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Alex Armand
Orazio Attanasio
Pedro Carneiro
Valérie Lechene

The Institute for Fiscal Studies
Department of Economics, UCL

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The Effect of Gender-Targeted Conditional Cash Transfers on Household Expenditures: Evidence from a Randomized Experiment*

Alex Armand Orazio Attanasio Pedro Carneiro Valérie Lechene

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Abstract

This paper studies the differential effect of targeting cash transfers to men or women on the structure of household expenditures on non-durables. We study a policy intervention in the Republic of Macedonia, offering cash transfers to poor households, conditional on having their children attending secondary school. The recipient of the transfer is randomized across municipalities, with payments targeted to either the mother or the father of the child. We show that the gender of the recipient has an effect on the structure of expenditure shares. Targeting transfers to women increases the expenditure share on food by about 4 to 5 percentage points. At low levels of food expenditure, we observe a shift towards a more nutritious diet as a result of targeting women.

JEL codes: D12, D13, E21, O12

Keywords: CCT, intra-household, gender, expenditure.

*__Armand__: University of Navarra, Navarra Center for International Development, and Institute for Fiscal Studies (e-mail: aarmand@unav.es); **Attanasio**: University College London and Institute for Fiscal Studies (email: o.attanasio@ucl.ac.uk); **Carneiro**: University College London, Institute for Fiscal Studies, and Centre for Microdata Methods and Practice (e-mail: p.carneiro@ucl.ac.uk); **Lechene**: University College London and Institute for Fiscal Studies (e-mail: v.lechene@ucl.ac.uk). We would like to thank Ingvild Almås, Martin Browning, Sylvie Lambert, Karen Macours, Marcos Rangel, Alexandros Theloudis and seminar participants at Paris School of Economics, Oxford University, the 2017 RES Annual Conference, the 2017 Annual Meeting of the Society of Economics of the Household for helpful comments. We gratefully acknowledge the financial support from 3ie International Initiative for Impact Evaluation (grant reference OW4-1022). Carneiro acknowledges the support of the Economic and Social Research Council (ESRC) through a grant (RES-589-28-0001) to the Centre for Microdata Methods and Practice, and from the European Research Council through grant ERC-2016-CoG-682349.

1 Introduction

In the design of cash transfer programs, it is important to understand whether women and men spend income differently. This is central to ensure that transfers reach the household members for whom they are intended. Until now, due to lack of suitable data, it has been difficult to measure the effect of targeting payments to men or women. Nevertheless, most Conditional Cash Transfer (CCT) programs in developing countries explicitly target payments to women within households (Fiszbein and Schady, 2009). The aim is to improve their well-being, and increase their participation in decision making by enhancing their control over household's resources. However, there is no consensus on this practice.

A large body of research supports the notion that control over resources leads to control over decision making (see, for instance, Browning and Chiappori, 1998). Empirically, the income pooling hypothesis has been rejected using observational and quasi-experimental data (Thomas, 1990; Schultz, 1990; Bourguignon et al., 1993; Browning et al., 1994; Phipps and Burton, 1998; Lundberg et al., 1997; Ward-Batts, 2008). Evidence shows that the share of resources contributed by each household member affects the allocation of household expenditures. While this suggests that targeted transfers could influence expenditure decisions, relative incomes may depend on choices that are correlated with observed outcomes. It is therefore difficult to distinguish whether different allocations are due to relative incomes, or to other unobservable characteristics.

To overcome this issue, a first wave of experimental studies looked at programs providing cash transfers given to a randomly selected group of mothers. In the case of the CCT program Progresa/Oportunidades, Attanasio and Lechene (2010) document for rural Mexico that, although total consumption is increased substantially by the program, the food share does not decline as expected, because there is a counterbalancing effect of the program on women's control of household resources. This finding is consistent with other studies focusing on Progresa in Mexico (Angelucci and Attanasio, 2009, 2013; Hoddinott et al., 2000), on Familias en Acción in Colombia (Attanasio et al., 2012), on Bono Solidario in Ecuador (Schady and Rosero, 2008), and on Atención a Crisis in Nicaragua (Macours et al., 2012). However, in all these settings, it is only possible to compare the spending patterns of recipient households with those of non-recipient households with similar levels of income. While these findings are consistent with a model where mothers and fathers spend income in a different way, and where the CCT program affects the control of household resources, they do not establish this result definitively. Nor do they enable us to measure the magnitude of the impact of the identity of the transfer recipient on the use of resources without imposing some structure on the data.

To test whether income is spent differently by men and women, recent field experiments focus on cash transfer programs in which the gender of the recipient is randomized. This design allows us to directly compare outcomes in households where a woman is the recipient of the transfer with households where the recipient is a man. The existing evidence from such studies shows no impact of targeted transfers on the structure of expenditures. However, it is problematic to

interpret these results as strong evidence that the identity of the transfer recipient is irrelevant for the allocation of household resources. Benhassine et al. (2015) study a cash transfer program in Morocco featuring a degree of randomization of the recipient's gender. They find little or no effect of targeting, but they report that husbands were able to fully appropriate the transfer, and therefore their setting is not suitable to effectively study this question. Haushofer and Shapiro (2016) study the effect of large unconditional cash transfers in rural Kenya, where, among other dimensions, the payment recipients are randomized to be either the wife or the husband. They too do not find any significant difference in the expenditure pattern. However, because this study had multiple experimental arms, the sample size for this comparison was small. As a result, only relatively large effects can be identified.[1]

In this paper, we address these limitations by directly studying in a large experiment whether targeting transfers to women or men leads to different expenditure patterns. We use data from a nationwide CCT program implemented in Macedonia from 2010. The program provides cash transfers to poor households, conditional on having their children enrolled in secondary school. Its unique feature is that the gender of the recipient is randomly targeted across the 84 municipalities. In half of them, the payment is targeted at mothers, and in the other half, it is targeted at fathers.

The design of the CCT program and the richness of the expenditure data allow us to examine whether expenditure patterns differ depending upon the targeted recipient of the transfer. This is the first time that it is possible to gather direct evidence on this issue using a large experiment. We focus on both budget shares of non-durables, and food budget shares for different categories within the food basket. We find that targeting CCT transfers to mothers has a positive effect on the food share of 4 to 5 percentage points, which corresponds to an average increase of 7%. Impacts on other expenditure categories are statistically insignificant.

To better understand what drives this effect, we go beyond a simple comparison between treatment arms, and we study how variation in the control of household resources can explain our result. While most of previous evidence focuses on uni-directional changes (generally in favour of women) in relative income shares induced by a policy intervention (Lundberg et al., 1997; Ward-Batts, 2008; Attanasio and Lechene, 2014), our experiment provides unique exogenous variation in income shares in favour of either mothers or fathers, depending on the payment modality of the CCT program. We therefore make use of detailed information about individual income to build mothers' income shares within each household and to estimate its impact on expenditure choices. An increase in the mother's income share by 1 percentage point leads to an increase in the food budget share by on average 0.25 percentage points. This is a sizeable effect given that, in a program like the Macedonian CCT, at follow-up, mothers' income shares were on average 17 percentage points higher in municipalities where payments were targeted at mothers (as compared to municipalities where payments were targeted at fathers).[2] This result provides the first exper-

[1] Akresh et al. (2014) study alternative cash transfer delivery mechanisms (among those the payment to mothers versus fathers) on household demand for preventative health services in rural Burkina Faso. They do not study the effect on the allocation of household expenditures.

[2] Targeted cash transfers can have large impacts on the intra-household distribution of income. In the case of Pro-

imental evidence confirming that the puzzling finding in literature linking CCT transfers paid to women with increases in both expenditure and the food budget share might indeed be due to a change in the bargaining power of women, resulting from an increase in the amount of resources they control (Attanasio and Lechene, 2010; Angelucci and Attanasio, 2009, 2013; Attanasio et al., 2012; Schady and Rosero, 2008).

Targeted transfers and expenditure choices are not only closely related to the distribution of income across partners, but also to the overall household income. We then focus on demand analysis by estimating Engel curves and studying how targeted transfers affect their shape. This analysis allows understanding whether targeting can differentially affect the structure of expenditures at different levels of household income. This is important since mothers' and fathers' Engel curves could have both different intercepts and slopes and therefore, could both be affected by the payment modality of the program.[3] Targeting mothers leads to a shift upwards of the Engel curve for food, making the impact homogeneous across the income distribution. Within the food basket, targeting transfers to women leads instead not only to a change in the intercepts of Engel curves, but also in their slopes. In households with low levels of food expenditure (presumably, the poorest), it induces a move away from salt and sugars, and towards meat, fish and dairy. This suggests that, at least at low levels of food expenditure, there is a shift towards a more nutritious diet as a result of targeting women. This is in line with the literature on transfers to women and child investment (Duflo, 2003; Macours et al., 2012).

The remainder of the paper is organized as follows. In Section 2 we describe the study area and the design of the intervention, while in Section 3 we introduce our dataset. We discuss the empirical strategy in Section 4 and the results in Section 5. Section 6 concludes.

2 The Macedonian CCT program

The Macedonian *Conditional Cash Transfer (CCT) for Secondary School Education* is a social protection program aiming to increase secondary school enrolment and completion rates among children in the poorest households in the country. It was first implemented by the Macedonian Ministry of Labour and Social Policy (MLSP) in the school year of 2010/11 in the whole country. It provided transfers to households conditional upon school-age children attending secondary school at least 85% of the time. The program was offered to beneficiaries of Social Financial Assistance (SFA), the largest income support program in Macedonia. SFA accounts for around 0.5%

gresa, in which payments were received by women only, the transfers represented 20% of household income (Attanasio and Lechene, 2010). Assuming husband's income remains constant, this corresponds to an increase of 17 percentage points in the wives' income share if the husband is the sole income earner or 8 percentage points if both partners contribute equally.

[3]For example, food Engel curves for women may not only have a higher intercept, suggesting that they spend a higher fraction of expenditure on food at low levels of income. They can also have a flatter slope, suggesting that the decline in the food share with income is slower for women than men. It is also possible that Engel curves for husbands and wives cross at some point. For example, when for women the intercept is higher, but the slope is also steeper. In this case, there would be values of total expenditure where a change in household resources would lead to a very little change in food shares, and others where the change would be substantial and in either direction.

of GDP, and 50% of total spending on social assistance (Verme, 2008), and targets households in the lowest tail of the income distribution (World Bank, 2009). It is a means-tested monetary transfer to people who are fit for work, but who cannot support themselves. It is a minimum guaranteed income, provided if, after other benefits are taken up, household income is still below a given threshold.[4] Overall, the CCT targeted around 12500 eligible households, who were recipients of SFA and simultaneously had at least one child of secondary school age.

The total annual amount of the subsidy provided by the CCT if all conditions are met is 12000 MKD per student, roughly 250 USD. The total amount received can be larger if the household has more than one child eligible. In terms of annual expenditure of targeted households, this corresponds to 8% of expenditure on non-durables and 16% of food expenditure. Instalments are paid quarterly in December, February, May and July, in correspondence with the quarters that constitute a school year (September-October, November-December, January-March and April-June). CCT payments are made after the school quarter is completed, and student attendance is checked. Attendance data is then entered in the CCT system by each school's officers and payments are processed by the MLSP. An internal audit procedure is implemented by MLSP to guarantee that payments are accurate. During the first two years of the program, the payment was processed via nominal cheques. These cheques can be cashed in local post offices or in banks, which excludes the need of a bank account to gain access to the transfer.

The recipient of the transfer was randomized across municipalities, allowing payments to be targeted to either the mother or the father of the child. Since the program was implemented in the whole country, no pure control group was introduced. Randomization of the payment modality was done at the municipality level. The 84 municipalities composing the Republic of Macedonia were first stratified into 7 groups depending on population size, and then randomized into two groups. In one group of 42 municipalities the transfer is paid to the mother of the child (*Mother municipalities*). In the other group of 42 municipalities the payment is transferred to the household head (*Father municipalities*). The household head, who is also the recipient of the SFA transfer, is generally the father of the child. In fact, across SFA recipients, the household head is the male partner in 90% of two-parent households, who in turn represent 88% of all SFA households. We select the sample such that the household head is either the mother or the father of the child (see section 3.1), and we address the issue that there exist female headed households in Father municipalities in section 4.1.[5]

Compliance with local guidelines governing the gender of the recipient is easy to ensure. The

[4]The benefit is equal to the difference between household income and the social assistance amount determined for the household, which depends on household size and time spent in SFA. It varies from a monthly amount of 1825 Macedonian Denars (MKD, $\approx$ 38 USD) for one-member household to 4500 MKD ($\approx$ 94 USD) for households with 5 or more members. We use the exchange rate 47.5346 MKD/USD (January 1st 2012). Source: National Bank of the Republic of Macedonia.

[5]The *Household Head* is the person in the household that is registered at the Social Welfare Centre (SWC) for the SFA benefit. In our setting, it is more likely that the household head is the adult male unemployed person representing the household. Since this is related to unemployment status, we check whether the program impacts labour supply. We do not observe any impact of payment modalities on labour supply or time use of both partners. Our results are robust to adding controls for employment status of both partners. See appendix A.5.

full CCT management is computerized, and the payments are processed depending on the family composition originally entered in the social protection system. It is rare to observe a payment targeted at the wrong person. In administrative data, less than 1% of payments is processed to a man when the payment should have been made to a woman (Armand and Carneiro, 2013). This is possibly due to mistakes in the original SFA database that were fixed during the implementation of the program. In our sample, we do not record any case.

3 Data

Our data comes from two waves of a Household Survey collected in 2010 and 2012. The surveys include detailed information on a variety of household characteristics and outcomes (demographic characteristics, expenditures on durable and non durable goods, housing), and individual level information on household members (education, health, labour supply, time use). Further details can be found in Armand and Carneiro (2013).

3.1 Sample structure and descriptive statistics

The baseline survey took place between November and December 2010. This period coincides with the beginning of the school year in which the CCT program became available. Due to delays in the implementation of the program in its first year, the CCT program came into place only after the completion of the baseline data collection and the first payments were processed only in March-April 2011.

At baseline, the population of eligible households was taken from the MLSP's electronic database of recipients of all types of financial assistance. This was assembled during the Summer of 2010 for the implementation of the program. The database was checked against hard-copy archives at the Social Welfare Centres (SWC), which administer social welfare provision at the local level. For evaluation purposes, a random sample was drawn from this group. Our population of interest consists of households eligible for the CCT program during the summer before the introduction of the program. The follow-up survey was collected during the Fall of 2012, two years after the beginning of the program.

In terms of family structure, originally our sample is quite diverse. Households can be composed of a single-parent or two-parents and can be either nuclear or non-nuclear. In addition, while in 90% of the cases households are led by a man, they can also be led by a woman (we discuss in detail how we exploit this characteristic in section 4.1). Table 1 decomposes the full sample in categories depending on family type and the residence of the household (whether living in a Mother or Father municipality).

