** | −11.74*** | −11.66*** | −11.85** |
| | (2.333) | (3.590) | (2.741) | (3.756) |
| | [0.0120] | [0.0320] | [0.0130] | [0.0410] |
| | {0.017} | {0.034} | {0.017} | {0.038} |
| Treatment B | −9.768* | −4.776* | −11.23*** | −8.663*** |
| | (4.793) | (2.472) | (3.176) | (1.588) |
| | [0.2740] | [0.2050] | [0.0870] | [0.0790] |
| | {0.09} | {0.099} | {0.03} | {0.015} |
| X | −9.495** | −8.343* | 0.656 | 2.124 |
| | (4.221) | (3.815) | (4.033) | (4.523) |
| | [0.0000] | [0.0920] | [0.7860] | [0.6600] |
| | {0.084} | {0.084} | {0.282} | {0.227} |
| Treatment A × X | 2.663 | 13.19* | 1.864 | 6.901 |
| | (7.120) | (6.318) | (4.456) | (5.431) |
| | [0.7330] | [0.0180] | [0.7060] | [0.2310] |
| | {0.241} | {0.086} | {0.234} | {0.129} |
| Treatment B × X | 16.01* | 15.83* | 14.37*** | 13.09** |
| | (8.379) | (7.121) | (4.287) | (4.790) |
| | [0.1880] | [0.1150] | [0.0380] | [0.0880] |
| | {0.099} | {0.084} | {0.034} | {0.061} |
| Observations | 171 | 171 | 171 | 171 |
| Control variables | No | Yes | No | Yes |
| *p*-value joint significance test | 0.0007 | 0.0309 | 0.0000 | 0.0000 |
| *R*-squared | 0.095 | 0.289 | 0.111 | 0.315 |

Notes: FDS cluster-level clustered robust standard errors in parentheses, wild-cluster bootstrap standard *p*-values in brackets, and the sharpened false discovery rate *q*-values in braces. Columns (2) and (4) include control variables for logarithmic total expenditure, squared logarithmic total expenditure, urban dummy, farmer dummy, log of number of family members, and number of the children divided by the age cohort (0–4, 5–9, 10–14, and 15–19 years), and barangay-fixed effects. The *p*-value of the joint significance test is for the displayed variables in the table. All regressions are estimated by ordinary least squares. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

of the coefficients of treatment variables, yielding positive impacts for households headed by women. When we explicate the heterogeneous effects with a higher female contribution to income, we find that mothers who contribute more than half the household income, and were in Treatment B, have more significant positive effects on

both Engel coefficients and offset the negative impacts of the treatment itself (columns [3] and [4]). The results from the estimation suggest that receiving more information increases food consumption ratios for households where females play a greater role in decision-making.

## VI. Conclusion

We conducted a field experiment, wherein we distributed a flyer containing information about nutrition crucial for childhood growth to CCT beneficiary mothers and conducted a follow-up field survey 2 months after the intervention. According to the estimation results, the treatment positively impacted the cultivation of mothers with nutrition knowledge; on the contrary, we did not find any significant positive effects of the treatment itself on the Engel coefficient. However, we did observe that the heterogeneous effects of female leadership and treatment positively affect the Engel coefficient. Notably, if mothers with greater decision-making power gain copious knowledge through the flyer, there is a more significant increase in their Engel coefficient and in the monthly food consumption of their households. We posit that both (i) an increase in awareness due to information distribution and (ii) the level of the intrahousehold decision-making power of mothers play an essential role in determining resource allocation within households. Recent studies have tested the channels on household consumption allocation by conducting multifaceted interventions for cash transfers and information (e.g., Levere, Acharya, and Bharadwaj 2016; Fernald et al. 2017; Ahmed, Hoddinott, and Roy 2019; Carneiro et al. 2021), and they suggest that the exogenous transfer of both cash and information to mothers is crucial for ameliorating intrahousehold allocation.[13] Our findings contribute to clarifying the mechanisms through which CCTs and information provision affect resource allocation and the importance of female decision-making power for intrahousehold consumption allocation.

There are some limitations to our study. First, our primary data were small in terms of the number of samples. We chose Benguet province as the sampling location because of professional contact with DSWD-CAR and a diverse environment in the Philippine context in terms of location and income levels. Nevertheless, as our study is focused on one zone with a limited sample size, external validity is not guaranteed.

[13]Roy et al. (2019) suggest that the combination of cash and information transfers to women will likely enhance female empowerment as a result of evaluating a program to reduce intimate-partner violence in Bangladesh.

To ensure the generalization of our results, we require more samples from different locations. Second, our data lack variables on the actual health status of children, and the follow-up period was short. Thus, we can only capture the changes in the food consumption pattern and the short-term effects. To understand the impact on healthy food consumption, it is necessary to collect information on the consumption volume for each food item and health status. Moreover, long-term effects are also of interest, as some studies show that the treatment effects diminish in the longer term (Banerjee, Duflo, and Glennerster 2008; Hanna, Duflo, and Greenstone 2016; Levere, Acharya, and Bharadwaj 2016).

