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OLD AND NEW WELFARE: THE RELATIVE EFFECT ON CHILD NUTRITION

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ABSTRACT

The study compares the relative merits of Conditional Cash Transfer programs with more traditional programs to improve children nutritional status for the case of Colombia. The Conditional Cash Transfer program is called "*Familias en Acción"* and the childcare and feeding program is called *Hogares Comunitarios.* We use administrative data from the first program and the household surveys that were carried out in 2002 and 2003 to evaluate this program. We apply fixed effect and instrumental variables estimators to exploit exogenous variation that allows us to identify the average treatment effect of each program. We use the different degrees of availability of FA and of HC to model participation into the two programs and, in a second step, their effect on the nutritional status of children. We find that both programs have similar impact on nutritional and morbidity outcomes.

1. INTRODUCTION

Conditional Cash Transfer (CCT) programs provide monetary transfers to mothers of poor children if they verify certain conditions such as attending preventive health care visits and going to schools. CCT programs have become very popular tools for governments to relieve poverty and increase human capital accumulation. After the successful evaluation of the Mexican CCT program (PROGRESA), CCT programs have quickly expanded in Central and Latin America. Argentina, Chile, Colombia, Honduras, Nicaragua, Ecuador, and Brazil have (or have had) CCT programs in place. CCT programs are now being introduced in Africa, in particular, in South Africa, Malawi, and Nigeria.

Though it is accepted that CCT programs are effective tools at increasing the uptake of preventive care (Lagarde 2007), there is more controversy about their effect on nutritional status. PROGRESA increased the height of children younger than 36 months by 1 cm (Behrman and Hoddinott 2005, Gertler 2004, and Rivera *et al* 2004). The Nicaraguan CCT programme decreased the prevalence of stunting by 5.5% and of being underweight by 6.2%, for children younger than 36 months (Maluccio and Flores 2008). The Colombian CCT program, *Familias en Acción*, reduced by 0.07 the probability of being stunted (Attanasio *et al* 2005). On the other hand, the Brazilian CCT programme was associated with a reduction of 0.03 kilograms per month in the rate of weight gain of preschool children (Morris *et al* 2004) and the Honduran CCT programme was not found to achieve any improvement in nutritional status (IFPRI 2003). Moreover, CCT have had only limited (in the case of Mexico) or no (in the case of Colombia) success in reducing the prevalence of anaemia among young children.

Public resources are scarce but can be dedicated to different means. Other types of government interventions exist that can potentially improve nutrition: price subsidies, unconditional cash transfers, distribution of nutritional supplements, as well childcare centres where children are fed and taken care. As far as we know, there has been no research comparing the relative merits of CCT programs with more traditional programs to improve children nutritional status.

In this research, we will compare the effect of *Familias en Acción* (FA) with the effect of *Hogares Comunitarios* (HC), a childcare and feeding program in Colombia. We exploit that the survey used to evaluate *Familias en Acción* also collected data on the participation of the children on *HC* as well as on variables that are important determinants of the participation in HC. Moreover, during the first few years of existence of *Familias en Acción,* children were not allowed to be in both FA and HC, which allow us to disentangle the effect of each of them.

Clearly, FA and HC operate in very different ways, and require different logistic challenges. FA operates by transferring money to the mother. It is unclear how much of this transfer ends up benefiting the child. HC should provide food directly to the child while the child is in the HC centre. FA program is relatively easy to expand to other households or municipalities as the most important logistic challenge is to supervise that the conditionalities are met. However, a program such as HC requires setting up the logistic of food purchase, providing training to the child carers, monitoring to prevent the food from being resold or used by individuals different from the children for whom it is intended, as well as to have adequate premises for the children.

In this paper, we apply fixed effect and instrumental variables estimators to exploit exogenous variation that allows us to identify the average treatment effect of each program. In particular, we use the different degrees of availability of FA and of HC to model participation into the two programs and, in a second step, their effect on the nutritional status of children. We find that both programs have similar impact on nutritional and morbidity outcomes. This result is consistent with previous studies where FA program improves the quality of the food consumed. It also complements studies of the effectiveness of HC. The results we provide allow policy makers a direct comparison of the two programs.

The paper is organized as follows. In section 2 we briefly describe the main characteristics of the FA and HC programs, while in section 3 we present the data. Section 4 discusses the methodology and section 5 presents some basic statistics. The main results of the paper are shown and discussed in section 6. We end in section 7 with some concluding remarks and policy recommendations

2. PROGRAM DESCRIPTION

Both FA and HC are programs targeted to the poor population. As most programs in Colombia, they are targeted using the so-called Sisben index. Sisben is an index constructed as a function of a number of variables that are related to long run poverty. On the basis of the score so obtained, each household for which it is computed is assigned to 1 of six levels (1 being the poorest and 6 the richest) depending on the individual score relative to the cut-off points. The latter are region and sometime city specific. This targeting methodology has been used for some time in Colombia. In principle all households living in certain neighbourhoods are periodically surveyed with the purpose of establishing their sisben level. A household that has not been surveyed and wants to apply for specific programs, can ask to be surveyed. The first expansion of FA was targeted to Sisben 1 households with children living in relatively small towns. HC is targeted to Sisben 1 and 2 and to households with 'apparent needs'. The latter vague definition gives some scope for flexibility. In the data we find that there are few Sisben 3 households who actually use HC. In what follows, however, as the paper's aim is the comparison with HC, we focus on Sisben 1 households living in towns that were used for the evaluation of FA.

"Hogares Comunitarios" Program

HC is a nutrition and childcare program introduced all over Colombia in the mid 1980s. There are roughly 80,000 HC across the country and more than a million children that attend one. The cost of the programme is approximately $US 250 million, or almost 0.2% of GDP. The program is targeted to poor children between 0-6 years old. Parents are required to pay a monthly fee about $US4 per month per child, although there is considerable variation in the amount across towns. Children attending to the nurseries receive a lunch and two snacks that include a nutritional beverage called *bienestarina*. Children attending to HC should receive the 70% of recommended daily intake.