In line with the literature on household decision making, we select the sub-sample of single family households for our analysis. Allowing for multi-family households in the sample would introduce further heterogeneity in the household decision process, which we want to avoid (see, for instance, Browning et al., 2014). In particular, we focus on households with two decision

Table 1: Actual recipient of the transfer by type of household and municipality

Enrolled in CCT	Presence of partners	Identity of the Household head	Actual recipient if living in a... FATHER Municipality	Actual recipient if living in a... MOTHER Municipality	Sub-sample
Yes	Both Present	Father	Father	Mother	**A1 (N = 613)**
		Mother	Mother	Mother	**A2 (N = 79)**
	Father only	Father	Father	Father	A3 (N = 17)
	Mother only	Mother	Mother	Mother	A4 (N = 65)
No	Both Present	Father	-	-	**B1 (N = 125)**
		Mother	-	-	**B2 (N = 35)**
	Father only	Father	-	-	B3 (N = 2)
	Mother only	Mother	-	-	B4 (N = 5)
Non-nuclear households		-	-	-	C (N = 81)

Note. Father (Mother) municipalities are municipalities where the transfers are paid to heads of households (mothers). The actual recipient differs due to the decision to participate in the program and due to heterogeneity in the household structure. "-" indicates that no one in the household is receiving the transfer since the household does not participate in the program. The sub-samples selected for the analysis are highlighted in grey. The column "Sub-sample" presents in parenthesis the sample size in each category at follow-up. Overall sample at follow-up is equal to 1022 households.

makers only (a mother and a father), who represents the vast majority of households in the sample (84% of households).

We select only households in which both parents are present (sub-samples A1, A2, B1 and B2). We do not analyse single parents due to sample size limitations for this category.[6] In addition, we exclude non-nuclear households (sub-sample C), where additional adult members, such as grandparents, are part of the family and living in the same dwelling. These households represents around 8% of the sample. Selecting only nuclear families also guarantees that, in all selected households, the household head is either the father or the mother of the child eligible for the CCT. Our results are unchanged by the inclusion of non-nuclear households where both parents are present.

Among the selected households, the combination of household headship and residence determines the actual recipient of the CCT transfer between the father and the mother of the child eligible for the program. In Mother municipalities, the mother is always the recipient if a household enrols in the program. In Father municipalities instead, the recipient depends of who in the household is the head. As previously reported, in 90% of the cases, this is the father of the child.

At baseline, we obtain a sample of 766 households with at least one child eligible for the CCT in the first two years of the program. Of these, 74 households were not interviewed at follow-up, giving an attrition rate of 9.66%. Attrition is not driven by the treatment modality (see appendix A.1). A probit regression of an indicator for not being interviewed at follow-up on the Mother municipality dummy and on demographic controls does not produce any significant predictor of attrition. We also show that our results are robust to using inverse probability weighting (Wooldridge, 2010) to correct for attrition or ANCOVA (see, for instance, McKenzie, 2012). The follow-up sample includes baseline households not attrited and a refresher sample of 162 households who

[6] Selecting only couples in nuclear families excludes from the follow-up sample 89 households, of which 70 households with female single parent and 19 with male single parent. In this group, we observe a large heterogeneity in family statuses (e.g. divorced, widowed, in relationship but not-cohabiting, etc.). This does not allow us to draw any conclusion or comparison among these sub-groups.

were enrolled in the program during the second year of the program, for a total of 852 households. Appropriate re-weighting is carried out since, at follow-up, we over-sampled households participating in the program, as opposed to drawing a random sample of SFA recipients eligible for the CCT (choice based sample). The refresher sample did not introduce any difference between treatment arms and the results are robust to the exclusion of the refresher sample (see table A1 in appendix).[7] Discrepancies between observations in the results' tables and the sample size are due to missing values in the outcome variables.

Table 2 presents means and standard deviations for household characteristics at baseline. Column (1) refers to the whole sample, while columns (2)-(3) refer respectively to households living in Father and in Mother municipalities. Households are composed on average of 4.8 members. The education of fathers is low, about 8 years of schooling. Fathers are however more educated than mothers, with an average difference of 1 year of schooling. At the same time, on average, fathers (with an average age of 45 in the sample) are 3 years older than their wives. Mothers contribute only to 15% of total household income, with almost 80% of mothers contributing no income to the household.[8] Fathers also have a larger share of relatives living in the same municipality (71%). When looking at the ethnic composition of our sample, the majority of households are from two main ethnic groups (Macedonian and Albanian), while a remaining 30% is composed by Roma, Turk and other residual ethnic groups. In terms of location of dwellings, 14% live in the capital city (Skopje), 57% in the Northern regions of the country, 27% in municipalities where the Albanian language is recognized as an official language (in addition to Macedonian).

Column (4) of table 2 presents mean differences for all these variables between households living in Father municipalities and households living in Mother municipalities. At baseline, the two groups are balanced on all demographic characteristics reported in the table. No mean difference is statistically different from zero. Table 2 also shows a joint test checking the balance of all these variables simultaneously. We run a probit regression of treatment assignment to a Mother municipality on household characteristics, and we test whether the coefficients in the regressions are jointly equal to zero. We do not reject that null hypothesis. This provides additional evidence that households in the two groups were balanced at baseline. The samples are also balanced when running non-parametric tests for the equality of distributions of outcomes across treatment modalities (see appendix A.8). Pre-program randomization was effective in achieving balance in the characteristics of sampled households.

In our sample, the take-up of the program in the first two years is estimated to be about 73%. This is computed by merging baseline households with the administrative records of the CCT program in either the first or the second year of the program. Households are listed in the CCT system

[7] Eligible children at baseline are in aged 12-16 years old. At baseline, an additional sample of households with children in the age group corresponding to the final year of secondary school was collected to study the living standards of the whole population of households in SFA with secondary school children. We exclude this sample from the analysis since these children aged out of the program at the moment of its introduction. At follow-up, we do not observe any difference across treatment modalities for this group of households. See figure A1 in appendix.

[8] We discuss in detail how the mother's income share is built in section 4.1. Additional descriptives for this variable are presented in appendix A.6.

if they enrolled a child in school and registered for the CCT program at the welfare centre. Take-up is slightly larger in Mother municipalities, but the difference is not significant. The compliance rate (e.g. the share of classes that enrolled students attend) is also not different across Mother and Father municipalities (Armand, 2015).

3.2 Expenditure shares and prices

In what follows, we analyse expenditure shares and relate them to prices and other household level variables. Here we describe how expenditure shares and prices are constructed in our context.

3.2.1 Total expenditure and budget shares

Expenditure shares are built using available information about purchases and self-production on a variety of items consumed by the household. We consider the main categories of items consumed by households in the sample, such as food, tobacco, clothing, schooling, health, utilities and other goods. Table 3 presents the description of each category considered.[9]

Expenditure data is collected using a recall method (see Deaton and Zaidi, 2002). A detailed expenditure section was included in the household questionnaire and divided into sub-sections depending on the characteristics of the goods and their proposed frequency of purchase. The adopted frequencies for reporting of each item are based on the Macedonian Household Budget Survey, an annual survey collected by the Macedonian State Statistical Office with the purpose of identifying expenditure patterns in the average Macedonian household. Based on these purchase frequencies, the survey collected information about expenditures with a reference period of one week for food; one month for expenses related to health, personal hygiene, transportation costs, sport, culture and entertainment and for meals provided at school; six months for clothing, utensils for the house, toys for children, house and vehicle maintenance; and one year for utilities and for school-related costs.

Using information about expenditure on individual items, we also computed an expenditure aggregate for non-durable goods.[10] We first transform all the expenditures on non-durable goods into a comparable time period. We then add up the expenditures on individual items. For food items, we take into account not only what the household spent on purchases, but also what the household actually consumed from self-production. To impute the value of self-produced items, we use a set of prices built upon a proximity criteria. This procedure is discussed in detail in Section 3.2.2.

Food is the main component in the budget, accounting, on average, for 55% of household expenditure (see table A.8 in appendix). The Macedonian State Statistical Office reports that the mean share of food for a representative sample of households in 2012 is around 34%. Our results are in line with the fact that we are focusing on the poorest sector of the Macedonian population.

[9] For food items, table A15 in appendix presents derivatives of food budget shares for each items contained in the sub-categories with respect to total food expenditure.

[10] Throughout the paper, we use total expenditure and food expenditure in real terms. See section 3.2.2.

Table 2: Descriptive statistics on household characteristics at baseline, by treatment status

		By municipality group		
	All	Father	Mother	Difference
	(1)	(2)	(3)	(4)
Household-level outcomes				
Schooling (father)	8.15	8.09	8.21	0.12
	[2.96]	[2.90]	[3.02]	(0.28)
Schooling (mother)	7.08	7.06	7.10	0.03
	[3.40]	[3.21]	[3.57]	(0.36)
Age (father)	44.51	44.61	44.42	-0.19
	[5.21]	[5.08]	[5.34]	(0.44)
Age difference (father - mother)	3.44	3.38	3.50	0.13
	[4.38]	[4.32]	[4.45]	(0.42)
Household members	4.79	4.76	4.82	0.06
	[1.11]	[1.09]	[1.12]	(0.13)
Children 0-12 y.o.	0.73	0.68	0.78	0.10
	[0.86]	[0.76]	[0.95]	(0.07)
Children 13-18 y.o.	1.75	1.74	1.76	0.02
	[0.66]	[0.68]	[0.65]	(0.06)
Household works in agriculture	0.27	0.30	0.23	-0.07
	[0.44]	[0.46]	[0.42]	(0.07)
Minority ethnic group	0.30	0.31	0.30	-0.01
	[0.46]	[0.46]	[0.46]	(0.07)
House property holder	0.04	0.03	0.04	0.00
	[0.19]	[0.18]	[0.19]	(0.02)
Mother's income share	14.91	14.00	15.81	1.81
	[33.08]	[32.56]	[33.59]	(2.93)
Father's share of relatives	0.71	0.73	0.69	-0.04
	[0.30]	[0.30]	[0.29]	(0.03)
Municipality-level outcomes				
Part of city of Skopje	0.14	0.13	0.15	0.02
	[0.35]	[0.34]	[0.36]	(0.08)
Albanian is an official language	0.27	0.27	0.26	-0.01
	[0.44]	[0.45]	[0.44]	(0.11)
Unemployment rate	31.53	30.06	32.98	2.91
	[10.12]	[10.50]	[9.53]	(2.27)
Northern Region	0.57	0.56	0.57	0.02
	[0.50]	[0.50]	[0.50]	(0.12)
Observations	764	378	386	764
Joint equality test (p-value)	.	.	.	0.91
Program take-up	0.73	0.71	0.75	0.04
	[0.44]	[0.45]	[0.43]	(0.04)

Note: *** p<0.01, ** p<0.05, * p<0.1. Columns (1)-(3) report sample means for the whole sample and restricted to different treatment modalities, standard deviations in brackets. Column (4) reports the difference between (3) and (2) estimated using OLS regression of the correspondent variable on the treatment indicator and clustering standard errors (reported in parenthesis) at municipality level. Minority ethnic groups include Roma, Serbs, Turks and Vlachs. Father's share of relatives indicates the share of relatives living in the same municipality of the household and that can be attributed to the father's family. Northern Region is composed by the administrative regions of Northeastern, Polog, Skopje and Eastern. To control for joint significance, we run a probit regression of the treatment indicator on the selected variables and we report p-values of an F-test for the joint significance of the coefficients. Treatment indicator is equal to 1 if the household lives in a Mother municipality and zero otherwise. Program take-up refers to the share of households enrolled in the CCT during either of the first two years of the program. This is computed by merging baseline households to the administrative records of the CCT program in either of the two years.

Table 3: Description of goods and food items

CATEGORY	**DESCRIPTION**
Food	Cereals, vegetables and fruit, meat, fish and dairy, coffee, tea and other beverages, fats, salt and sugars and other food items.
Alcohol and Tobacco	Beer, wine, other spirits, cigarettes and tobacco.
Clothing	Clothing and footwear.
Education	Tuition fees, uniforms, school supplies, textbooks, additional courses, transportation to school, meals at school and other school related expenses.
Health	Consultations, hospital services, medicines, surgical appliances, hearing aids, glasses, x-rays, echocardiograms and laboratory tests, transportation cost to health centres and other medical expenses.
Utilities and other expenses	Electricity, gas, phone and mobile phone bills and other non-durable expenditures.
FOOD CATEGORY	**DESCRIPTION**
Starches	Bread, wheat flour, rice, pasta and other cereal products, potatoes.
Fruit and vegetables	Fresh vegetables and fruit, beans, canned and pickled vegetables, and dried fruit.
Meat, fish and dairy	Fresh, dried and smoked meat, fresh and canned fish, eggs, milk, yoghurt, cheese, butter and other lipids.
Salt and sugars	Salties, sugar, honey, jam, chocolate, sweets and cookies, soft drinks, coffee and tea.
Other food	All other food items.

Note. The definition of categories is based on the structure of the annual Household Budget Survey collected by the Macedonian State Statistical Office. Food items within food categories are defined on the basis of frequency of purchase and of familiarity with the item.

In addition, households allocate, on average, 4% of the total budget to education, 13% to health, 3% on tobacco and alcohol, 5% on clothing, and 19% to utilities and other expenses. Within the food basket, several groups of (aggregated) food categories were identified, reflecting the structure of purchases of a typical Macedonian family. The food items with the highest share are starches, capturing on average 38% of total food expenditure. The next highest item is meat, fish and dairy, accounting for 35% of total food expenditure.

At baseline, differences in expenditure shares across the two treatment modalities are not statistically different from zero across different specifications. This provides additional evidence of baseline balance. In addition, since our data is based on a recall method, we also perform some tests to check for potential non-random measurement error induced by the payment modalities. Appendix A.7 provides evidence against this possibility in relation to differential presence of mothers and fathers during the interview or differential characteristics of the interviewers across treatment arms. Payment modalities do not induce significant differences across treatment arms. All our results are also robust to including these indicators as control variables.

3.2.2 Unit values and Prices

To compute real expenditure aggregates which include self-produced goods (important in rural areas), we require prices for consumed goods. Since geographically-disaggregated prices are not available, we approximate them with unit values using information on expenditures and quantities purchased (Attanasio et al., 2013, follow a similar procedure). This allows approximating prices at household (if the item is purchased), municipality, and regional levels. However, unit values can be computed only for food items, since quantities were not collected for non-food items. For these

items, we use regional dummies, a control for whether the household lives in the capital city, and a dummy for rural municipalities to proxy for price variation. These control variables are included in all specifications.

For food items, we compute median unit values starting from the lowest level of geographical clustering (municipality), and substituting for median values at higher levels (region, and then country) in case of missing purchases. We set the minimum acceptable number of observations per municipality per item at 6. When we observe a smaller number at the lower level, we move to larger geographical clusters.

Median unit values are first used to compute the value of self-produced goods, when a price is not available for the same household. Given the small size of the country and its relative degree of closeness to international markets, it is reasonable to assume that observed unit values are close to farm-gate prices. For these items, it is ideal to use farm-gate prices, since market prices include the intermediaries' markup.

Median unit values are also used to adjust total expenditure and food expenditure to real terms by building Stone Price indices, and subtracting them from nominal expenditures. Stone price indices are built at municipality level by weighting median unit values by the sum of all individual household expenditures in a certain municipality and on a certain item, and dividing by total expenditure in the municipality in the food category of the item. Since prices are only available for food, the real adjustment can only be carried out using a Food Price Index. Due to the small size of the country, we also expect little geographical variation on non-durables' prices.

Since the total amount transferred is relatively small and the CCT program is targeting only a small part of the population, we consider prices built using unit values as exogenous. At follow-up, we do not observe any effect of payment modalities on food prices (see appendix A.10).

4 Empirical strategy

The main goal of this paper is to study the effect of targeting resources to mothers rather than fathers on the structure of household expenditures. We use two complementary empirical approaches. First, we estimate the effect of targeting payments to mothers and of the mother's income share on expenditure shares. This analysis relies entirely on the variation induced by the randomization. Second, we estimate a demand system and examine how the intervention affects its parameters. This is necessary as changes in expenditure decisions induced by targeted transfers can be driven by direct changes in the control of resources or indirect changes through adjustments in total expenditure. Distinguishing between the two mechanisms requires a specific focus on household demand. We detail both approaches in the following sections.