Nevertheless, our findings suggest that both an increase in maternal awareness of health and nutrition knowledge and an enhancement of female leadership in the household are essential for the alternation of intrahousehold resource allocation to improve child development. Above all, nutrition education provided to mothers through the distribution of flyers is found to have positive effects on knowledge cultivation, and it is a relatively low-cost intervention. We believe that the findings in this paper contribute to a better understanding of practical measures to change the resource allocation for child development.

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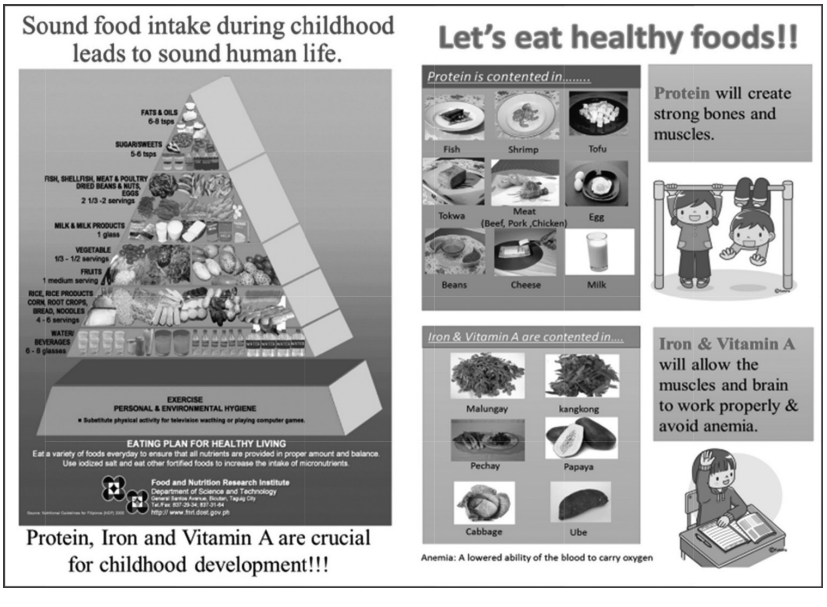
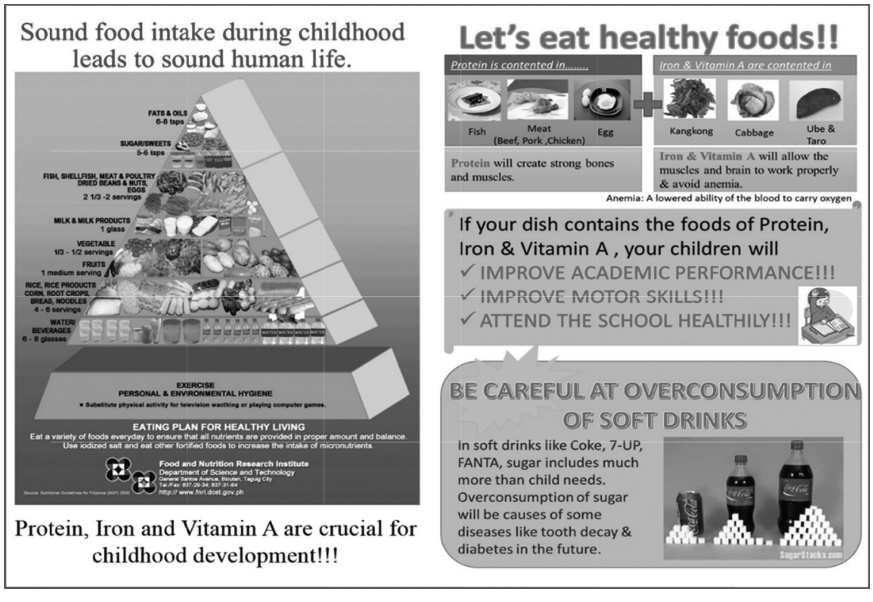
## Appendix 1: Figures and Tables

Figure A1.1. **Flyer for Treatment A**




Source: Department of Social Welfare and Development–Cordillera Autonomous Region.

Figure A1.2. **Flyer for Treatment B**




Source: Department of Social Welfare and Development–Cordillera Autonomous Region.

Table A1. **Economic Growth and Poverty Status in the Philippines, 1991–2012**

| | 1991 | 2000 | 2003 | 2006 | 2009 | 2012 |
|---|---|---|---|---|---|---|
| GDP growth (annual %) | −0.58 | 4.41 | 4.97 | 5.24 | 1.15 | 6.68 |
| Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population) | 27.47 | 18.41 | 16.84 | 16.45 | 11.98 | 13.11 |
| Poverty headcount ratio at national poverty lines (% of population)[a] | — | — | 24.9 | 26.6 | 26.3 | 25.2 |
| Magnitude of poor families (million) | 3.55 | — | 3.29 | 3.81 | 4.04 | 4.21 |
| Magnitude of poor population (million) | 21.75 | — | 19.80 | 22.64 | 23.30 | 23.75 |

— = no available data, GDP = gross domestic product, PPP = purchasing power parity.
[a]According to the Philippine Statistics Authority, a family of five needed at least ₱5,513 on average every month to meet the family's basic food needs, and at least ₱7,890 on average every month to meet both basic food and nonfood needs.
Sources: World Bank. World Development Indicators; Philippine Statistics Authority.