"Familias en Accion" Program

FA program is a large-scale welfare program introduced in 2001. In 2002, the program registered 365,000 families and 520,000 families in 2006. Currently the program involves more than 1.5 million households and is scheduled to increase even further.

The program gives a monetary transfer to mothers provided their children are up to date with growth and development monitoring visits and attend school regularly.

A family is eligible if it satisfies the following requirements: a) it is classified as being in the lowest level of the official socio-economic classification as of December 1999 (SISBEN level 1), b) it lives in municipalities where the program is implemented, and c) it has children under 18.

The family will receive a monthly nutritional subsidy of $COL 46,500 (about $US20) if they have children aged 0–6 who participate in the health component of the program. If they have school-age children (6–17), they are also entitled to a school subsidy per child which depends on the level of school attended. For primary-school children, the subsidy is $COL 14,000 per month, while for secondary school, it is $COL 28,000 (about US$10). The nutritional subsidy is per mother, independent of the number of children; the schooling subsidy is per child.

3. THE DATA

The data for this study comes from the evaluation of the FA program. The first wave of data collection was collected in 2002, the second one in 2003, and the last one in 2005.

We focus our analysis in those municipalities that were not receiving FA payments at the time of the first wave and those where FA was not available at any time. The study considers only the first and second wave, 2002 and 2003 respectively. The relevant sample size is 6,394 children (5,645 households) and 6,185 children (5,512 households) under 6 years old for the first and second wave, respectively.

The survey collected to evaluate the FA program is a rich household survey. Among other variables, it collects information on demographics, distances to important places in the town such as nearest health centre and school, children's and mother's anthropometrics, and participation in the HC program. Participation in the HC program is collected retrospectively for each child up when they were born. The survey asks for the number of months that each child attended a HC centre for each age up to the 6th year. The survey also asks for the distance from the household to the nearest HC centre.

We use the household survey and administrative data from the FA program to collect data on the number of months that household have received FA payments and the amount of payments received while the family is eligible. Administrative data is available until the time of the second wave. Hence, we restrict the analysis to the first and second wave. Number of payments and amount of money received between each wave is crucial to construct the treatment variable for FA program.

4. METHODOLOGY

In order to identify the effect of HC and FA on children nutritional status, we want to estimate the following model:

$$(1)\quad y_{ihmt} = \beta_{FA}(EFA)_{ihmt} + \beta_{HC}(EHC)_{ihmt} + \beta_X X_{iht} + \beta_T Time_t + \theta_m + \varepsilon_{ihmt,}$$

where y_{ihmt} is the nutritional status of child *i* of household *h*, living in municipality *m*, in year *t.* The variable $(EFA)_{ihmt}$ is the conditional subsidy per child[1] received in *i*'s household up to time *t*, and $(EHC)_{ihmt}$ is the number of months that child *i* was attending to the HC program until time *t.* The vector X_{iht} contains variables that are specific to child *i* and household *h;* the binary variable $Time_t$ takes value 1 if time *t* correspond to the second data wave, θ_m are municipality fixed effects, and ε_{ihmt} is an error term. One of the variables in X_{iht} will be whether or not household *h* has a child eligible[2] for the FA program.

We explore alternative definitions for $(EFA)_{ihmt}$ such us: a) conditional FA payments per child (including educational subsidy) in *i*'s household until time *t*, b) exposure of child *i* to FA program scaled by the number of children under 17 and c) life exposure of child *i* to FA program. Exposure to FA program scaled by number of children is defined as number of months that the child *i* was receiving nutritional payments up to time *t* divided by the number of children in the household under 17. Life exposure is defined as the fraction of life that the child *i* was receiving FA nutritional payments[3] up to time *t*. For $(EHC)_{ihmt}$ we also consider as an alternative definition, the life exposure of child *i* to HC program up to time *t.*

One way to interpret equation (1) above is as a production function for human capital. The coefficients on the program variables, therefore, can represent the marginal product of these programs. In estimating them, however, it will be important to take into account the fact that these inputs to the production function are not distributed exogenously to the households, but they are chosen by them. Participation in a nutritional program is a choice variable and as such must be considered endogenous. We will use instrumental variables in order to obtain consistent estimates of the effect of the HC and FA programmes in children nutritional status: β_{FA} , β_{HC} . As instruments we will be considering variables that can be plausibly considered given to the households and that reflect the availability or cost of the programs we are considering. The moment condition that will be used is:

$$E[\varepsilon_{ihmt,} | X_{iht}, Time_t, \theta_m, EMFA_{ihmt,}, PEHC_{ihmt}, EMFA_{ihmt,} * PEHC_{ihmt}] = 0,$$

where $EMFA_{ihmt,}$ is the potential amount of money per child that child *i*'s family could have received

1 This variable is defined as the nutritional FA payments that the family received until time t adjusted for the number of children in the household younger than 18 years.

2 We consider that a child is eligible if it is not a new born and is younger than 7 years old. In particular we only consider those children that were born before May 1st , 2001.

3 The number of months that the child *i*'s household has received the FA nutritional subsidy up to time *t* , divided by the child *i*'s age in months.

since the program started in the municipality *m* up to time *t* [4]. The household could stop being eligible for FA because all their children born before they registered in the program are older than 6 years old. Due to this rule, we impose a maximum value for $EMFA_{ihmt,:}$: maximum allowance that the family could have received while she had an eligible children, assuming that she registered in the program when the program started in municipality *m* and satisfied the nutritional conditionality.

We consider linear and non-linear instruments. We include non linear instruments in order to improve the efficiency of results (see Windmeijer and Santos Silva (1997)). $PEHC_{ihmt}$ is a prediction of the number of months that the child *i* attended to HC nursery, using the distance from household *h* to the nearest HC centre as an argument in the prediction. $PEHC_{ihmt}$ is the prediction using a non-linear regression of the number of months that the child attended to HC on the linear instruments for HC, FA and other controls. The interaction $EMFA_{ihmt,}*PEHC_{ihmt}$ will account for the fact that exposure to HC will be low if the child is likely to participate in the FA program. This is because according to the rules of the FA programme, families could not have children participating in the HC programme in order to be eligible for the FA nutritional subsidy.