4.1 Measuring the impact of targeted payments

We begin by comparing expenditure shares between households living in municipalities randomized to different payment modalities. Since enrolment in the program is voluntary (see section

3.1), these are intent-to-treat (ITT) estimates of the impact of gender-targeting on these outcomes. As we discuss below, the municipality of residence of a household does not guarantee that the mother or the father in the household actually receives the transfer. For this reason, the estimates that we obtain comparing the two groups of municipalities are ITT estimates.

Let $mother_j$ be an indicator variable equal to 1 if municipality j is a Mother municipality, and zero otherwise, and denote w_{ij} as an outcome of interest for household i in municipality j (e.g. the share of total expenditure spent on food). To measure the effect on w_{ij} of targeting the transfer to mothers we estimate the following relationship:

$$w_{ij} = \beta_0 + \beta_1 \, mother_j + X_i' \beta_{\mathbf{2}} + V_j' \beta_{\mathbf{3}} + \epsilon_{ij} \tag{1}$$

where X_i is a vector of household characteristics, V_j is a vector of municipality characteristics, and ϵ_{ij} is a household-specific error term. We cluster the standard errors at the municipality level.

We estimate equation (1) using the follow-up survey. In appendix A1, we present robustness checks using ANCOVA and controlling for the lagged value of the outcome variable. Household controls include the age and education of both partners, their ethnicity, household size, and a dummy variable to indicate whether the household is involved in farming. Municipality controls include a set of regional dummies, and indicators for the randomization strata, for whether the municipality is part of the capital city, and whether Albanian is an official language in the municipality.

The direct consequence of a transfer targeted at mothers or fathers is an increase in their relative income share. To understand the mechanism behind ITT estimates, we therefore take into account the endogenous receipt of the transfer by either the mother or the father of the child and we build mothers' income shares (which we indicate by $share_{ij}$). This measures our main source of variation in the control of household resources. We make use of several sources of income among the selected households, collected from both self-reported information and administrative data about transfers (we follow the same procedure as in Almås et al., 2017). We include labour income, income from financial assistance (including transfers from the CCT program) and assistance from family and friends. A mother's income share is then defined as the share of total parental income that can be attributed to the mother of the eligible child, such as, for example, income coming from the mother's relatives. In the case of the SFA subsidy, we attribute it to the legal recipient of this transfer, i.e. the household head.

The unique feature of the CCT program is that it generates exogenous shifts in relative income shares depending on the family's municipality of residence. In Father Municipalities, mother's income shares are low since the transfer is targeted at men, while in Mother Municipalities, mother's income shares are (relatively) high. However, actual changes in income shares depend on whether the household takes up the program. Among potential recipients initially sampled, around 73% received at least one CCT payment in the first two years of the program, and the remaining decided not to enrol in the program. In addition, the actual transfer to a mother also depends on

the choice of who within the household is declared as head. It is possible, for instance, that in a Father municipality the transfer is given to the mother if she is declared as head of household (see table 1 for a summary of these combinations). The program did not induce changes in household headship since this decision occurred before the introduction of the CCT as it is associated with the SFA registration, a pre-condition to enrol in the CCT program.

To solve endogeneity issues of the mother's income share that are related to program take-up and household headship, we use the randomisation variable, $mother_j$, as instrumental variable. We observe a strong relationship between residing in a Mother municipality and the mother's income share (see table B16 in appendix). This supports our identifying restriction that CCT payment modalities exogenously shifted intra-household income distribution. We then estimate the effect of mother's income share on household expenditure shares using the following specifications:

$$w_{ij} = \beta_0 + \beta_1 \, share_{ij} + X_i' \beta_{\mathbf{2}} + V_j' \beta_{\mathbf{3}} + \epsilon_{ij} \tag{2}$$

where again X_i is a vector of household characteristics, V_j is a vector of municipality characteristics, and ϵ_{ij} is an household-specific error term assumed to be clustered at the municipality level. We perform 2SLS estimation where $share_{ij}$ is instrumented using $mother_j$.

4.2 Demand system

The CCT program could shift the decision to allocate expenditure towards different resources not only through the control of the transfer, but also through its potential effect on total household expenditure. To disentangle these two mechanisms, we estimate a household demand model. We study whether the program's payment modalities induce a shift in the Engel curve (which could operate through its intercept or its curvature), a shift along the Engel curve, or both.

We first estimate a demand system for different goods using the Almost Ideal Demand System (Deaton and Muellbauer, 1980). We have also experimented with the Quadratic Almost Ideal Demand system (Banks et al., 1997), but the coefficient on the quadratic term of total expenditure is never significant for the good categories we consider, suggesting a linear relationship between the budget share and total expenditure for the sample analysed. The model we estimate is the following:

$$\begin{aligned} w_{ij}^n \;=\; & \beta_0 + \beta_1 \, mother_{ij} + \delta \, ln\left(\frac{exp_{ij}}{a\,(p)}\right) + \eta \, ln\left(\frac{exp_{ij}}{a\,(p)}\right) * mother_{ij} + \\ & + \sum_{n=1}^{N} \gamma_{ijn} ln\,(p_{nj}) + X_i' \beta_{\mathbf{2}} + V_j' \beta_{\mathbf{3}} + \epsilon_{ij} \end{aligned} \tag{3}$$

where w_{ij}^n is the expenditure share of good n, exp_{ij} is total household expenditure on non-durables, $a(p)$ is a price index and p_{nj} is the price of item n in municipality j. The price index $a(p)$ is defined in section 3.2.2.

Similar to the previous specification, X_i is a vector of household characteristics, V_j is a vector

of municipality characteristics, and ϵ_{ij} is a household-specific error term, which we assume to be clustered at the municipality level. Household and municipality characteristics are the same control variables as in the estimation of equation (1) and (2). These control variables are generally used in the literature for the estimation of Engel curves.[11] Similar to the analysis in section 4.1, we first estimate the demand system using $mother_j$ in equation (3), and we then consider the endogenous take-up of the program, by substituting it with the mother's income share ($share_{ij}$) and using $mother_j$ as instrumental variable. In order to understand whether payments to the mother change the allocation of food expenditures across items, we also extend our analysis to the demand within the food basket. In this case, we estimate demand system (3) by using the share of food expenditure allocated to food category m as dependent variables and by replacing total expenditure with food expenditure. In both cases, we estimate Engel curves by demeaning expenditure, food expenditure and $share_{ij}$ to facilitate the interpretation of the main effect when introducing interactions.

In estimating the demand system, we take into account the fact that some variables on the right hand side of equations (3) can be endogenous. This is a potential issue for the mother's income share (as discussed in section 4.1), and for total expenditure (either because of the presence of measurement error or because of taste heterogeneity). We tackle this issue using a control function approach, which consists in adding to the estimating equation an approximation to the conditional mean of the residuals, given the endogenous variables.

The main reason to consider a control function approach is the possibility to allow for interactions between endogenous variables. This is particularly important since it allows understanding whether targeting payments to women induces only a shift in the intercept of the Engel curves, or also changes in their slopes. While a shift in the intercept indicates homogeneous impacts across the income distribution, a change in the slope (or both) indicates heterogeneous effects at different points of the income distribution.

We first estimate first stage regressions of the endogenous variables on the exogenous variables in the model, including exclusion restrictions for each endogenous variable. We then compute the residuals of these first stage models, and incorporate functions of these residuals as control variables in equations (3). The exact form of the control function depends on the specific assumptions about the probability distribution of the residuals in all the model's equations. We approximate these unknown functions with second-order polynomials in the residuals. Standard errors are estimated using a bootstrap estimator allowing for clustering at municipality level to account for the correlation between households living in the same location and same treatment unit.[12]

We use as the exclusion restriction for the mother's income share equation the randomization

[11] Since the CCT program provides payments conditional on children attending school, it could then be important not only to control for household structure, but also for the number of children enrolled in school. However, the latter can be related with other household unobservable characteristics also affecting consumption decisions. Our estimates are unaffected by the inclusion of the number of children in school as a control variable or by estimating the demand system instrumenting it (see appendix B.3). In the main text, we treat it as exogenous to expenditure choices.

[12] The proposed control function approach and 2SLS lead to similar estimates when no interaction between endogenous variables is considered. See appendix B.2.

variable $mother_j$, as discussed in section 4.1. In addition, following a standard procedure in the literature, we use information about wealth as an exclusion restriction in the equation for total expenditure (see, for example, Dunbar et al., 2013). We discuss in detail the endogeneity issues, the control function procedure, and the instruments we have used in appendix B.1, where we also present the results of the first stage of our demand system. We also consider the endogeneity of school choices. Our conclusions are unaffected by estimating the demand system instrumenting for the number of children enrolled in school.

5 Results

In this section, we begin by focusing on ITT estimates of the impact of targeting CCTs to mothers on household expenditure, on expenditure shares and on the share of food expenditure allocated to different food categories. We then estimate the relationship between income shares and expenditure choices. Finally, we estimate demand systems using a sample of around 850 households and using information collected during the follow-up survey in 2012.

5.1 Impacts on expenditure shares

Our main results concern the impact of the targeting payments to mothers on the consumption patterns of households living in different municipalities. Columns (1)-(2) in table 4 present means and standard deviations for total household expenditure on non-durables, for the value of households' durables, and for expenditure shares, at follow-up. Columns (3)-(5) present differences between Mother and Father municipalities estimated using OLS regressions accounting for different sets of control variables. Pre-program differences in expenditure shares across the two treatment modality groups are not statistically different from zero, providing additional evidence of baseline balance (see appendix A.8).

Targeting mothers had a significant effect on the share of total expenditure allocated to food. At follow-up, we find a statistically significant higher food share of roughly 4 percentage points for households residing in Mother municipalities. This corresponds to an average increase of 7% in the budget share of food, which is a sizeable effect. The estimate is robust to estimating the difference using ANCOVA and controlling for the lagged value of the food share (see table A2 in appendix). Our result is consistent with the previous literature showing that transfers targeted at women increase the expenditure share on food (see, for instance, Attanasio and Lechene, 2010). We also observe a marginally significant decrease in the expenditure shares of clothing and of tobacco and alcohol, although these results become statistically insignificant when we add controls to the model.

The observed difference in budget shares is not driven by differences in overall household expenditure across the two groups of municipalities. In fact, when looking at total expenditure on non-durables, we do not observe significant differences between the two groups. This is an expected result, since the program did not introduce a pure control group of municipalities, i.e.

Table 4: Expenditure on non-durables, budget shares and food budget shares

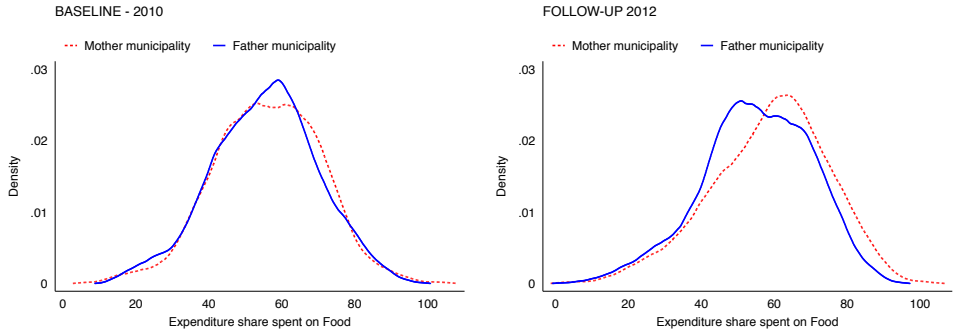
	Average by Municipality group		OLS Difference [Mother - Father]		
Sub-sample:	Father	Mother	All	All	All
	(1)	(2)	(3)	(4)	(5)
Ln Real Expenditure	7.52	7.54	-0.00	-0.00	0.03
	[0.54]	[0.58]	(0.07)	(0.07)	(0.06)
Ln Durables Value	10.50	10.55	0.01	0.01	0.05
	[0.88]	[1.22]	(0.11)	(0.11)	(0.10)
Expenditure Shares					
Food	55.10	58.73	3.91**	4.01**	3.91**
	[14.95]	[16.51]	(1.76)	(1.68)	(1.55)
Tobacco and alcohol	3.95	2.66	-0.98*	-0.98*	-0.87
	[6.43]	[4.60]	(0.58)	(0.56)	(0.54)
Clothing	5.31	4.24	-0.70	-0.72*	-0.59
	[5.19]	[4.70]	(0.44)	(0.43)	(0.44)
Education	3.86	4.39	0.34	0.32	0.51
	[5.10]	[5.91]	(0.53)	(0.54)	(0.51)
Health	10.67	9.97	-1.14	-1.18	-1.48
	[11.29]	[10.22]	(0.92)	(0.91)	(0.89)
Utilities and other expenses	21.10	20.01	-1.43	-1.46	-1.48
	[10.83]	[11.58]	(1.19)	(1.18)	(1.13)
Food Budget Shares					
Starches	34.64	35.14	0.71	0.67	0.32
	[16.58]	[16.14]	(1.80)	(1.82)	(1.80)
Meat, fish and dairy	35.96	35.18	-0.58	-0.63	-0.50
	[15.49]	[15.58]	(1.57)	(1.60)	(1.56)
Fruit and vegetables	13.84	14.90	0.83	0.81	1.01
	[9.87]	[9.12]	(0.74)	(0.74)	(0.77)
Salt and sugars	14.03	13.16	-0.98	-0.89	-0.88
	[8.87]	[7.21]	(0.78)	(0.75)	(0.71)
Other food	0.01	0.07	0.04	0.05	0.06
	[0.21]	[0.77]	(0.03)	(0.03)	(0.04)
Observations	418	429	847	847	847
Municipality controls	-	-	No	Yes	Yes
Demographic controls	-	-	No	No	Yes

Note. Standard deviations in brackets, standard errors clustered at municipality level in parenthesis (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Total expenditure is reported in real terms and computed in logarithms. Budget shares are defined as the ratio between expenditure on a specific category and total household expenditure on non-durables. Food budget shares are defined as the ratio between expenditure on a specific category and total food expenditure. Budget shares and Food budget shares are multiplied by 100. Mother (Father) municipalities are municipalities where the transfer is paid to the mother (father) of the child. In columns (3)-(5) differences are estimated from running the corresponding least squares regression on the Mother municipality dummy, equal to 1 if the transfer is made to mothers and zero otherwise. All specifications include region and stratum indicators. The full list of controls is presented in section 4.1. Sample is restricted to observations at follow-up.

the CCT transfer is potentially offered to every eligible household in the country. The difference in budget shares is also not driven by differences in the frequency of purchase. We look at the share of non-zero consumption for each item and we find no significant effects on the proportion of non-zero expenditures. Similarly, we look at the frequency of visits to the market by both partners, and we do not observe any significant difference across treatment groups (see appendix A.4). Overall, this suggests the observed change in food shares is a genuine increase in its expenditure share, rather than a spurious change, caused by changes in frequency of purchase.

The impact of targeting payments to mothers is also evident by looking at the distribution of food budget shares in both groups of municipalities. Figure 1 presents the Kernel density for the food budget share at baseline and follow-up in the Mother and in Father municipalities. At baseline, we cannot reject the null of equality using a two-sample Kolmogorov-Smirnov (KS) test. In appendix B.1.2 we present similar evidence for the distribution of total expenditure. At follow-up, the distribution of food budget shares for Mother municipalities is entirely shifted to the right relative to the distribution in Father municipalities. A KS test rejects the null of equality of the distributions in the two samples. The main drivers of this difference are households allocating more than 35% of total expenditure to food, i.e. the poorest households in the sample.