## Appendix 2: Estimation of the Impact of the 4Ps on Food Consumption Share

Prior literature investigates the impact of CCTs in Latin American countries on the consumption ratio and finds some positive impacts on Engel coefficients for food. In this section, we explore whether the 4Ps influence the Engel coefficients among Filipino beneficiaries.

### Data and Estimation Strategy

According to Chaudhury, Friedman, and Onishi (2013), the project team collected and evaluated the impact of the program using household data through an RCT evaluation approach. The survey covered 3,742 households from 130 barangays in eight municipalities in four provinces (Mountain Province, Occidental Mindanao, Negros Oriental, and Lanao del Norte). The barangays in each municipality were divided into 65 treatment and control barangays. Using the National Household Targeting System for Poverty Reduction database, 1,418 low-income households with children aged between 0 and 14 years and pregnant mothers at the time of the assessment were defined as Sample Group 1 (SG1) and the main sample group in the research design.[14] In this study, we used these 1,418 samples to evaluate the treatment effects in our estimation. Although there was no baseline survey for evaluating the impact, Chaudhury, Friedman, and Onishi (2013) mentioned that the randomization was successful according to evidence of roughly equal household characteristics, as measured in the household assessment data collected in 2008 for SG1. The evaluation data were collected in October–November 2011, which was 2.5 years after program implementation. The DSWD publicly released the RCT data of the Impact Evaluation in 2012; thus, this study exploits this dataset. This dataset includes socioeconomic household characteristics and consumption data (recall data of the actual weekly average consumption of goods). Of 1,418 samples, we excluded samples with coding errors that did not match our research; thus, there were 1,412 samples in total in the impact evaluation. For this dataset, the researchers requested weekly food consumption for the past 6 months as a recall survey. They also requested expenditures for 6 months in total on other items, such as education or medical fees. We convert these to annual expenditure and derive the consumption ratio. As for the estimation strategy, we employed the same models as in equation (1) and use the

[14]Chaudhury, Friedman, and Onishi (2013) explain that this RCT survey was also conducted in eight municipalities for noneligible groups: (SG2) (nonpoor with children), SG3 (poor without children), and SG4 (nonpoor without children). They collect data from noneligible groups for 4Ps to identify unexpected effects of the program among the nontarget population living in program areas.

OLS approach. We followed econometric techniques in the main text. Furthermore, we controlled for price effects using the municipality dummy.

### Results

Table A2 shows the estimation results for the Engel coefficient for the treatment effect and the gender effect. Although we expect a positive impact from the treatment on the Engel coefficient, as indicated by the literature on the impact of CCTs on the food Engel coefficient, the result was the opposite; that is, receiving 4Ps grants significantly reduced the food share of household spending by 1.9%–2.0% at the 5% and 10% significance levels (columns [1] and [2]).

Table A2. **Impact of Conditional Cash Transfers on Food Consumption Share**

| | **Food Consumption Share (%)** | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| Treatment | −2.0288* | −1.9051** | −1.2246 |
| | (1.1089) | (0.9385) | (0.9937) |
| | [0.0680] | [0.0430] | [0.2350] |
| Head = Female | | −0.9791 | 1.0329 |
| | | (1.5169) | (2.0901) |
| | | [0.5260] | [0.6160] |
| Treatment × | | | −3.9601 |
| (Head = Female) | | | (2.8853) |
| | | | [0.1700] |
| Observations | 1410 | 1404 | 1404 |
| Control | No | Yes | Yes |
| *p*-value of Joint significance test | | 0.1017 | 0.1282 |
| *R*-squared | 0.0026 | 0.1828 | 0.1841 |
| Adjusted *R*-squared | 0.0018 | 0.1733 | 0.1741 |

Notes: Municipality-level cluster-robust standard errors in parentheses and wild-cluster bootstrap standard error *p*-values in brackets. For columns (2) and (3), logarithmic total expenditure, squared logarithmic total expenditure, log of number of family members, urban dummy and municipality dummy, number of children aged 0–4, 5–9, and 10–14 years are included as controls. The *p*-value of joint significance test is for the displayed variables in the table. All regressions are estimated by ordinary least squares. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

In this dataset, we identify the gender-specific effect using the female-head dummy. Braido, Olinto, and Perrone (2012) exploit the female head dummy to identify female empowerment effects; therefore, we follow their research. For the head-gender dummy (female head = 1), insignificant results on the food consumption ratio are shown in columns (2) and (3).[15] Furthermore, we did not detect a significant effect on the interaction term. These results imply that women's empowerment in household finance does not affect food consumption behavior, even if grants are distributed to mothers or mothers are household heads.

[15]Among households headed by women, we observe that 193 households have female heads with husbands and 48 households are single-parent families.