Notice that $EMFA_{ihmt,}$ is zero if the municipality *m* is a control town, or if municipality *m* has FA program but time *t* corresponds to the first wave of data. We are basically using the availability of the program at the municipality level in order to instrument for the uptake of the program. As we are considering municipality fixed effects, this means that our identification of the parameter β_{FA} relies on the availability of the program. The identification on β_{HC} relies on some households living closer to a HC centre than others, partly because HC centres have a high rotation. In this respect, we follow Attanasio and Vera-Hernandez (2006) in using distance from the household to the HC centre as an exclusion restriction. As them, we condition on the distance from the household to the nearest health centre, school, and to the town centre.

5. BASIC STATISTICS

This section describes the participation in the two alternative programs at the time of the first and second wave. Additionally, it compares the nutritional and morbidity outcomes of children in municipalities where FA was and was not implemented.

Program participation

During the first phase of the expansion of FA, families could choose to be enrolled in FA or HC program or to not being enrolled in any program. In order to be eligible for the nutritional subsidy paid by FA they could not have a child attending a HC centre.

Table 5.1 shows the program distribution by time in municipalities where FA was and was not available. , The first column, “HC”, reports the proportion of children that are attending or attended a HC centre in 2002 and the second column, “None”, reports the proportion of children that never attended a HC centre. In 2003, column “FA” reports the proportion of children that are receiving FA subsidy and never attend to HC center, column “HC” reports the proportion of children that are attending or attend to HC and are not enrolled in FA program. The remaining columns show the proportion of children that participate in both programs at different times and those who never participate in FA or HC.

4 If the family lost the eligibility for the nutritional subsidy before time *t* we consider the amount received until that time.

TABLE 5.1
PARTICIPATION IN NUTRITIONAL PROGRAMS BY AGE, TIME AND MUNICIPALITY GROUP

Age	Municipalities where FA was implemented						Municipalities where FA was not implemented					
	2002		2003				2002		2003			
	HC	None	FA	HC	Both	None	HC	None	FA	HC	Both	None
0	2.4	97.6	78.5	0.5	1.5	19.5	3.3	96.7	0.0	4.2	0.0	95.8
1	9.9	90.1	69.4	2.8	10.0	17.8	19.6	80.4	0.0	22.0	0.0	78.0
2	27.9	72.1	69.9	0.9	23.3	6.0	43.2	56.8	0.0	44.8	0.0	55.2
3	34.1	65.9	61.8	1.1	37.1	0.0	52.0	48.0	0.0	55.6	0.0	44.4
4	43.7	56.3	62.7	0.9	36.4	0.0	53.8	46.2	0.0	62.2	0.0	37.8
5	40.9	59.1	52.8	0.4	46.8	0.0	56.0	44.0	0.0	61.6	0.0	38.4
6	43.8	56.2	57.2	0.6	42.2	0.0	58.4	41.6	0.0	58.0	0.0	42.0

Note: Both indicates that the child was previously attending at HC and at time t is receiving FA subsidy

Two types of choices can be observed from table 1. First, mothers of children that were not attending to HC at the time of the first wave, choose to enroll their children in FA. Second, many mothers opt out of HC in order to receive FA subsidy. For instance, 66% of 3-year old children in municipalities where FA was implemented were not enrolled in any program in 2002 while all of them were enrolled in FA or HC in 2003. Moreover, while at the time of the first wave, 34% of 3-year old children had attended to HC at some stage, in the second wave only 1% had attended to HC and 36% reported to receive FA and attended to HC in the past and. The former suggests a movement from HC to FA program.

TABLE 5.2
ATTENDANCE RATES TO HC PROGRAM BEFORE FA IMPLEMENTATION

	Child has ever attended to HC		**Child is currently attending to HC**	
Age	Municipalities where FA was implemented	Municipalities where FA was not implemented	Municipalities where FA was implemented	Municipalities where FA was not implemented
0	2.4	3.3	1.6	3.3
1	9.9	19.6	6.8	16.8
2	27.9	43.2	16.3	37.3
3	34.1	52.0	20.9	41.9
4	43.7	53.8	18.5	32.0
5	40.9	56.0	7.4	20.5
6	43.8	58.4	2.9	9.1

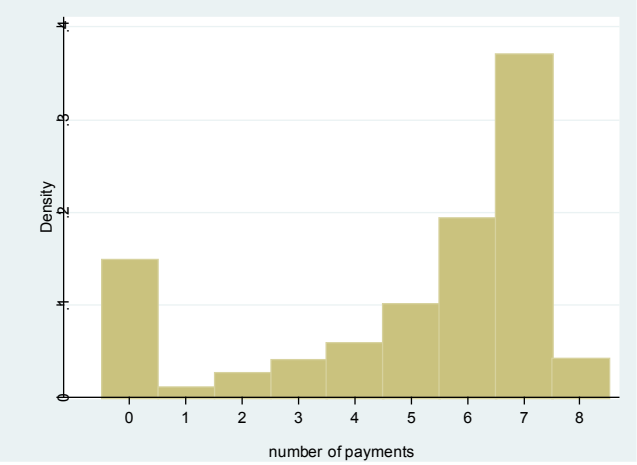
Note: Based on first wave (2002)

Table 5.2 shows the attendance rates to HC centre by age and municipality groups before FA program started. Attendance to HC centre was lower in municipalities where FA was implemented. For instance, 53% of 3-years old children in municipalities where FA was implemented have ever attended to HC while the percentage is only 34% for the other group of municipalities. Attendance is higher for children between 2 to 4 years old.