Figure 1: Non-parametric distribution fit for food budget shares at baseline and follow-up



Note. The distribution fit is estimated non-parametrically using a Kernel density. The left panel shows the comparison between Mother and Father municipalities at baseline, while the right panel shows the same at follow-up. A two-sample KS test statistic is equal to 0.06 at baseline (p-value 0.51) and to 0.15 at follow-up (p-value < 0.01).

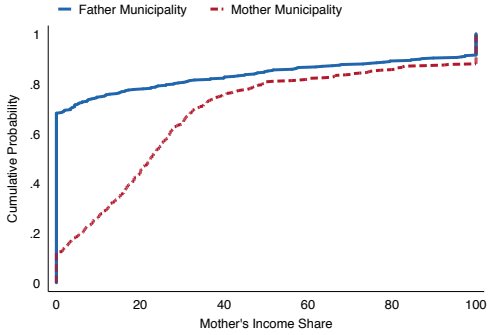
Since we observe a robust effect of the identity of the transfer recipient on food expenditure shares, we next investigate the allocation of food expenditures within the food basket. The lower panel of table 4 focus on the allocation of food expenditure in different food items. At follow up, on average, we cannot detect any statistically significant difference between households living in Mother and Father municipalities. The result is consistent across different estimation methods. As expected, the same is true at baseline (see appendix table A.8).

5.2 The Demand for Food

5.2.1 Control of Household Resources

To understand the mechanism behind the observed ITT effect on the food budget share, we focus specifically on the role of relative parental contribution to household income. We begin by focusing on the effect of targeted payments on the share of household income attributed to mothers. At baseline, when the CCT program was not in place and no payment was transferred to the households, the distribution of income within households was not different among households living in the two types of municipalities (see table 2). At follow-up, in households residing in Mother Municipalities, the mother's income share was 17 percentage points higher than in households residing in Father Municipalities. Figure 2 shows the cumulative distribution of mother's income share in Mother and Father Municipalities at follow-up. While in Father Municipalities, around 70% of households present a zero-share for the mother, in Mother Municipalities, this percentage is reduced to around 10%. This provides evidence that the CCT program was particularly effective in shifting income shares towards mothers in Mother municipalities and towards fathers in Father municipalities.

Figure 2: Cumulative distribution of mother's income share, by treatment group



Note. The figure shows the cumulative distribution of mother's income share in Mother and Father Municipalities at follow-up. Vertical axis reports the share of observations in which mother's income share is smaller or equal to the corresponding value. Mother's income share is defined as the share of total parental income that can be attributed to the woman in the household, and is multiplied by 100. Parental income is computed using all sources of income in the period 2010-2012 using both self-reported and administrative data (see section 4.1).

We then proceed by focusing on the effect of income shares on the food expenditure shares. In columns (1)-(3) of table 5 we present estimates of equation (2) where the main source of variation is captured by the mother's income share. An increase of one standard deviation in the mother's income share leads to an increase in the food budget share of around 0.24 percentage points.

To show robustness of our estimates, in columns (4)-(6), we present estimates of equation (2) replacing $share_{ij}$ with an indicator variable equal to one if, in the first two years of the program, at least one CCT transfer was received by the mother in household i, residing in municipality j, and zero otherwise.[13] If the mother received at least one CCT payment the food budget share

[13] Similar results are obtained by using a quantitative measure of the income received by the mother from the CCT.

was higher by around 5.5 percentage points relatively to households where the mother received no CCT payments. This suggests that women receiving at least one CCT payment tend to obtain multiple CCT payments over the course of the program. In fact, at follow-up, having received at least one CCT payment leads to an increase in mothers' income share by 21 percentage points (see appendix A.3). In appendix A.2, we also present these estimates for all other goods and we find no significant effect of targeting payments to mothers.

Table 5: Control of Resources and Food Budget Shares - IV estimates

	Dep.var.: Food Budget Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's income share	0.234**	0.243**	0.240**			
	(0.117)	(0.112)	(0.106)			
Actual transfer to mother				5.603**	5.733**	5.512**
				(2.592)	(2.474)	(2.256)
Observations	847	847	847	847	847	847
F-test for excluded instrument	42.976	43.277	42.652	464.614	479.774	584.026
Municipality controls	No	Yes	Yes	No	Yes	Yes
Demographic controls	No	No	Yes	No	No	Yes

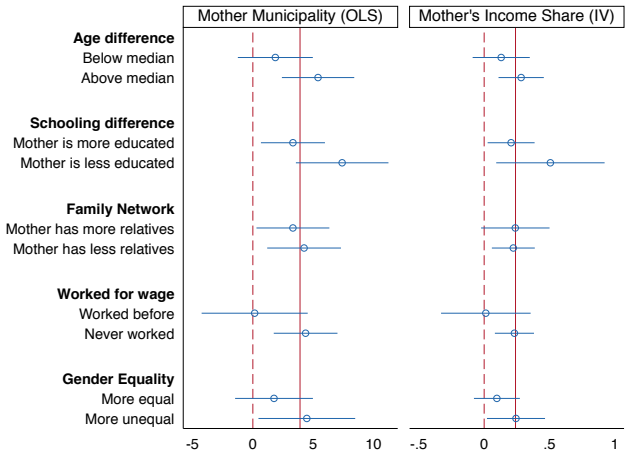
Note. Estimates based on 2SLS estimation using equation (2). Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the food budget share, defined as the ratio between the expenditure on food and the total household expenditure. *Actual transfer to mother* is a dummy variable equal to 1 if a woman received at least one payment during the first two years of the program. *Mother's income share* is defined as the share (multiplied by 100) of total parental income that can be attributed to the woman in the household. Endogenous variables are instrumented with *Mother municipality*, a dummy variable equal to 1 if the household resides in a Mother municipality and 0 otherwise. First stage estimates are presented in table B16. All specifications include region and stratum indicators. The full list of controls is presented in section 4.1.

Exogenously shifting income shares towards mothers could in principle generate differential effects in households where mothers have larger or lower control over the resources. We therefore focus on available household-level indicators that have been used in the literature to proxy for the intra-household distribution of power between partners: the age and education difference between husbands and wives (see, for instance, Browning et al., 1994), and the extent of relative family networks (Attanasio and Lechene, 2014). We measure age and education differences by subtracting the mother's age and years of schooling from the father's age and years of schooling. We measure the extent of the relative family network by computing, for both mothers and fathers, the total number of parents, brothers and sisters, uncles and aunts living in the same municipality. We use the relative share of relatives as a measure of family network. We also proxy for family values by looking at whether the mother has never worked for wage in her whole life (see, for instance, Alesina et al., 2013).

Figure 3 presents estimates of the impact of targeted payments on the food budget share in different sub-samples. In the left panel, the effect is the ITT impact, estimated using equation (1), while in the right panel, we present the effect of the mother's income share, estimated using equation (2). For each variable, we split the sample in two sub-groups and estimate the impact on food budget share separately. The solid lines represent the estimates using the whole sample

Targeting payments to mothers has an overall positive effect on all groups as we do not observe a negative coefficient. While we cannot statistically reject that the coefficients are different among

Figure 3: Heterogeneous effects of targeted payments on the food budget share

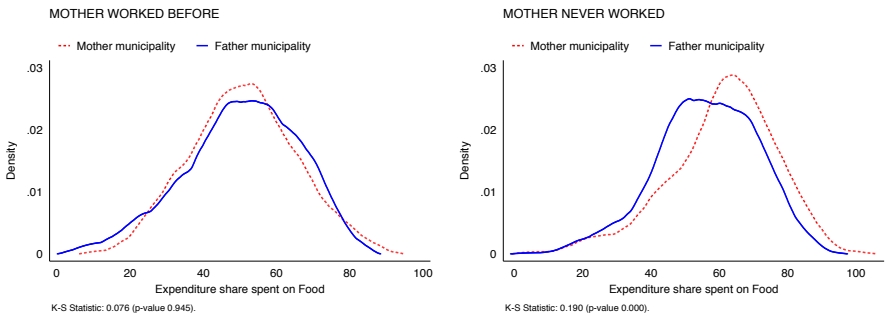


Note. The figure plots marginal effects of residing in a Mother Municipality (left panel) and of mother's income shares (right panel) on the food budget share. In the left panel, marginal effect are estimated using equation (1), in the right panel with equation (2). Each coefficient is computed in separate regressions where the sample is restricted to the categories reported in the left column. Standard errors are clustered by municipality and confidence intervals are built using a 90% significance level. The dashed lines indicate the value zero, the solid lines represent the OLS and IV estimates using the whole sample (see tables 4 and 5).

each of the two sub-groups, most of the estimates are significantly positive in the groups that are related to lower control of the household resources for the mother, such as being younger or less educated than the father, having smaller family networks and having never worked for wage. On the contrary, for most of the outcomes, we cannot reject the null hypothesis of a zero effect for the sub-groups that proxy higher control of resources.

Non-parametric evidence leads to similar conclusions. For age and mother's employment, a KS test leads to a rejection of equality of the food budget share distributions in the Mother and Father Municipalities when age difference is smaller and when the mother never worked (see figure 4). This hypothesis cannot be rejected when focusing on households in which the age difference is larger and in which the mother worked. See figure A3 in appendix for other sub-groups.

Figure 4: Non-parametric treatment effect on food shares, by mother's work experience



Note. The distribution fit is estimated non-parametrically using a Kernel density. The left panel shows the comparison between Mother and Father municipalities for the group in which mothers worked before, while the right panel shows the same for the group in which mothers never worked before. Two-sample KS test statistics is reported at the bottom of each figure.

Heterogeneous ITT estimates of the impact of targeting mothers on the food budget share

show similarities in terms of direction with IV estimates of the effect of mother's income share. This supports the idea that the main results are driven by an increase in the control of resources, through a shift of the mother's income share. This explanation is also in line with the findings in Almås et al. (2017). Women in this same program present higher empowerment (defined by their willingness to pay for receiving a cash transfer instead of having her husband receiving it) after experiencing targeted transfers.[14]

An alternative mechanism that could explain changes in household consumption relates to individual time allocation. To test this hypothesis, we collected information about the amount of time spent by both parents the day before the interview on different activities, including both leisure and work time. We do not find any effect of targeting on time allocation. A similar conclusion is reached by focusing on self-reported labour supply. We discuss some of these issues in appendix A.5.

5.2.2 Targeted Transfers and Income Heterogeneity

One of the objectives of CCT programs is to increase household income, one of the main determinants of expenditure choices. In the case of the Macedonian CCT, the annual transfer was equal to 8% of the average household expenditure on non-durables, an increase that would plausibly impact how households allocate expenditures. However, the relative importance of the transfer can be very different at the tails of the expenditure distribution. For instance, in the lowest quartile (the poorest), the transfer was equal to 13% of total expenditure, while in the top quartile it represented only 4%. This suggests that the effect of targeting payments to mothers might be heterogeneous in total household expenditure.

Since CCT payments affected jointly total expenditure and the recipient of the transfer, it is therefore necessary to examine not only the impact of targeting on expenditure shares, but also how Engel curves are affected. While, on average, total expenditure was not affected by the different payment modalities (see table 4), targeted transfers can plausibly affect both the level and the slope of the Engel curves, potentially generating different effects at different points on the income distribution.

We begin by estimating an Engel curve for food using equation 3 (see section 4.2 for details about the estimation procedure). The estimation results for the first stage are discussed in appendix B.1. We report the coefficient estimates of the Engel curve in table 6. In column (1), we estimate the impact of living in a Mother Municipality on the intercept of the Engel curve. In column (2) we also interact this variable with the (demeaned) household expenditure, allowing targeting to affect the slope of the Engel curve as well. In columns (3)-(4) of this table, we focus instead on the effect of mother's income share. The control function approach allows for a straightforward test for endogeneity, by testing the significance of the control functions in the estimating equations. The table also reports a regression-based Hausman test for the endogeneity of the selected endogenous

[14] It is not possible to make use of the measurement collected in Almås et al. (2017) since it focused on urban areas only, and therefore fewer households in the sample were part of the study.

control variables.

Table 6: Food Engel curve

	Dep.var.: Food Budget Share			
	(1)	(2)	(3)	(4)
Mother Municipality	4.57***	4.57***		
	(1.66)	(1.67)		
Mother Municipality x Expenditure		-0.48		
		(3.17)		
Mother's income share			0.30***	0.30***
			(0.09)	(0.09)
Mother's income share x Expenditure				0.06
				(0.06)
Expenditure	-8.64**	-8.36**	-8.83***	-8.93***
	(3.50)	(3.90)	(3.41)	(3.43)
Observations	847	847	847	847
R^2	0.201	0.201	0.212	0.214
Joint significance of main effect and interaction (p-value)	.	0.02	.	0.00
Endogeneity test (p-value)	0.00	0.00	0.00	0.00

Note. Bootstrap standard errors clustered by municipality (2000 replications) are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the food budget share, defined as the ratio between the expenditure on food and the total household expenditure. Expenditure and Mother's income share are demeaned. *Expenditure* is the total household expenditure on non-durable. *Mother municipality* is a dummy variable equal to 1 if the household resides in a Mother municipality and 0 otherwise. *Mother's income share* is defined as the share (multiplied by 100) of total parental income that can be attributed to the woman in the household, and is instrumented with the *Mother municipality* dummy. Estimation procedure through control function approach and the full list of controls are presented in section 4.2. The test of joint significance of main effect and interaction is performed with an F test. The endogeneity test is performed as a joint Wald test for the equality to zero of all coefficients in the polynomial of residuals. The full list of controls is presented in sections 4.1 and 4.2.

In line with Engel's law, food is a necessity for these households. The share of expenditures allocated to food decreases as total expenditure increases. An increase by 10% in total expenditure is associated with a decrease of 0.8-0.9 percentage points in the food budget share. This corresponds to an expenditure elasticity of food demand at the mean values in the sample of 0.85.[15]

At lower levels of total household expenditure, food represents a much larger share of the household expenditures. However, offering transfers to women shifts the intercept on the Engel curve by 4.57 percentage points, but the change in the slope is not statistically significant.[16] Similarly, an increase in the mother's income share by 1 percentage point shifts the Engel curve up by 0.30 percentage points. Again we do not observe any significant effect when we look at the change of the slope. Overall, this result suggests that targeting payments to mothers was beneficial in terms of increased food budget share throughout the expenditure distribution.

Engel curves also allow us to provide evidence on the puzzling finding in literature that CCT transfers paid to women tend to increase both expenditure and the food budget share. In fact, we observe that small increases in the mother's income share can offset the reduction in the food budget share induced by an increase in expenditure. In order to compensate the reduction in the food budget share induced by a 10%-increase in total expenditure, we would require a shift of the income share towards mothers by just about 3 percentage points. This result is consistent with

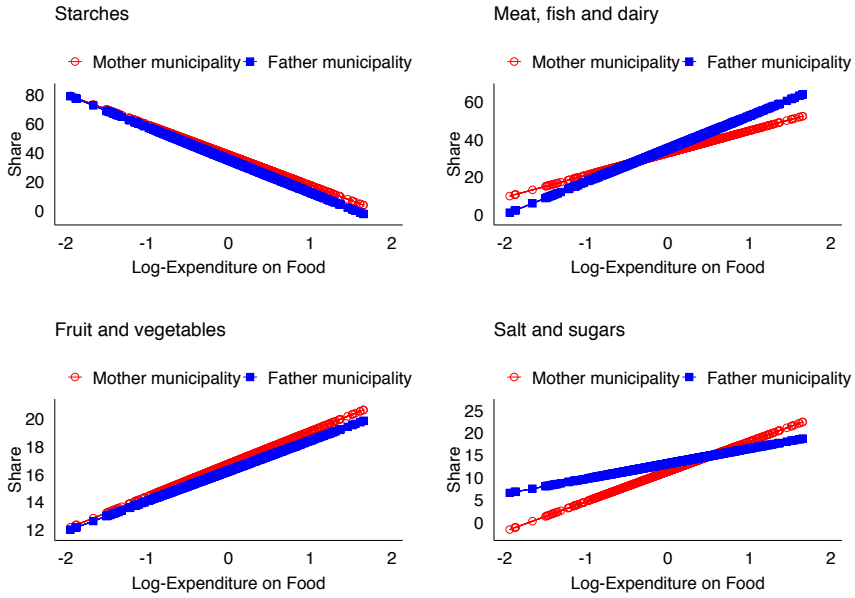
[15] Following Green and Alston (1990), the expenditure elasticity of food demand at mean values in the AIDS specification is equal to $(1 + \delta/w^F)$, where δ is estimated using equation (3) and w^F is the average food budget share at follow-up. See estimates in table 6.

[16] In the estimation of the Engel curves, we demean expenditure, food expenditure and mother's income share to facilitate the interpretation of the main effect when an interaction term is introduced. See section 4.2.

the findings of Angelucci and Attanasio (2013) and Attanasio and Lechene (2010) for Progresa, whose transfer is about 2.5 times the transfer in Macedonia (relative to household expenditure).[17] To relate our findings with the design of other CCT programs, we also make use of Engel curve estimates to predict food budget shares under different scenarios, such as introducing payments to mothers or fathers only, or introducing a larger transfer. In our setting, we estimate that introducing a transfer comparable to Progresa would increase the effect on the food budget share of targeting mothers to about 7 percentage points (see appendix A.9).

We focus next on the components of the food budget. Table 7 presents the estimated coefficients of the demand system for different items in the food basket. Each equation in the system is given by equation (3) for a specific food category. Similarly to table 6, columns (1)-(2) show the impacts of residing in a Mother municipality on the Engel curve, and columns (3)-(4) show the impact of an increase in mother's income share. Figure 5 plots the Engel curves within the food basket using the estimated coefficients in column (2). In appendix A.11, we show that Engel curves at baseline are not statistically different across treatment groups.

Figure 5: Estimated Engel curves for food categories



Note. The figure presents estimated Engel curves (holding other control variables constant at the average) for food categories for households living in a Mother municipality and for households living in a Father municipality. Estimated coefficients are reported in column (2) of table 7. Log-Expenditure on Food is demeaned.

At lower levels of expenditure, households tend to consume mainly starches, while at higher levels, these are substituted with meat, fish and dairy, with vegetables and with salt and sugars.

[17] Attanasio and Lechene (2010) estimate that an increase of 20% in total expenditure (which corresponds to the average transfer of the program) reduces food budget share by about 4 percentage points. If the husband is the sole income earner and his income is constant, the transfer targeted at wives would increase their income share by about 17 percentage points. We would therefore need an increase in the food budget share of 0.24 percentage points per percentage point increase in income share to obtain an overall zero effect of the transfer.

When turning our attention to the role of targeted transfers, we observe statistically significant changes in the intercepts and/or the slopes of the Engel curves for all food categories, except fruit and vegetables. Targeting CCT payments to mothers in households with low levels of food expenditure (presumably, the poorest) induces a move away from salt and sugars, and towards meat, fish and dairy. This suggests that, at low levels of food expenditure, there is a shift towards a more nutritious diet as a result of targeting women.

6 Conclusion

Most social programs in the developing world support poor families with transfers that are mainly channelled to women. However, the effect of providing additional cash to one specific family member on household consumption allocation is still unclear. One problem in the literature has been the lack of suitable data for this analysis. Most of these interventions have transferred their financial support uniquely in the hands of women, restricting the possibility of comparing outcomes for households where the transfer is exogenously provided to a different household member.

This paper studies the effect of a nationwide transfer program, the Macedonian CCT for Secondary School education. This program provided cash transfers to poor households in Macedonia conditional on having their children enrolled in secondary school. As targeted recipients were randomized across municipalities to be either the mother or the father of the child, it deliberately changed the control of resources within households.

When provided with an additional source of income, mothers and fathers spend income differently. Targeting women increases the share of resources allocated to food and has a significant impact on the shape of Engel curves for different food items. For lower levels of food expenditures, mothers allocate more resources to more nutritious diet. One potential driver of our results is that husbands and wives have different preferences. An increased control of household income by wives shifts expenditure towards food and different types of food, presumably because women favour these goods more than men.

Table 7: Demand system for the food basket

	Dep.var.: Food Budget Share of Food Category			
	(1)	(2)	(3)	(4)
Starches				
Mother Municipality	3.43*	3.42*		
	(2.01)	(2.01)		
Mother Municipality x Food Expenditure		1.62		
		(2.67)		
Mother's income share			0.22*	0.21*
			(0.12)	(0.12)
Mother's income share x Food Expenditure				0.09*
				(0.05)
Food Expenditure	-21.55***	-22.57***	-22.42***	-22.31***
	(4.34)	(4.87)	(4.44)	(4.21)
Meat, fish and dairy				
Mother Municipality	-2.22	-2.21		
	(1.83)	(1.77)		
Mother Municipality x Food Expenditure		-5.66**		
		(2.76)		
Mother's income share			-0.15	-0.14
			(0.11)	(0.11)
Mother's income share x Food Expenditure				-0.11**
				(0.05)
Food Expenditure	13.92***	17.49***	14.22***	14.09***
	(4.42)	(5.15)	(4.39)	(4.14)
Fruit and vegetables				
Mother Municipality	0.50	0.50		
	(0.96)	(0.96)		
Mother Municipality x Food Expenditure		0.17		
		(1.67)		
Mother's income share			0.03	0.03
			(0.06)	(0.06)
Mother's income share x Food Expenditure				-0.02
				(0.03)
Food Expenditure	2.30	2.19	2.40	2.37
	(2.54)	(2.91)	(2.65)	(2.67)
Salt and sugars				
Mother Municipality	-1.74**	-1.75**		
	(0.85)	(0.84)		
Mother Municipality x Food Expenditure		3.31***		
		(1.24)		
Mother's income share			-0.10**	-0.11**
			(0.05)	(0.05)
Mother's income share x Food Expenditure				0.04**
				(0.02)
Food Expenditure	5.45***	3.36	5.92***	5.97***
	(1.98)	(2.37)	(1.88)	(1.92)
Observations	847	847	847	847

Note. Bootstrap standard errors clustered by municipality (2000 replications) are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variables are the shares of food expenditure spent on each category. Food Expenditure and Mother's income share are demeaned. *Food Expenditure* is total expenditure on food items. *Mother municipality* is a dummy variable equal to 1 if the household resides in a Mother municipality and 0 otherwise. *Mother's income share* is defined as the share (multiplied by 100) of total parental income that can be attributed to the woman in the household. Estimation procedure through control function approach and the full list of controls are presented in section 4.2. The full list of controls is presented in sections 4.1 and 4.2.

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APPENDIX for "The Effect of Gender-Targeted Conditional Cash Transfers on Household Expenditures: Evidence from a Randomized Experiment"

A Additional analysis

A.1 Attrition and sample selection

We present an analysis of attrition rate at follow-up from baseline household. Columns (1)-(3) in table A1 present probit regressions of attrition under different specifications. The dependent variable is equal to one if the household was interviewed at baseline and not re-interviewed at follow-up, and zero if the household was interviewed in both rounds. Similarly, in columns (4)-(6), we check whether the refresher sample was added differentially in different treatment arms. The dependent variable is a dummy variable equal to 1 if the observation is from the refresher sample and zero if it is from the baseline. In both cases, living in a Mother municipality is not driving the attrition rate, nor the refresher sampling.

Table A1: Probability of attrition at follow-up

Dep.var.:	**Household did not respond at follow-up**			**Household is part of refresher sample**		
	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	Probit	Probit	Probit	Probit	Probit
Mother municipality (d)	0.009	0.009	0.003	0.009	0.009	0.009
	(0.021)	(0.021)	(0.021)	(0.020)	(0.020)	(0.019)
Observations	766	766	766	852	852	852
Municipality controls	No	Yes	Yes	No	Yes	Yes
Demographic controls	No	No	Yes	No	No	Yes

Note. Marginal effects. Standard deviations in brackets, standard errors in parenthesis clustered at municipality level (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. In columns (1)-(3), the dependent variable is equal to one if the household was interviewed at baseline and was not re-interviewed at follow-up and zero otherwise. In columns (4)-(6), the dependent variable is equal to 1 if the observation is from the refresher sample and zero if it is from the baseline. All specifications include region and stratum indicators. The full list of controls is presented in section 4.1.

To understand the role of sample selection of the effect of food budget share, we then study how the estimate of the impact of targeting mothers under different sub-samples (table A2). We first focus on baseline differences. Column (1) compares food budget shares across treatment arms among all eligible households, while column (2) restricts the sample to households with younger eligible children (12-14 at baseline). Balance at baseline is confirmed across sub-samples.

The effect at follow-up is also robust to selection on different sub-samples. Column (3) presents estimates for equation (1) restricting the estimation to only households interviewed at baseline. To control for robustness to attrition, column (4) presents estimate for equation (1) using inverse probability weighting (Wooldridge, 2010). This increases the weight of observations which had a higher attrition rate at follow-up. In column (5) we also implement ANCOVA analysis by including the lagged value of the dependent variable. This specification maximizes statistical power in experiments, if autocorrelations of outcome variables are low (McKenzie, 2012). In our setting, auto-correlation in the food budget share is equal to 0.17, suggesting this is a preferred method compared to a DiD estimation. Similarly, in column (6), we control for the municipality

Table A2: Treatment effect on food budget share under different sub-samples

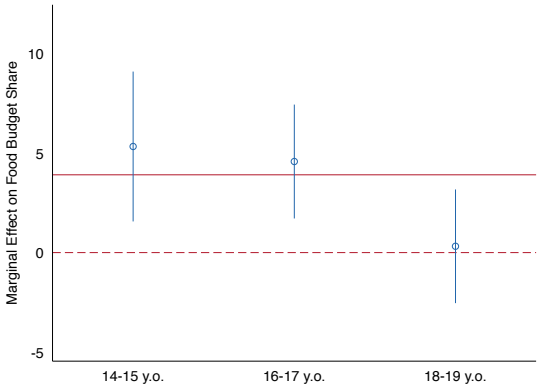
	Dep.var.: Food Budget Share					
	BASELINE		FOLLOW-UP			
Sub-sample:	All eligible households	Households with younger children	Panel households	Panel households (IPW)	All eligible households (ANCOVA)	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
Mother municipality	0.106	0.095	3.909**	3.840**	4.153***	4.334***
	(1.430)	(1.837)	(1.554)	(1.677)	(1.572)	(1.497)
Observations	756	352	677	677	658	847
Lagged dep.var.	No	No	No	No	Yes	No
Lagged dep.var. (municipality)	No	No	No	No	No	Yes

Note. Standard errors clustered at municipality level in parenthesis (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Food budget share is defined as the ratio between food expenditure and total household expenditure on non-durables. Budget shares are multiplied by 100. *Mother municipality* is a dummy variable equal to 1 if the transfer is targeted to mothers and zero otherwise. All specifications include region and stratum indicators. The full list of controls is presented in section 4.1.

average at baseline of the dependent variable. In both cases the results are unaffected. The result observed at follow-up is robust to these checks.

We also focus on the effect of targeting payments to mothers on the food budget share depending on the age of children present in the household. To capture this heterogeneity, we estimate equation (1) and we interact the Mother municipality indicator with dummy variables for the presence in the household of children in the age groups 13-14, 15-16 and 17-19. Marginal effects are presented in figure A1. We observe that the main effect of targeting on the food budget share is driven by households with younger children.

Figure A1: Marginal effects of targeting on food budget shares, by age of children



Note. The figure shows marginal effects computed by estimating equation (1) and interacting the Mother municipality indicator with dummy variables for the presence in the household of children in the age groups 13-14, 15-16 and 17-19. Standard errors clustered by municipality and confidence intervals are built using a 90% significance level. The dashed line indicates the value zero, the solid line represents the OLS estimate using the whole sample (see table 4).

A.2 Program impact: ITT versus IV and Control Function estimates

We compare ITT estimates of the program's impact on budget shares and food budget shares with IV estimates that take into account the take-up of the program. Table A3 presents the results. Column 1 presents ITT estimates using equation (1). Column 2 and 3 present IV estimates using

equation (2) where the main source of variation is given by the actual transfer to a mother and by the mother's income share, respectively.

Table A3: Comparison of OLS and IV estimates of program's impact

Estimation method (variable)	OLS (Mother Municipality) (1)	2SLS (Actual Transfer to a Mother) (2)	2SLS (Mother's income share) (3)
Expenditure Shares			
Food	3.91**	5.51**	0.24**
	(1.55)	(2.30)	(0.11)
Tobacco and alcohol	-0.87	-1.22	-0.05
	(0.54)	(0.75)	(0.03)
Clothing	-0.59	-0.83	-0.04
	(0.44)	(0.63)	(0.03)
Education	0.51	0.72	0.03
	(0.51)	(0.72)	(0.03)
Health	-1.48	-2.09	-0.09
	(0.89)	(1.30)	(0.06)
Utilities and other expenses	-1.48	-2.09	-0.09
	(1.13)	(1.62)	(0.07)
Food Budget Shares			
Starches	0.32	0.45	0.02
	(1.80)	(2.55)	(0.11)
Meat, fish and dairy	-0.50	-0.71	-0.03
	(1.56)	(2.21)	(0.10)
Fruit and vegetables	1.01	1.42	0.06
	(0.77)	(1.08)	(0.05)
Salt and sugars	-0.88	-1.25	-0.05
	(0.71)	(1.01)	(0.04)
Other food	0.06	0.08	0.00
	(0.04)	(0.05)	(0.00)
Observations	847	847	847

Note. All specifications include Municipality and Demographic controls. Standard errors clustered at municipality level in parenthesis (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Total expenditure is reported in real terms and computed in logarithms. Expenditure shares are defined as the ratio between expenditure on a specific category and total household expenditure on non-durables. Food budget shares are defined as the ratio between expenditure on a specific category and total food expenditure. Budget shares ad food budget shares are multiplied by 100. Column (1) presents program's impact estimates using equation (1) on the Mother Municipality dummy. In column (2)-(3), the impact is estimated using (2) and instrumenting endogenous variables with the Mother Municipality dummy. "Mother's income share" is defined as the share (multiplied by 100) of total parental income that can be attributed to the woman in the household. The full list of controls is presented in section 4.1.

We can compare control function estimates with 2SLS estimates. Table A4 presents estimates for equation 3 comparing the control function approach and the 2SLS estimation method. Control function and 2SLS lead to very similar results under our functional form assumption for the control function.