FA nutritional payments

Graph 5.1 shows the number of months with nutritional payments for a family with at least one eligible child in 2003. 50% of the families living in municipalities with FA program have received at least 7 months of nutritional payments at the time of the second wave.

GRAPH 5.1
DISTRIBUTION OF FA PAYMENTS



Nutritional status and morbidity outcome for children under 7

Statistics on nutritional status are shown in table 5.3. Prevalence and risk of malnutrition for different nutritional indicators are similar between treatment and control groups before FA was implemented. After FA treatment was implemented there is no significant gap between both groups.

Prevalence of respiratory diseases is similar between treatment and control group in 2002. However, there is a relative bigger improvement for children under 4 in the treatment group in 2003. Part of this difference may be related to the health conditionality of the FA program.

TABLE 5.3

NUTRITIONAL AND MORBIDITY OUTCOMES BY AGE, TIME AND MUNICIPALITY GROUP

Prevalence of chronic malnutrition

	Treatment		Control	
Age	2002	2003	2002	2003
0	13.48	8.87	13.52	10.50
1	30.57	29.89	25.44	35.81
2	23.08	21.89	22.57	20.28
3	22.93	27.87	25.15	23.61
4	28.00	24.66	25.14	25.09
5	23.97	26.08	24.66	23.29
6	23.79	21.81	23.68	23.40
Total	24.06	23.71	23.52	23.54

Risk of chronic malnutrition

	Treatment		Control	
Age	2002	2003	2002	2003
0	42.17	33.50	35.23	32.77
1	60.38	61.69	60.65	68.58
2	53.50	50.51	54.85	54.65
3	56.63	59.48	61.55	56.79
4	63.75	58.82	65.28	63.86
5	64.61	61.68	60.88	64.97
6	61.29	60.71	61.11	58.97
Total	58.82	57.06	58.88	59.01

Prevalence of global malnutrition

	Treatment		Control	
Age	2002	2003	2002	2003
0	7.83	8.87	8.54	6.30
1	16.60	19.16	15.38	22.30
2	15.73	8.42	12.86	13.80
3	10.22	13.22	10.02	11.58
4	11.25	9.73	10.85	8.05
5	9.36	8.84	11.11	10.86
6	10.28	8.45	9.94	9.98
Total	11.34	10.56	11.10	11.38

Risk of global malnutrition

	Treatment		Control	
Age	2002	2003	2002	2003
0	28.26	27.59	25.98	24.79
1	49.43	47.51	47.63	56.42
2	47.55	37.37	45.87	48.17
3	43.65	44.54	48.26	44.10
4	47.75	38.91	47.92	45.13
5	44.06	41.95	45.51	44.66
6	44.96	38.90	44.59	44.77
Total	44.29	40.02	44.76	44.68

Prevalence of acute malnutrition

	Treatment		Control	
Age	2002	2003	2002	2003
0	1.30	2.96	0.00	1.68
1	2.26	4.60	2.37	5.41
2	1.40	0.67	2.18	2.54
3	1.93	0.29	0.82	0.89
4	1.25	1.13	0.72	0.56
5	2.05	0.91	0.91	1.05
6	2.42	1.18	0.58	0.78
Total	1.86	1.44	1.03	1.52

Risk of acute malnutrition

	Treatment		Control	
Age	2002	2003	2002	2003
0	8.26	13.79	7.47	10.50
1	18.49	25.29	19.82	25.00
2	15.73	12.46	16.26	15.49
3	12.15	14.08	11.66	10.02
4	10.25	11.09	12.84	9.93
5	13.47	10.88	11.72	14.01
6	11.49	11.79	12.28	12.01
Total	12.68	13.47	13.01	13.26

Prevalence of Diarrhea

	Treatment		Control	
Age	2002	2003	2002	2003
0	27.63	23.04	21.12	19.27
1	32.31	29.90	28.01	27.54
2	21.87	20.23	18.52	22.38
3	16.54	12.23	13.12	14.14
4	13.63	11.60	11.34	11.24
5	8.90	9.09	8.09	9.55
6	10.40	10.40	8.14	9.93
Total	16.93	14.96	13.69	14.60

Prevalence of Acute Respiratory Diseases

	Treatment		Control	
Age	2002	2003	2002	2003
0	45.31	34.10	44.55	44.00
1	52.04	33.68	51.97	40.72
2	47.81	37.83	48.58	44.04
3	45.41	31.91	48.20	36.36
4	44.34	34.39	43.49	33.05
5	39.83	32.35	39.16	35.21
6	40.88	30.29	38.40	30.21
Total	44.38	33.20	43.89	36.25

Note: Treatment Group= municipalities where FA was available in 2002
Control Group= municipalities where FA was not available at any time.

6. RESULTS

In section 4, we presented the methodology. As we mentioned, we explore alternative definitions for the treatment variables of FA (*EFA)*: a) accumulated conditional FA payments per child[5], b) accumulated conditional FA payments per child (including educational subsidy), c) life exposure to FA program and d) exposure scaled by the number of children under 17. For HC treatment we also use alternative definitions: i) Number of months in HC and ii) Life exposure to HC.

5 We computed as conditional payments up to time t divided by the number of children in the household under 17 years.

This section considers only the case where FA treatment is defined as conditional money per child for nutrition and HC treatment is defined as number of months that the child has attended to HC. The results are similar when we consider other treatment definitions[6].

We start presenting the instruments that we use for each treatment variables and then we present the result for the first and second stage of IV estimations. Our estimates of the impact of each program are obtained using Instrumental Variables and fixed effect specification. For the estimations, we consider the first and the second wave of the data.

IV estimators will identify the average treatment effect of each program on nutritional and morbidity outcomes if we have and exclusion restriction (conditioning on the observable variables, the outcomes are mean independent on the instruments). Even if a proper instrument is available, the identification of the average treatment effect relies on assumption that the impact of the treatment is homogenous.