A.3 Targeted versus actual transfer and the mother's income share

In this section, we study how, at follow-up, mother's income share is affected by the payment modalities of the CCT program. We first look at how living in a Mother versus a Father municipality affected mothers' income shares. We estimate an OLS regression where the dependent variable is the mother's income share and the regressor of interest is the Mother municipality dummy variable. Columns (1)-(3) in table A5 presents the estimates. In households living in a Mother municipalities, the mother's income share is 17 percentage points larger. The estimate might differ from the estimate in B16 since we do not include the instruments for total expenditure

Table A4: Food Engel curve: comparison between Control Function and 2SLS estimates

	Dep.var.: Food Budget Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Estimation method:	CF	2SLS	CF	2SLS	CF	2SLS
Mother Municipality	4.57***	4.80***				
	(1.66)	(1.10)				
Mother's income share			0.30***	0.26***		
			(0.09)	(0.06)		
Actual transfer to mother					5.36**	6.71***
					(2.16)	(1.50)
Expenditure	-8.64**	-7.63***	-8.83***	-8.00**	-8.54**	-7.51**
	(3.50)	(2.92)	(3.41)	(3.45)	(3.53)	(2.99)
Observations	847	847	847	847	847	847

Note. In columns (1) and (3), bootstrap standard errors clustered by municipality (2000 replications) are presented in parentheses (84 clusters in total). In columns (2) and (4), standard errors clustered by municipality are presented in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the food budget share. *Expenditure* is the (demeaned) total household expenditure on non-durable. *Mother municipality* is a dummy variable equal to 1 if the household resides in a Mother municipality and 0 otherwise. *Actual transfer to mother* is a dummy variable equal to 1 if a woman received at least one payment during the first two years of the program and is instrumented using the *Mother municipality* dummy. *Mother's income share* is defined as the share of total parental income that can be attributed to the woman in the household. All specifications include region and stratum indicators, municipality and household controls. The full list of controls is presented in section 4.2. Endogenous variables are instrumented using a control function approach in columns (1), (3) and (5) (see section 4.2), and 2SLS in columns (2), (4) and (6).

in this specification regression. We then look at how mother's income share is affected by whether a mother received at least one CCT payment in the first two years of the program. We therefore estimate linear regression with endogenous treatment effects where the actual receipt of at least one transfer is instrumented with the Mother municipality dummy variable. Having a mother received at least one payment leads to an increase in mothers' income share by on average 21 percentage points. This clearly suggests that women receiving at least one transfer tend to receive multiple transfers, as the average shift in the income share is large.

Table A5: Mother's income share, targeted and actual recipient of the transfer

	Dep.var.: Mother's Income Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Estimation method:	OLS	OLS	OLS	IV	IV	IV
Mother municipality	16.743***	16.574***	17.038***			
	(2.536)	(2.507)	(2.420)			
Actual transfer to mother=1				21.926***	21.681***	20.881***
				(2.972)	(2.892)	(2.930)
Observations	852	852	852	852	852	852
Municipality controls	No	Yes	Yes	No	Yes	Yes
Demographic controls	No	No	Yes	No	No	Yes

Note. Estimates based on OLS estimation (columns 1-3) and on a linear regression with endogenous treatment effect (column 4-6). Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the mother's income share. All specifications include region and stratum indicators. The full list of controls is presented in section 4.2.

A.4 Effect on the decision to purchase

We focus here on the share of non-zero consumption for each item. We build dummy variables equal to 1 if the item was consumed and zero otherwise. We start by focusing on budget shares. Table A6 presents descriptive statistics about non-zero expenditures and mean difference between Mother and Father municipalities for all goods and for food categories within the food basket. For most items there is no difference at follow-up.

Table A6: Non zero expenditures, by treatment status

	BASELINE			**FOLLOW-UP**		
	Municipality group			**Municipality group**		
	(1)	(2)	(3)	(4)	(5)	(6)
	Father	Mother	Difference	Father	Mother	Difference
Food	1.00	1.00	0.00	1.00	1.00	-0.01
	[0.00]	[0.00]	(0.00)	[0.00]	[0.05]	(0.00)
Tobacco and Alcohol	0.31	0.34	-0.01	0.45	0.36	-0.08
	[0.47]	[0.47]	(0.05)	[0.51]	[0.49]	(0.06)
Clothing	0.80	0.81	0.03	0.83	0.76	-0.06
	[0.40]	[0.39]	(0.04)	[0.39]	[0.44]	(0.04)
Education	0.83	0.90	0.07	0.90	0.87	-0.05
	[0.38]	[0.30]	(0.04)	[0.31]	[0.36]	(0.04)
Health	0.97	1.00	0.03**	0.98	0.98	-0.01
	[0.18]	[0.05]	(0.01)	[0.15]	[0.15]	(0.01)
Utilities and other expenses	1.00	0.99	-0.00	1.00	0.99	-0.01
	[0.00]	[0.07]	(0.00)	[0.00]	[0.11]	(0.01)
Starches	1.00	1.00	0.00	0.99	1.00	0.01
	[0.00]	[0.00]	(0.00)	[0.10]	[0.05]	(0.00)
Meat, fish and dairy	1.00	0.99	-0.01**	0.98	0.99	0.00
	[0.00]	[0.11]	(0.01)	[0.12]	[0.11]	(0.01)
Fruit and vegetables	0.92	0.92	-0.00	0.92	0.95	0.04*
	[0.27]	[0.28]	(0.03)	[0.28]	[0.21]	(0.02)
Salt and sugars	0.94	0.95	0.01	0.97	0.97	-0.01
	[0.23]	[0.21]	(0.02)	[0.17]	[0.18]	(0.02)
Other food	0.03	0.02	-0.00	0.01	0.03	0.01
	[0.16]	[0.15]	(0.01)	[0.12]	[0.19]	(0.01)
Observations	375	381	756	418	429	847
Demographic controls	-	-	Yes	-	-	Yes

Note. Standard deviations in brackets, standard errors clustered at municipality level in parenthesis (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Non-zero expenditures are defined as a dummy variable equal to one if the household consumed the item and zero otherwise. In columns (3) and (6) differences are estimated from running the corresponding least squares regression on the Mother municipality dummy, equal to 1 if the transfer is made to mothers and zero otherwise. The full list of controls is presented in section 4.1.

We then focus on whether the payment modalities affect the frequency of visits to the market. The following question was collected during the survey: "*How frequent do you and your partner go to the market?*". Frequency of visits were collected for both partners. Table A7 presents estimates of ITT effect of payment modalities on the frequency. No significant effect is highlighted.

A.5 Time use and Labour Supply

We collected information on time use the day before the interview for both parents. We report the share of the day spent on the following activities: sleeping, doing house chores, working, taking care of elderly, shopping, leisure with children, leisure without children, helping children to study and doing other activities (with and without children). Table A8 presents differences in time use

Table A7: Frequency of visits to the market

	Dep.var.: How frequent do you go to the market					
	Father			Mother		
	(1)	(2)	(3)	(4)	(5)	(6)
Mother municipality	-0.063	-0.074	-0.066	0.006	0.003	0.020
	(0.118)	(0.114)	(0.114)	(0.170)	(0.162)	(0.150)
Observations	841	841	841	844	844	844
R^2	0.076	0.082	0.097	0.112	0.132	0.198
Municipality controls	No	Yes	Yes	No	Yes	Yes
Demographic controls	No	No	Yes	No	No	Yes

Note. Estimates based on OLS estimation using equation (1). Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the frequency at which fathers and mothers go to the market. The exact question reads as follow: "*How frequent do you and your partner go to the market?*". The scale of the variable is the following: 1 - daily, 2 - once per week, 3 - once every two weeks, 4 - monthly, 5 - less frequently than monthly, 6 - never. All specifications include region and stratum indicators. The full list of controls is presented in section 4.1.

across treatment groups at baseline and follow-up. No difference is significant at both baseline and follow-up. This provides evidence that the targeting of payments had no impact on time use.

Table A8: Share of the day spent on different activities by treatment status

	BASELINE			FOLLOW-UP		
	Municipality group			Municipality group		
	(1)	(2)	(3)	(4)	(5)	(6)
	Father	Mother	Difference	Father	Mother	Difference
FATHERS						
Sleeping	0.376	0.382	0.013*	0.383	0.383	0.003
	[0.062]	[0.062]	(0.007)	[0.060]	[0.066]	(0.008)
House chores and working	0.226	0.223	-0.009	0.231	0.235	-0.003
	[0.162]	[0.153]	(0.021)	[0.189]	[0.204]	(0.019)
Time with children	0.135	0.143	0.010	0.127	0.144	0.019
	[0.106]	[0.115]	(0.015)	[0.138]	[0.142]	(0.015)
Shopping and leisure	0.142	0.138	0.006	0.142	0.128	-0.013
	[0.127]	[0.131]	(0.014)	[0.125]	[0.123]	(0.015)
Other activities	0.121	0.114	-0.020	0.116	0.110	-0.006
	[0.127]	[0.128]	(0.017)	[0.160]	[0.156]	(0.023)
Observations	309	320	629	406	418	824
MOTHERS						
Sleeping	0.363	0.370	0.009	0.381	0.382	0.002
	[0.057]	[0.062]	(0.007)	[0.060]	[0.060]	(0.008)
House chores and working	0.226	0.223	-0.009	0.231	0.235	-0.003
	[0.162]	[0.153]	(0.021)	[0.189]	[0.204]	(0.019)
Time with children	0.157	0.165	0.015	0.132	0.143	0.006
	[0.115]	[0.112]	(0.012)	[0.110]	[0.122]	(0.013)
Shopping and leisure	0.077	0.080	0.008	0.085	0.087	0.006
	[0.089]	[0.087]	(0.007)	[0.089]	[0.095]	(0.010)
Other activities	0.068	0.070	-0.005	0.058	0.061	0.001
	[0.090]	[0.098]	(0.010)	[0.086]	[0.093]	(0.010)
Observations	327	358	685	405	426	831

Note. Standard deviations in brackets, standard errors in parenthesis clustered at municipality level (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the share of the day spent by fathers (upper panel) and mothers (lower panel) on different activities. The standard errors on the differences are estimated from running the corresponding least squares regression on treatment status allowing for the errors to be clustered at municipality level. Treatment status is equal to 1 if the transfer is made to mothers and zero otherwise.

Table A9 presents instead estimates of the impact of payment modalities of the probability of both partners to have worked for salary or in agriculture during the week before the interview. We do not record any significant effect on labour supply.

Table A9: Labour supply

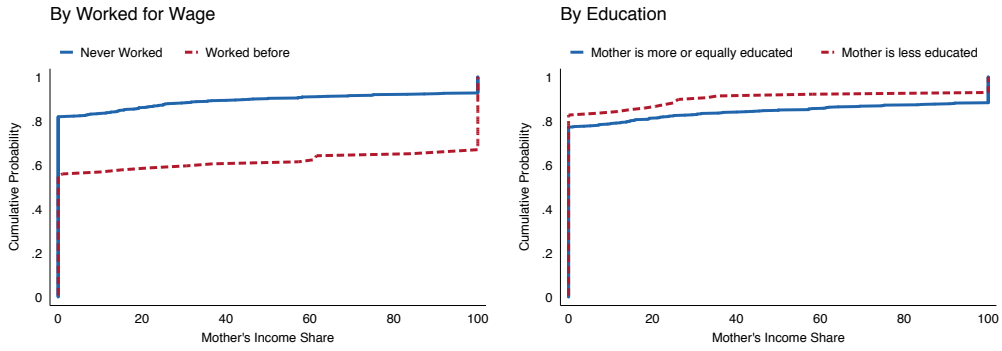
Dep.var.:	Worked				Worked in Agriculture			
	Father		Mother		Father		Mother	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother municipality	-0.053	-0.049	-0.027	-0.024	-0.032	-0.000	-0.023	0.005
	(0.039)	(0.038)	(0.019)	(0.018)	(0.040)	(0.037)	(0.040)	(0.038)
Observations	852	852	852	852	852	852	852	852
R^2	0.049	0.099	0.044	0.065	0.224	0.376	0.226	0.342
Municipality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	No	Yes	No	Yes	No	Yes	No	Yes

Note. Estimates based on OLS estimation using equation (1). Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is an indicator variable equal to 1 if the person worked (columns 1-4) or worked in agriculture (columns 6-8) in the week before the interview. All specifications include region and stratum indicators. The full list of controls is presented in section 4.2.

A.6 Mother's income share at baseline

Figure A2 shows the cumulative distributions of mother's income share at baseline, by sub-groups. The left panel compares income shares by whether the mother worked for wage before. In almost 80% of households in which the mother never worked, income share is equal to zero. This is reduced to about 60% when the mother worked before for wage. The right panel presents instead a comparison by looking at the education differences between partners. We observe a similar pattern, with women less educated than their partner presenting lower income shares.

Figure A2: Cumulative distributions of mother's income share at baseline



Note. The figures show the cumulative distribution of mother's income share at baseline, by sub-grops. Vertical axes report the share of observations in which mother's income share is smaller or equal to the corresponding value. Mother's income share is defined as the share of total parental income that can be attributed to the woman in the household, and is multiplied by 100. Parental income is computed using all sources of income self-reported at baseline.

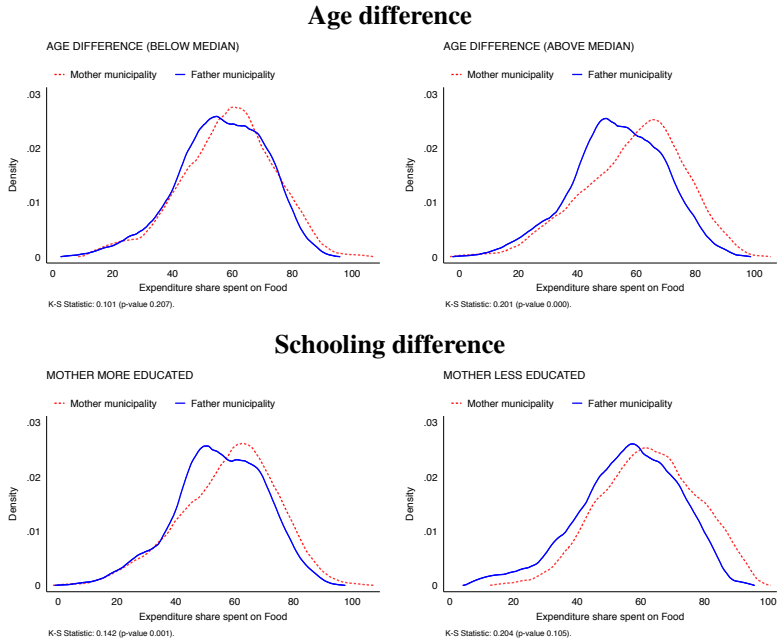
Table A10 presents estimates of OLS regression of mother's income share with determinants on intra-household power distribution. We focus on the age and education difference between husbands and wives, the extent of relative family networks, whether the mother has never worked for wage in her whole life and values related to gender roles (as measured in the World Values Survey). Figure A3 presents instead the distributions of the food budget shares in Mother and Father Municipalities for all these variables in different sub-groups.

Table A10: Determinants of mothers' income shares

	Dep.var.: Mother's income share					
	(1)	(2)	(3)	(4)	(5)	(6)
Age difference	-0.001					-0.000
	(0.004)					(0.004)
Schooling difference		-0.006				-0.002
		(0.004)				(0.004)
Father's share of relatives			-0.119**			-0.119***
			(0.047)			(0.045)
Mother never worked for wage				-0.261***		-0.249***
				(0.044)		(0.045)
Gender Equality (low)					-0.055	-0.061
					(0.057)	(0.059)
Observations	766	764	763	766	729	724
R^2	0.082	0.088	0.094	0.144	0.087	0.165

Note. Estimates based on OLS estimation. All specifications include Municipality and Demographic controls. All specifications include region and stratum indicators, municipality and household controls. The full list of controls is presented in section 4.1. Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the mother's income share, defined as the share of total parental income that can be attributed to the woman in the household. Differences are defined as the measure for the father minus the value for the mother.