Instruments

We instrument HC using the distance to the nearest HC. In particular, we use the distance to the nearest HC from the child's household in minutes and its square at the time of each wave of data. We also include the same variables but measured at the time of the first wave. In order to account for the fact that exposure to HC will be low if the child is likely to participate in the FA program, we interact the prediction for HC with the availability of FA program in the community at each time. Additionally, we interact the distance variables to the nearest HC with the availability of FA program in the community. As we will explain later, we condition all the regressions on the distance from the household to the nearest health centre, school, and to the town centre. For the case that we use life exposure to HC as the treatment variable, we adjust the prediction dividing by child's age in months.

We instrument FA using the availability of FA at the time of each wave. The others instruments for FA will depend on the treatment variable under consideration. For conditional payments we consider the potential payment that the family could have received since the program started in the municipality until the time of each wave. The potential payment is the number of transfers that municipality had paid until time *t* multiplied by the nutritional subsidy per payment ($COL93.000) and divided by the number of children under 17 in the household. When we consider nutritional and educational subsidy in the treatment variable, we include the educational payment for primary and secondary depending on the household composition of children's ages. We instrument life exposure to FA computing the potential number of months that the family could have received nutritional subsidy adjusted by child's age. Finally, we instrument exposure scaled by number of children as the potential number of months receiving FA divided by the number of children under 17. In all cases, we consider the family can receive nutritional payments as long as there is an eligible child[7] in the household. If the youngest children lost the eligibility for nutritional subsidy before the time of the wave, we compute the variable until the time they are not longer eligible.

In both cases, we include in the instruments a prediction of the treatment variable for HC (months attending to HC) using a non-linear specification. Additionally, we include the square of the prediction and the interaction between the prediction and the availability of FA program in the community at the time of each wave. In order to predict months attending to HC, we run a negative

6 Full estimations for the other cases are available from the authors upon request.

7 We consider that a child is eligible if it is not a new born and is younger than 7 years old. In particular we only consider those children that were born before May 1st , 2001.

binomial regression of number of months on the instruments for FA, HC and controls. We also use the instruments for FA as instruments for HC and vice verse.

First stage estimations

We run the first stage estimation using the instruments that we explained before. Our control variables are age in months and its square, gender, birth order, mother and household head age, mother's education, mother's height, single mother, household with children between 8 to 12 and between 13 to 17 years, household with at least one child eligible[8] for FA, distance in minutes from the household to the nearest health centre, school, and to the town centre and wave.[9]

As we mentioned before, this section considers only the case where FA treatment is defined as conditional money per child for nutrition and HC treatment is defined as number of months attending to HC. Table 6.1 presents the first stage estimations of the impact on nutritional[10] and morbidity outcomes, height-for-age Z scores (HAZ) and diarrhea prevalence (EDA) respectively. In table 6.1 we present only the coefficients for the instruments and some control variables of particular interest. The complete table is shown in table A.2 of the Annex. The first column reports the estimates for the number of month in the HC using a negative binomial model. We use these results to predict the number of months receiving HC program. The second and third column shows the first stage estimations for FA and HC program, respectively. The F-tests on the instruments are reported at the bottom of the table.

8 We consider eligible child if he/she is under 7, is not a new born and were born before May 1, 2001

9 When we use life exposure as treatment we include the inverse of age as control.

10 Note that the first stage estimation is the regression of the treatment variable on all instruments and controls. Hence, they are the same for the other nutritional outcomes.

TABLE 6.1
FIRST STAGE IV ESTIMATIONS

	First Stage for program effect on HAZ			First Stage for program effect on EDA		
	Negative Binomial	**First Stage FA**	**First Stage HC**	**Negative Binomial**	**First Stage FA**	**First Stage HC**
	Months in HC	Conditional Money per Child¹ (mill)	Months in HC	Months in HC	Conditional Money per Child¹ (mill)	Months in HC
FA treatment available in the community	0.525**	0.049***	0.599	0.472**	0.045***	0.681
	[0.234]	[0.013]	[0.891]	[0.229]	[0.012]	[0.826]
Potential conditional money per child¹ (mill)	-4.198*	0.168	0.209	-3.003	0.189	-1.069
	[2.177]	[0.119]	[5.552]	[2.096]	[0.116]	[5.228]
Potential conditional money per child¹ (mill) ^2	3.117	-0.014	8.961	2.623	-0.011	6.715
	[2.198]	[0.192]	[6.759]	[2.143]	[0.191]	[6.432]
age_m x potential conditional money per child¹ (mill)	-0.02	0.006**	-0.139	-0.054	0.005*	-0.048
	[0.071]	[0.003]	[0.160]	[0.068]	[0.003]	[0.149]
age_m^2 x potential conditional money per child¹ (mill)	0.001	0.000	-0.001	0.001	0.000	-0.002
	[0.001]	[0.000]	[0.002]	[0.001]	[0.000]	[0.002]
travel time to the nearest HC in minutes (at the time of the first wave)/100	-1.508***	0.007	-1.252	-1.443***	0.006	-1.371
	[0.294]	[0.008]	[1.407]	[0.285]	[0.007]	[1.376]
[travel time to the nearest HC in minutes (at the time of the first wave)/100] ^2	0.252*	-0.004	0.421	0.221	-0.003	0.5
	[0.145]	[0.004]	[0.542]	[0.140]	[0.004]	[0.519]
travel time to the nearest HC in minutes/100	-2.134***	0.003	-3.152**	-1.940***	0.005	-2.968**
	[0.305]	[0.009]	[1.341]	[0.296]	[0.008]	[1.277]
(travel time to the nearest HC in minutes/100)^2	0.663***	-0.001	0.807	0.584***	-0.002	0.770
	[0.159]	[0.004]	[0.527]	[0.155]	[0.004]	[0.486]
travel time to HC at wave 1 x FA treatment available in the community	-1.165***	-0.005	-0.568	-1.066***	-0.006	-0.539
	[0.254]	[0.010]	[0.910]	[0.249]	[0.009]	[0.840]
travel time to HC x FA treatment available in the community	0.522**	-0.018	0.969	0.423*	-0.016	0.801
	[0.238]	[0.011]	[0.916]	[0.233]	[0.011]	[0.856]
prediction of months in HC		0.000	0.576***		0.000	0.616***
		[0.000]	[0.066]		[0.000]	[0.067]
prediction of months in HC^2		0.000	-0.004***		0.000	-0.004***
		[0.000]	[0.001]		[0.000]	[0.001]
prediction of months in HC x treatment available in the community		0.000	0.058		0.001	0.018
		[0.000]	[0.071]		[0.000]	[0.055]
single mother	0.190**	-0.002	1.001*	0.187**	-0.001	0.917*
	[0.076]	[0.002]	[0.576]	[0.073]	[0.002]	[0.547]
Household with children 8-12 years old	-0.03	0.000	-0.058	-0.036	0.000	-0.001
	[0.039]	[0.001]	[0.228]	[0.038]	[0.001]	[0.219]
Household with children 13-17 years old	-0.115***	0.002*	-0.208	-0.108***	0.002	-0.123
	[0.041]	[0.001]	[0.256]	[0.039]	[0.001]	[0.250]
Time in minutes to health center /100	-0.289*	-0.001	0.408	-0.259*	-0.002	0.431
	[0.151]	[0.004]	[1.083]	[0.147]	[0.004]	[1.029]
(Time in minutes to health center/100) ^2	0.021	-0.001	0.203	0.019	-0.001	0.331
	[0.101]	[0.002]	[0.682]	[0.096]	[0.002]	[0.584]
Time in min. to the school	0.568	0.004	-2.715	0.25	0.004	-1.972
	[0.400]	[0.010]	[2.342]	[0.383]	[0.010]	[2.222]
Time in min. to the school ^2	-0.502	0.003	4.782***	-0.422	0.007	4.301***
	[0.332]	[0.009]	[1.317]	[0.324]	[0.010]	[1.259]
Time to the school x time to the health center	-1.139***	-0.005	0.71	-1.111***	-0.001	0.227
	[0.438]	[0.008]	[1.514]	[0.416]	[0.008]	[1.361]
travel time to the town center	0.323**	-0.005	0.863	0.279**	-0.004	0.716
	[0.132]	[0.003]	[0.881]	[0.129]	[0.003]	[0.838]
travel time to the town center ^2	-0.140***	0.000	0.198	-0.125**	0.000	0.235
	[0.054]	[0.001]	[0.289]	[0.053]	[0.001]	[0.275]
travel time to the town center x time to health provider	0.189*	0.002	-0.392	0.166	0.002	-0.490
	[0.114]	[0.003]	[0.722]	[0.113]	[0.003]	[0.661]
travel time to the town center x time to the school	0.480	0.006	-2.520**	0.548	0.003	-2.366**
	[0.367]	[0.007]	[1.146]	[0.357]	[0.007]	[1.097]
Observations	8640	8640	8640	9315	9315	9315
R-squared		0.56	0.36		0.56	0.36
Test instruments	638.19	91.03	30.13	624.67	94.85	33.92
Prob inst	0.00	0.00	0.00	0.00	0.00	0.00
Shea's Partial R-Squared		0.3398	0.0835		0.3398	0.0835

Families have to choose between a nutritional program (FA or HC) and not being beneficiary of any program. First stage estimations give us some insight about the variables that may be relevant in the decision of each program.

First we present the effect of the some instruments on the treatment variables and then we analyse the effect of other controls. For the controls, we consider households with schooling age child, children with single mothers and distance to health facilities.

Distance to HC

Families who live relatively far from a HC are more likely to choose FA. Thirty minutes of extra travel to the HC, at the time of the first wave, increases the allowance per child by $COL 1,232 for a family with four children and reduces the time attending a HC by 9.8 days. Moreover, the same extra travel time at the time of each wave reduces the attendance to HC in 21.6 days.

FA program available in the community[11]

The availability of the program in the community reduces the attendance to HC in 6.1 months for a child with the average age (48 months) and increases the transfer in $COL 502,000 per child for a family with four children.

Other controls

Households with schooling age child

FA payments for attendance to secondary school are 100% higher than payment for primary school. Families with an additional child in secondary school are more likely to choose the FA program. In particular, an additional extra sibling in secondary school age increases the nutritional allowance by $COL2000 per child and reduces the attendance to HC by 6.2 days. The number of primary school children in the household doesn't seem to have a significant effect on the selection of a program.

Single Mothers

Single mothers are less likely to choose FA program. Having a single mother increases a child's attendance to HC by 28 days and reduces the allowance per child by $COL 2,000. Indeed, single mothers may prefer a childcare program rather a conditional cash transfer if they don't have a family member taking care of the child. Working single mothers may have less time available to take the child to the doctor. Hence, they may have more difficulties to satisfy the health conditionality of the CCT.

Distance to health facilities

In order to receive the nutritional allowance of the CCT, all children under 7 years should have their growth and development monitoring visits to date. Families who live relatively far to the health facility may be less likely to choose FA. Thirty minutes of extra travel time to the closer health facility reduces the allowance by $COL 234 per child and increases the attendance to HC by 3.4 days. However, those effects are not significant.

Are the instruments strong instruments?

IV methods for estimating average treatment effects can be very effective if a good instrument for treatment is available. Before continuing with the analysis for the second stage, we test if the instruments that we are using are strong instruments. On the bottom of table 6.1, we show the results for the F test on all the instruments for FA and HC program. The F-test for FA is 91.03 and the F-test for HC is 30.1. In both cases, we have strong instruments that will allow us to identify the average treatment effect of each program.

11 Includes treatment in the municipality and potential transfer

Effect of "Familias en Accion" and "Hogares Comunitarios" Program

This section presents the IV estimators for the effect of each program using the first and second wave of data. Average treatment effect is identified if the exclusion restriction is satisfied and the impact of the treatment is homogenous.