Figure A3: Non-parametric heterogeneous treatment effects of targeting on food budget shares



Note. Differences are defined as the measure for the husband minus the same for the wife. The distribution fits are estimated non-parametrically using a Kernel density. Each figure shows the comparison between Mother and Father municipalities. Two-sample KS test statistics and p-values are presented at the bottom of each figure.

A.7 Presence of partners during the interview

As a standard in the literature, expenditure data is collected with a recall method. However, if treatment modalities induce differential presence of respondents or different interviewers, we might be facing an issue with non-classical measurement error. To test this possibility, we make use of available information about whether mothers and fathers are both present during the interview (this is happening in around 70% of cases) and whether the interviewer is younger than 30 and has more than secondary school education. Table A11 presents estimate of the effect of payment modalities on these variables, while table A12 presents instead estimates of the effect of residing in a Mother Municipality and of the mother's income share on the food budget share, when controlling for these variables. This provides evidence against non-random measurement error.

Table A11: Targeted payments, presence of respondents and interviewers' characteristics

Dep.var.:	**Father and Mother are present**		**Interviewer younger than 30 y.o.**		**Interviewer has more than secondary education**	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother municipality	0.033	0.029	-0.053	-0.057	0.020	0.014
	(0.049)	(0.048)	(0.077)	(0.075)	(0.072)	(0.071)
Observations	852	852	852	852	852	852
R^2	0.115	0.131	0.173	0.202	0.158	0.170

Note. Estimates based on OLS estimation. All specifications include region and stratum indicators, municipality and household controls. The full list of controls is presented in section 4.1. Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variables are dummy variables for the presence of both partners during the interview, for the interviewer's age and education.

Table A12: Targeted payments and food budget share, controlling for potential measurement error

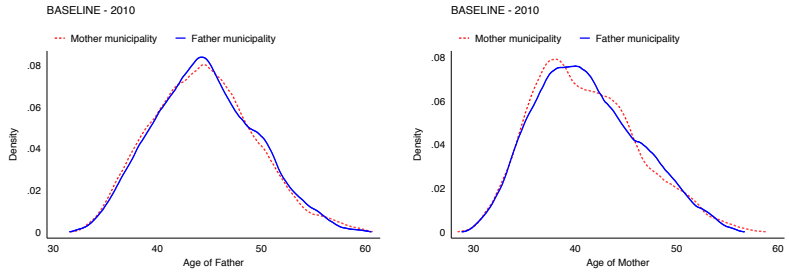
Dep.var.:	**Food Budget Share**			**Mother's Income Share**		
	OLS	OLS	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Mother municipality	3.904**	3.887**	3.933**			
	(1.552)	(1.550)	(1.563)			
Mother's income share				0.238**	0.239**	0.242**
				(0.105)	(0.105)	(0.107)
Observations	847	847	847	847	847	847
R^2	0.164	0.164	0.166	-0.128	-0.130	-0.135
Father and Mother presence	Yes	No	No	Yes	No	No
Interviewer's age	No	Yes	No	No	Yes	No
Interviewer's has university degree	No	No	Yes	No	No	Yes

Note. Estimates based on equation (1) (OLS) in columns 1-3 and equation (2) (IV) in columns 4-6. All specifications include region and stratum indicators, municipality and household controls. The full list of controls is presented in section 4.1. Standard errors clustered by municipality are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variables are the Food budget share (columns 1-3) and the mother's income share (columns 4-6).

A.8 Baseline balance checks

Table 2 in the main text shows that, at baseline, our sample is balanced across treatment groups for a series of observable characteristics. We also perform non-parametric tests to check baseline balance. For instance, figure A4 presents non-parametric distribution fit for both father's and mother's age. K-S tests cannot reject the equality of the distributions.

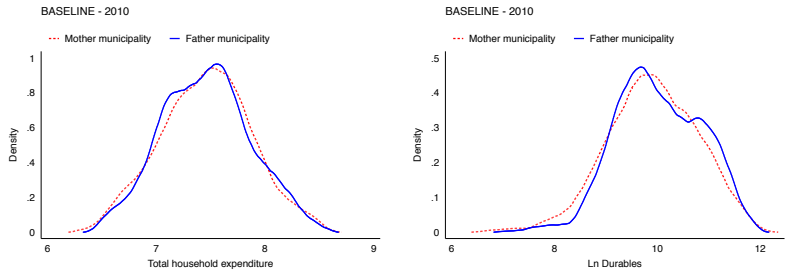
Figure A4: Non-parametric distribution fit for father's and mother's age at baseline



Note. The distribution fit is estimated non-parametrically using a Kernel density. The figure shows the comparison between Mother and Father municipalities at baseline for father's age (left panel) and for mother's age (right panel).

Table A13 presents a comparison of total expenditure and durables, of expenditure shares and of food budget shares at baseline. Columns (1) and (2) presents sample means and standard deviations by Municipality group, while columns (3)-(5) estimate the difference between the two group of Municipalities using different sets of controls. Total expenditure and wealth are both balanced at baseline. No statistically significant difference is observed at baseline across different treatment arms. This is also true non-parametrically by comparing their distributions. Figure A5 presents the distributions of the total household (log-)expenditure and of wealth for households living in Mother and Father municipalities. A KS test for these variables cannot reject the equality of the distributions.

Figure A5: Non-parametric distribution fit for total household expenditure and durables at baseline



Note. The distribution fit is estimated non-parametrically using a Kernel density. The figure shows the comparison between Mother and Father municipalities at baseline for total household (log-)expenditure (left panel) and for the value of durables (right panel).

Table A13: Expenditure on non-durables, budget shares and food budget shares, at baseline

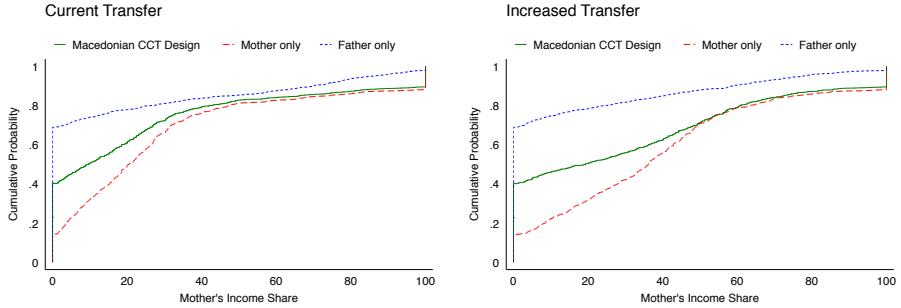
	Average by Municipality group		OLS Difference [Mother - Father]		
Sub-sample:	Father	Mother	All	All	All
	(1)	(2)	(3)	(4)	(5)
Ln Real Expenditure	7.46	7.45	0.01	0.01	0.01
	[0.43]	[0.46]	(0.04)	(0.05)	(0.04)
Ln Durables Value	9.92	9.88	-0.08	-0.08	-0.06
	[1.32]	[1.16]	(0.13)	(0.13)	(0.13)
Expenditure Shares					
Food	55.30	56.09	0.32	0.26	0.11
	[14.16]	[14.26]	(1.50)	(1.47)	(1.43)
Tobacco and alcohol	3.15	3.30	-0.27	-0.26	-0.20
	[5.59]	[6.79]	(0.63)	(0.61)	(0.60)
Clothing	5.41	4.45	-0.22	-0.20	-0.19
	[4.74]	[4.01]	(0.44)	(0.43)	(0.43)
Education	3.91	4.47	0.45	0.42	0.49
	[6.68]	[6.59]	(0.66)	(0.65)	(0.60)
Health	13.52	12.36	-0.60	-0.55	-0.56
	[11.80]	[9.97]	(0.95)	(0.94)	(0.95)
Utilities and other expenses	18.72	19.32	0.32	0.32	0.36
	[9.41]	[8.88]	(1.06)	(1.03)	(1.03)
Food Budget Shares					
Starches	39.54	37.19	-2.32	-2.40	-2.61
	[15.50]	[17.75]	(2.05)	(2.02)	(1.94)
Meat, fish and dairy	35.19	36.02	0.94	0.98	1.24
	[13.68]	[15.14]	(1.50)	(1.45)	(1.37)
Fruit and vegetables	11.99	12.92	0.91	0.92	0.85
	[7.97]	[9.18]	(0.98)	(0.98)	(0.97)
Salt and sugars	12.08	12.54	0.43	0.47	0.49
	[7.25]	[8.00]	(0.74)	(0.73)	(0.75)
Other food	0.09	0.02	-0.08	-0.08	-0.08
	[0.81]	[0.21]	(0.05)	(0.05)	(0.05)
Observations	375	381	756	756	756
Municipality controls	-	-	No	Yes	Yes
Demographic controls	-	-	No	No	Yes

Note. Standard deviations in brackets, standard errors clustered at municipality level in parenthesis (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Total expenditure is reported in real terms and computed in logarithms. Budget shares are defined as the ratio between expenditure on a specific category and total household expenditure on non-durables. Food budget shares are defined as the ratio between expenditure on a specific category and total food expenditure. Budget shares and Food budget shares are multiplied by 100. Mother (Father) municipalities are municipalities where the transfer is paid to the mother (father) of the child. In columns (3)-(5) differences are estimated from running the corresponding least squares regression on the Mother municipality dummy, equal to 1 if the transfer is made to mothers and zero otherwise. All specifications include region and stratum indicators. The full list of controls is presented in section 4.1. Sample is restricted to observations at baseline.

A.9 Targeted Transfers and alternative designs

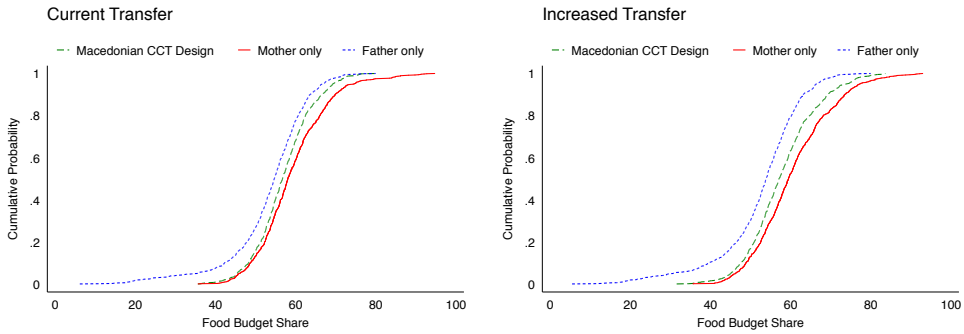
We make use of the food Engel curve estimates, by keeping all parameters constant and varying mother's income share and total household expenditure under different scenarios. We compare the current design of the Macedonian CCT (with payments to mothers or fathers), a design in which all transfers are paid to mothers (similar to most CCTs programs) and a design in which all transfers are paid to fathers. We then consider two levels of payments: the payment in the current design (*Current Transfer* scenario), and a transfer that is equal to 2.5 times the current transfer (*Increased Transfer* scenario). Figure A6 presents the cumulative distributions of mother's income share at follow-up under the different scenarios. For each scenario, at follow-up, we then predict the cumulative distributions of food budget shares using estimates in column 3 of table 6 (see figure A7). The difference in the mean food budget share between the "Mother only" and the "Father only" scenarios is equal to 4.7 percentage points with the current transfer and 6.6 percentage points in the increased transfer.

Figure A6: Cumulative distribution of mother's income share, under different scenarios



Note. The figures show the cumulative distributions of mother's income shares under different scenarios at follow-up. Mother's income share is defined as the share of total parental income that can be attributed to the woman in the household, and is multiplied by 100. Parental income is computed using all sources of income in the period 2010-2012 using both self-reported and administrative data (see section 4.1). CCT income is simulated according to the following rules: in "Mother only" ("Father only") all transfers are paid to mothers (fathers), and in the Increased Transfer scenario, payments are multiplied by a factor of 2.5.

Figure A7: Cumulative distributions of food budget share, under different scenarios



Note. The figure shows the cumulative distribution of food budget share under different scenarios. CCT income is simulated according to the following rules: in "Mother only' ("Father only") all transfers are paid to mothers (fathers), and in the Increased Transfer scenario, payments are multiplied by a factor of 2.5. Simulations are based on estimates presented in column 3 of table 6.

A.10 Prices and food budget shares

Table A14 presents a comparison of prices by municipality group. We observe no difference across municipality groups, both at baseline and follow-up. The introduction of different payment modalities for the CCT program did not induce any effect on food prices.

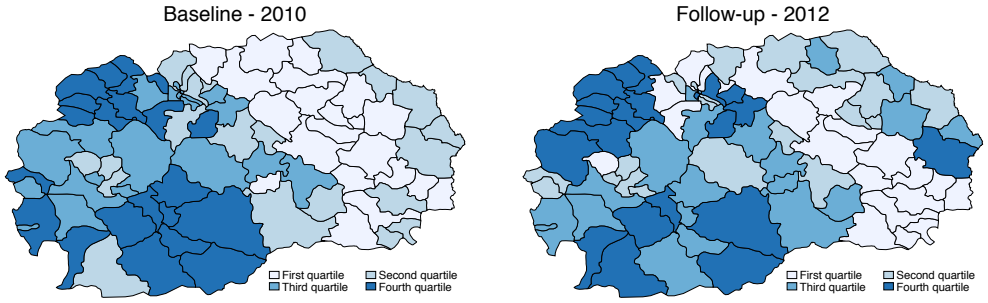
Table A14: Average Stone Price Indexes, by treatment status

	BASELINE			FOLLOW-UP		
	Municipality group			Municipality group		
	(1)	(2)	(3)	(4)	(5)	(6)
	Father	Mother	Difference	Father	Mother	Difference
Price index (Food)	2.16	2.17	0.01	2.27	2.27	0.01
	[0.06]	[0.06]	(0.01)	[0.06]	[0.05]	(0.01)
Price index (Starches)	1.69	1.71	0.03	1.74	1.76	0.02
	[0.11]	[0.11]	(0.02)	[0.10]	[0.09]	(0.02)
Price index (Fruit and vegetables)	1.16	1.15	-0.01	1.24	1.24	-0.01
	[0.11]	[0.11]	(0.02)	[0.10]	[0.10]	(0.02)
Price index (Meat, fish and dairy)	2.82	2.82	-0.00	2.98	2.98	0.00
	[0.06]	[0.05]	(0.01)	[0.08]	[0.07]	(0.02)
Price index (Salt and sugars)	2.37	2.36	-0.01	2.50	2.50	-0.00
	[0.09]	[0.07]	(0.02)	[0.07]	[0.09]	(0.02)
Price index (Other food)	2.73	2.71	-0.03	2.77	2.76	-0.01
	[0.21]	[0.24]	(0.05)	[0.20]	[0.25]	(0.05)
Observations	42	41	83	42	41	83
Demographic controls	-	-	No	-	-	No

Note. Standard deviations in brackets, standard errors in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. Prices indexes are averaged at municipality level. Detailed information about the construction of the indexes is reported in Section 3.2.1. In columns (3) and (6) differences are estimated from running the corresponding least squares regression on the Mother municipality dummy, equal to 1 if the transfer is made to mothers and zero otherwise.

To estimate Engel curves, we aim at exploiting a geographic variation in prices. Limited variation could limit our analysis. Figure A8 shows the distribution of the Stone Price index across municipalities and across time (for baseline and for the follow-up). While we observe little variation across time, we can observe that variation is substantial across municipalities.