Table 6.2 summarizes the effect of the program on nutritional and morbidity outcomes when FA treatment is defined as conditional money per child. Full results are shown in the Annex in table A.3.

TABLE 6.2
AVERAGE TREATMENT EFFECT ON NUTRITIONAL AND MORBIDITY OUTCOMES

Program effect - IV-1	HAZ	Chronic Malnutrition	Risk of Chronic Malnutrition	WAZ	Global Malnutrition	Risk of Global Malnutrition	WHZ	Acute Malnutrition	Risk of Acute Malnutrition	EDA	IRA
Conditional money pc (mill) [1]	0.620***	-0.101	-0.329***	0.978***	-0.187***	-0.367***	0.837***	-0.098***	-0.119	-0.216**	-0.254*
	[0.225]	[0.086]	[0.110]	[0.237]	[0.066]	[0.113]	[0.238]	[0.030]	[0.081]	[0.092]	[0.142]
Months in HC	0.010**	-0.003*	-0.004**	0.005	-0.001	-0.001	-0.003	0.001	0.000	-0.002*	-0.004***
	[0.004]	[0.002]	[0.002]	[0.004]	[0.001]	[0.002]	[0.004]	[0.000]	[0.001]	[0.001]	[0.002]
Observations	8640	8640	8640	8640	8640	8640	8640	8640	8640	9315	9314
R-squared	0.22	0.14	0.16	0.14	0.07	0.10	0.10	0.02	0.05	0.04	0.06
Effect of one year FA	0.09	-0.01	-0.05	0.14	-0.03	-0.05	0.12	-0.01	-0.02	-0.03	-0.04
t-test	2.75	-1.18	-3.00	4.13	-2.82	-3.25	3.51	-3.24	-1.46	-2.35	-1.79
Effect of one year HC	0.12	-0.04	-0.04	0.06	-0.01	-0.01	-0.04	0.01	0.00	-0.03	-0.05
t-test	2.44	-1.72	-2.00	1.20	-0.46	-0.40	-0.94	1.33	0.32	-1.91	-2.66
F Test- Same effect of one year program	0.38	0.96	0.00	2.20	1.52	2.67	9.24	9.34	1.53	0.01	0.41
Prob	0.54	0.33	0.94	0.14	0.22	0.10	0.00	0.00	0.22	0.91	0.52

Robust standard errors in brackets (standard errors clustered at household level)

* significant at 10%; ** significant at 5%; *** significant at 1%

[1] Only includes nutritional componet

Nutritional Outcomes

The relation between height and age is thought to be a long-term measure of nutritional status. This relation is usually expressed using a so-called Z-score. Height to age Z score (HAZ) is the difference between a child's height and the median height of the reference population for the same age and gender, divided by the standard deviation of the reference population for the same age and gender. Children have chronic malnutrition or are chronically undernourished or stunted when the value of the height-for-age Z-score is below –2. Children are at risk of chronic malnutrition when the value of the height-for-age Z-score is below –1.

The first year in the FA program increases HAZ score by 0.09 standard deviations while the effect is 0.12 for HC. Considering the effect on chronic malnutrition (HAZ score below -2 standard deviation), one year program in FA reduces the prevalence of chronic malnutrition by 1% vs 4% with HC. In the same way, FA reduces the risk of chronic malnutrition (HAZ score below -1 standard deviations) by 4% and HC by 5%. However, for all these cases, the test doesn't reject the equality in the effect of both programs, F-test 0.38, 0.96 and 0.00 respectively.

One year in the FA program increases the weight to age Z score in 0.14 standard deviations and reduces the probability of having global malnutrition and the risk of having global malnutrition by 3% and 5%, respectively. Once more, the effect of HC program is not significant different from those found for FA program.

We found different effects on weight to height Z scores where FA has a higher impact. However, Colombian population has no relevant deficit in weight to height outcomes. Hence, we will base our conclusion in the other nutritional outcomes.

Summing-up, both programs improve the nutritional outcomes and they have similar impact. Although, the CCT doesn't include a nutritional supplement, it has almost the same effect than HC. This result is consistent with those found in Attanasio and Mesnard (2006) where FA program contributes to improvements in the quality of food consumed, in particular of items rich in proteins (milk, meat and eggs) and of cereals.

Morbidity Outcomes

Given that FA program is conditional on having growth and development monitoring visits to date, it generates an incentive to go to the doctor. Hence, the conditional transfer may also improve health outcomes. Children receiving FA conditional subsidy or attending to HC have around 3% lower probability of having diarrhea events and respiratory diseases.

The conclusions don't change if we consider other definitions for the treatment variables. Table 6.3 summarizes the results for three alternative definitions presented in tables A.6-A.9. Both programs improve nutritional and morbidity outcomes. HAZ and WAZ indicators improve. The probability of chronic and global malnutrition and the risk of them fall. The effect of both programs is not statistically different.