Figure A8: Geographical variation in Stone Price Index for Food at Baseline and Follow-up



Note. The left panel shows the geographical variation of a Stone Price Index for food computed at Baseline, while the right panel presents it for the Follow-up. See Section 3.2.2 for a discussion about the computation of the Index.

To study how food expenditure is allocated to different food categories, we estimate equation (3) for each food category. We then compute the derivative with respect to food (log-)expenditure and to the food price index. Table A15 presents the estimated coefficients and the standard errors. While food expenditure increases, households tend to allocate a lower share to bread and potatoes

and a higher share on meat, fruit, cheese, chocolate and sugars. In terms of sensitivity to food prices, pasta and rice, lipids of vegetable origin and pulses are negatively responding to increases in the food price index, while the share of manufactured vegetables tend to increase.

Table A15: Food budget shares, total food expenditure and food prices

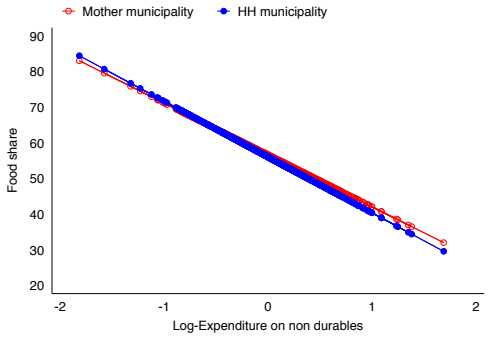
		Derivative with respect to...			
		Total food expenditure		**Food price index**	
	(1)	(2)	(3)	(4)	(5)
	Average share	Coefficient	Std.error	Coefficient	Std.error
Bread	17.04	-14.36***	2.68	45.11***	12.45
Butter	0.75	-0.19	0.25	2.38*	1.33
Pasta and rice	2.53	-0.03	0.52	3.56	3.17
Cheese	3.74	1.20	1.09	-5.04	5.63
Chocolate and biscuits	1.42	0.43	0.32	-3.28*	1.92
Coffee and tea	4.37	0.95	0.59	7.88**	3.41
Dry fruit	0.21	-0.05	0.17	0.18	0.86
Eggs	3.31	-1.07	0.66	2.98	4.40
Fish	0.95	0.29	0.42	-0.18	2.84
Food and drinks outside	1.20	0.36	0.88	3.43	3.95
Fresh vegetables	6.41	3.03***	0.84	3.26	4.35
Fruit	3.12	-0.12	0.61	18.65***	4.57
Lipids of animal origin	0.13	0.18	0.14	-0.88	0.56
Lipids of vegetable origin	7.05	0.21	0.75	-13.43***	3.88
Manufactured meat	2.19	-0.87	0.74	-5.32	4.18
Manufactured vegetables	1.54	-1.16*	0.62	12.57***	4.25
Milk and yoghurt	4.97	-3.36***	1.27	20.16***	6.20
Meat	11.28	4.33***	1.43	17.35*	9.76
Other food items	0.04	0.09	0.11	-0.13	0.15
Potatoes	3.16	-1.01	1.00	-4.72	3.07
Pulses	4.63	1.87*	0.95	-8.21	5.49
Salt and salties	1.60	0.23	0.29	-1.36	1.51
Soft drinks	3.14	0.21	0.55	9.47**	4.08
Sugar and honey	3.06	1.98***	0.62	-2.81	2.92
Wheat	12.15	6.86***	2.60	-101.64***	11.67

Note. Standard deviations in brackets, standard errors in parenthesis clustered at municipality level (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Food budget shares are defined as the ratio between the consumption deriving from a specific source and the total food consumption. Total food expenditure and Food price are both reported in logarithms.

A.11 Engel curves at baseline

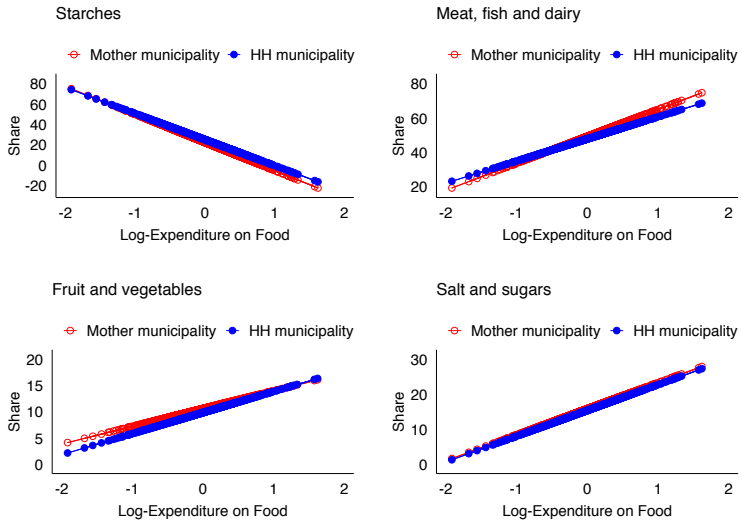
Figure A9 shows the estimated Engel curve for food for each treatment modality at baseline. Figure A10 presents instead the estimated Engel curves for food items at baseline. In both cases, estimated Engel curves are not different across treatment modality.

Figure A9: Estimated Engel curves for food, at baseline



Note. The figure presents estimated Engel curves (holding other control variables constant at the average) for food categories for households living in a Mother municipality and for households living in a Father municipality. Log-Expenditure on Food is demeaned.

Figure A10: Estimated Engel curves for food categories, at baseline



Note. The figure presents estimated Engel curves (holding other control variables constant at the average) for food categories for households living in a Mother municipality and for households living in a Father municipality. Log-Expenditure on Food is demeaned.

B Demand equation estimation

In this section we discuss in details the control function method adopted for the estimation of the demand equations. Similarly to equation (3), let w be the outcome variable (i.e. the expenditure share on a specific item), $share$ the mother's income share, and y_3 the total expenditure (or total food expenditure). Assuming $\mathbf{z}$ is the $1 \times L$ vector of all exogenous variables (including a constant), we can write the following specification:

$$w = \alpha_2 share + \alpha_3 y_3 + \gamma_1 share \cdot y_3 + \mathbf{z_1}\delta_1 + u_1 \tag{4}$$

where $\mathbf{z_1}$ is a $1 \times L_1$ strict sub-vector of $\mathbf{z}$ such that $\mathbf{z} = \begin{bmatrix} \mathbf{z_1} & \mathbf{z_{-1}} \end{bmatrix}$ and $\mathbf{z_{-1}}$ is the $1 \times (L - L_1)$ vector of excluded instruments. To identify the parameters of interest, we need to address the endogeneity of the variables $share$ and y_3. We follow a control function approach and we instrument endogenous variables with $\mathbf{z_{-1}}$, which we discuss in detail in the next section.

B.1 First stage of the demand system

B.1.1 Mother's income share

To instrument for the endogenous income share attributable to a mother, we use the indicator variable for treatment modality at municipality level, $mother$, as instrument. Since payment modalities are defined through a lottery, this variable provides exogenous variation in the intra-household distribution of income. Columns (4) and (6) in table B16 presents first stage regressions based on the following specification:

$$share = \mathbf{z}\delta_2 + e_2 \tag{5}$$

where $E\left[\mathbf{z}'e_2\right] = 0$. We show a strong relationship between residing in a Mother municipality and the mother's income share.

B.1.2 Total Expenditure and Food Expenditure

We instrument expenditure using wealth measures. In the literature, these are standard instruments for expenditure. Wealth measures are valid instruments if consumption allocation decisions within a period are separable from savings decisions across periods (and if recall error in wealth is uncorrelated with recall error in consumption). We use the value of durable goods and the land owned by the household as measures of wealth. Durable goods are enumerated during the interview using a list of 25 items. These includes household appliances, communication and entertainment appliances and vehicles. The value is self-reported by the respondent for each item by answering the question "*Imagine you find similar items at the local market or shop. How much would you have to pay to purchase them?*". We alternatively implement a measure of durables by imputing the value of each good using median unit values at regional level (or for the whole country), and

Table B16: First stage regressions of actual transfer and expenditure

	Actual transfer to mother		**First stage for FOOD SHARE**		**First stage for FOOD DEMAND**	
			Non-durable expenditure	Mother's income share	Food expenditure	Mother's income share
	(1) Probit	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Mother municipality (d)	0.766***		-0.006	17.278***	0.105	16.981***
	(0.024)		(0.059)	(2.458)	(0.073)	(2.398)
Predicted Mother Recipient		1.021***				
		(0.032)				
Land owned (hectares)	-0.033	0.002	0.066***	2.826	0.077***	2.460
	(0.039)	(0.021)	(0.025)	(1.724)	(0.028)	(1.741)
Ln Durables Value	0.893**	0.002	-0.084	8.592***	0.162***	0.171
	(0.372)	(0.028)	(0.074)	(2.886)	(0.025)	(1.686)
Ln Durables Value squared	-0.043**	-0.000	0.014***	-0.447***		
	(0.018)	(0.002)	(0.004)	(0.160)		
Observations	852	852	847	852	849	852
R^2		0.590	0.280	0.145	0.217	0.142
F-test for excluded instrument on:						
- CCT transfer / Income share	.	1014.156	0.010	49.410	2.077	50.162
- expenditure	.	0.004	34.245	3.741	30.986	1.180
Municipality controls	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes

Note. Standard errors clustered at municipality level in parenthesis (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Columns (1) reports marginal effects. Columns (3)-(4) present the first stage estimates for the estimation of food demand, while columns (5)-(6) show the estimates for the food basket demand system. In columns (1)-(2), the dependent variable is a dummy equal to 1 if a mother in the household has received at least a transfer in the first two years of the program and zero otherwise. In columns (3) and (5), the dependent variables are total household expenditure on non-durables and food expenditure, both reported in real terms and in logarithms. In columns (4) and (6), the dependent variables is the mother's income share. Estimates in columns (3)-(4) are used as first stage for the estimation of the Food Engel curve. Estimates in columns (5)-(6) are used as first stage for the estimation of the food basket demand system. The full list of controls is presented in sections 4.1 and 4.2.

an asset index built solely on whether the household own one or more item. The choice of the measure do not affect our results. Table B16 shows first stage results of a linear regression of total expenditure on the instruments using the following specification:

$$y_3 = \mathbf{z}\delta_3 + e_3 \tag{6}$$

where $E\left[\mathbf{z}'e_3\right] = 0$. Column (3) reports the results for total expenditure on non-durables, while column (5) shows the results for food expenditure. For total expenditure, we include a quadratic term for the durables, while we exclude it for the food expenditure regression since it is not significant. The partial F-statistic on the instruments is high for both endogenous variables.

B.2 Control function estimates

We start from equation (4) and write the projection of u_1 on a function f of (e_2, e_3), i.e. $u_1 = f\left(e_2, e_3\right) + e_1$, where by construction $E[e_2'e_1] = 0$ and $E[e_3'e_1] = 0$. To allow for a flexible form, we approximate $f(.)$ with a non-linear function in the first-stage residuals, specifically a second-order polynomial:

$$f\left(e_2, e_3\right) = \rho_2 e_2 + \rho_3 e_3 + \rho_5 e_2^2 + \rho_6 e_3^2 + \rho_8 e_2 e_3$$

In line with a control function standard approach (Wooldridge, 2010), we assume that, once conditioning for all endogenous and exogenous variables, the expected value of e_1 is equal to $f(.)$, i.e. $E\left[u_1 | share, y_3, \mathbf{z}\right] = f\left(e_2, e_3\right)$. This is equivalent to assume that once conditioning for the first stage residuals, the expected value of e_1 is equal to zero. We first derive the first stage residuals from equations (5) and (6), and we substitute for u_1 in equation 4 by writing:

$$w \quad = \quad \alpha_2 share + \alpha_3 y_3 + \gamma_1 share \cdot y_3 + \mathbf{z_1}\delta_1 + f\left(\hat{e}_2, \hat{e}_3\right) + e_1 \tag{7}$$

where $\hat{e}_2 = share - \mathbf{z}\hat{\delta}_2$, and $\hat{e}_3 = y_3 - \mathbf{z}\hat{\delta}_3$. The new error e_1 is uncorrelated not only with all endogenous variables, but also with e_2, e_3, and $\mathbf{z}$. Under the specified hypothesis, OLS estimators for for α_2, α_3, and γ_1 in equation (7) are consistent. Standard errors are estimated using a bootstrap estimator allowing for clustering at municipality level.

We also present results when substituting $share$ with the exogenous payment modality dummy, $mother$. The variable is treated as exogenous and the estimation is based on a similar procedure, but assuming that $f(.)$ is only function of e_3.

B.3 An extension: schooling endogeneity

We extend the main specification by considering schooling decisions endogenous and by estimating the demand system instrumenting for it. We assume the following specification:

$$w = \alpha_2 share + \alpha_3 y_3 + \alpha_4 y_4 + \gamma_1 share \cdot y_3 + \mathbf{z_1}\delta_1 + u_1 \tag{8}$$

where y_4 is the number of children enrolled in school, and $u_1 = f(e_2, e_3, e_4) + e_1$. We instrument this variable using the gender of the first born child, and the expected probability (as expressed by parents) that children will attend university. Table B17 reports estimates of an Engel curve for food using equation 3 by taking into account the endogeneity of total expenditure, the actual transfer to a mother and of schooling by using a control function approach.

A large body of evidence uses the gender of the first-born as exogenous source of variation in household composition (see, for instance, Angrist and Evans, 1998; Dahl and Moretti, 2008). In Macedonia, while the vast majority of children attend primary school, female children among SFA recipients tend to have a higher enrolment rate in secondary school compared to male children. If, after controlling for the number of children, the first born is male, we should expect a lower number of children enrolled in school. The expected probability of attending university is also likely to be correlated with schooling decisions. The probability is reported by the respondent during the interview on a scale from 0 to 10 for the two youngest adolescents aged 12-16 with different gender. We average this probabilities at household level. We assume that, conditional on the detailed set of controls adopted in our models, this measure is not correlated with other unobservable household attributes affecting expenditures.

Table B17: Food Engel curve with endogeneous schooling

	Dep.var.: Food Budget Share			
	(1)	(2)	(3)	(4)
Mother Municipality	4.73***	4.74***		
	(1.60)	(1.62)		
Mother Municipality x Expenditure		-1.54		
		(3.13)		
Mother's income share			0.31***	0.31***
			(0.09)	(0.09)
Mother's income share x Expenditure				0.00
				(0.06)
Expenditure	-9.44***	-8.51**	-9.29***	-9.30***
	(3.53)	(3.91)	(3.54)	(3.54)
Observations	842	842	842	842
R^2	0.231	0.232	0.240	0.240
Joint significance of main effect and interaction (p-value)	.	0.00	.	0.00
Endogeneity test (p-value)	0.00	0.00	0.00	0.00

Note. Bootstrap standard errors clustered by municipality (2000 replications) are presented in parentheses (84 clusters in total). *** denotes significance at 1%, ** at 5%, and * at 10%. Dependent variable is the food budget share. Expenditure and Mother's income share are demeaned. *Expenditure* is the total household expenditure on non-durable. *Mother municipality* is a dummy variable equal to 1 if the household resides in a Mother municipality and 0 otherwise. *Mother's income share* is defined as the share (multiplied by 100) of total parental income that can be attributed to the woman in the household, and is instrumented with the *Mother municipality* dummy. Estimation procedure through control function approach and the full list of controls are presented in sections 4.1 and 4.2. The test of joint significance of main effect and interaction is performed with an F-test. The endogeneity test is performed as a joint Wald test for the equality to zero of all coefficients in the polynomial of residuals.