TABLE 6.3
EFFECT OF ONE YEAR PROGRAM ON NUTRITIONAL AND MORBIDITY OUTCOMES

	HAZ	Chronic Malnutrition	Risk of Chronic Malnutrition	WAZ	Global Malnutrition	Risk of Global Malnutrition	WHZ	Acute Malnutrition	Risk of Acute Malnutrition	EDA	IRA
IV -2- Treatment Definition: FA = Conditional money[1] pc (mill), HC= Months attending to HC											
Test IV - 2											
Effect of 1- year FA	0.14	-0.02	-0.07	0.19	-0.04	-0.07	0.16	-0.02	-0.02	-0.04	-0.06
t-test	2.75	-1.06	-2.96	3.74	-2.58	-2.69	3.08	-3.01	-1.15	-2.03	-1.76
Effect of 1- year HC	0.12	-0.04	-0.05	0.06	-0.01	-0.01	-0.04	0.01	0.01	-0.03	-0.05
t-test	2.47	-1.78	-2.04	1.20	-0.51	-0.42	-0.97	1.29	0.35	-1.98	-2.68
F Test- Same effect of 1-year program	0.04	0.44	0.71	4.25	2.52	3.41	9.75	10.15	1.46	0.32	0.01
Prob	0.84	0.51	0.40	0.04	0.11	0.06	0.00	0.00	0.23	0.57	0.94
IV - 3 - Treatment Definition: FA= life exposure[2] to FA subsidy, HC = life exposure[2] to HC program											
Test IV - 3											
Effect of 1-year FA at average age	0.08	-0.01	-0.08	0.13	-0.02	-0.01	0.09	-0.01	-0.01	0.00	-0.02
t-test	1.59	-0.68	-1.37	2.53	-1.61	-0.83	2.17	-1.53	-1.00	-0.16	-1.09
Effect of 1-year HC at average age	0.22	-0.06	-0.03	0.17	0.00	-0.05	0.03	0.01	-0.01	-0.05	-0.07
t-test	2.43	-1.56	-1.95	2.04	-0.13	-1.20	0.44	1.41	-0.41	-1.95	-1.76
F Test- Same effect of 1-year program	1.54	1.28	1.20	0.13	0.26	0.51	0.43	3.33	0.00	2.25	0.97
Prob	0.21	0.26	0.27	0.72	0.61	0.48	0.51	0.07	0.97	0.13	0.32
Effect of 20% life in FA	0.07	-0.01	-0.02	0.11	-0.01	-0.01	0.07	-0.01	-0.01	0.00	-0.02
t-test	1.59	-0.68	-1.37	2.53	-1.61	-0.83	2.17	-1.53	-1.00	-0.16	-1.09
Effect of 20% life in HC	0.18	-0.05	-0.06	0.14	0.00	-0.04	0.03	0.01	-0.01	-0.04	-0.05
t-test	1.54	1.28	1.20	0.13	0.26	0.51	0.43	3.33	0.00	2.25	0.97
IV - 4 - Treatment Definition: FA = Exposure[3] to FA scaled per child, HC= Months attending to HC											
Test IV - 4											
Effect of 1- year FA	0.10	-0.03	-0.02	0.18	-0.02	-0.08	0.18	-0.01	-0.02	-0.06	-0.02
t-test	1.71	-1.30	-0.72	2.92	-1.65	-2.82	2.77	-1.66	-0.90	-2.95	-0.60
Effect of 1- year HC	0.14	-0.04	-0.05	0.09	-0.01	-0.02	-0.01	0.00	0.00	-0.04	-0.05
t-test	2.80	-1.97	-2.27	1.86	-0.55	-1.03	-0.32	0.86	-0.20	-2.51	-2.59
F Test- Same effect of 1-year program	0.44	0.34	0.91	1.47	0.75	2.68	6.37	3.84	0.38	1.09	0.74
Prob	0.51	0.56	0.34	0.23	0.39	0.10	0.01	0.05	0.54	0.30	0.39

[1] Includes nutritional and educational allowance. [2] Months in the program / age in months. [3] Months in FA/number of children under 17 years

Comparing with table 6.2, the effect of one-year program on HAZ, WAZ and morbidity outcomes is slightly higher if we define FA treatment as conditional money per child including also educational subsidy or months in the program scaled by the number of children in the household.

7. CONCLUDING REMARKS AND POLICY RECOMMENDATIONS

In this report, we have provided estimates for two different nutritional interventions in Colombia, a traditional nutritional program - “Hogares Comunitarios” and a CCT with a nutritional component – “Familias en Acción”.

According to our estimates, both programs improve the nutritional status and morbidity outcomes of children under 7 and there is not significant difference in their impact. This result is consistent with previous studies where FA program improves the quality of the food consumed. It also complements studies of the effectiveness of HC.

Finding the same effect for both programs does not necessary imply that the programs are substitutes. Different groups of the population may prefer different programs. Our estimates provide some insight about the characteristics that are relevant in the choice of FA vs HC. For instance, the results suggest that single mothers prefer HC program. Thus, the programs may be considered as complementary. However, further research on the potential complementarities of both programs and their relative costs should be carried out.

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ANNEX

TABLE A.1
VARIABLES DESCRIPTION

Variable	Description
Instruments	
treat	1 if the FA program is opperating at the time and municipality in consideration
Potential conditional money per child	(Potential conditional subsidy that the family could have received / number of children 0-17)/1000000
Potential conditional money per child^2	(Potential conditional subsidy that the family could have received / number of children 0-17)^2 /1000000
Potential Months in FA	Potential months receiving FA payments since the program started
Potential Months in FA^2	Potential months receiving FA payments since the program started ^2
Potential Life Exposure FA	Potential months receiving FA / age in months
Potential Life Exposure HC	Potential months attending HC / age in months
hc_hat_age	Prediction of the number of months that the child attended to HC
hc_hat_age2	Prediction of the number of months that the child attended to HC ^2
treat_hc_hat_age	Treat x prediccion of the number of months that the child attend to HC
time_hc_b	Household average travel time to the nearest HC in minutes (at the time of the baseline t=1)/100
time_hc_b2	(Household average travel time to the nearest HC in minutes (at the time of the baseline t=1) /100) ^2
traveltimhogcom	Household average travel time to the nearest HC in minutes at time t /100
traveltimhogcom2	(Household average travel time to the nearest HC in minutes at time t /100)^2
travelhcb_treat	Community with treatment at time t x travel time to the nearest HC at time t=1 /100
travelhc_treat	Community with treatment at time t x travel time to the nearest HC at time t /100
Controls	
age_m	Child's age in months
age_m2	Child's age in months ^2
female	1 if female
ln_order	Log of child's birth order
ln_age_h	Log of household head's age
ln_age_m	Log of mother's age
mother's height	Mother's Height in mts
edu_m345	1 if Mother has complete primary school or higher level of education
edu_h345	1 if Household Head has complete primary school or higher level of education
single	1 if single mother
n8_12_hog	number of children in the household between 8 to 12 years old
n13_17_hog	number of children in the household between 13 to 17 years old
time2	1 if second wave
niniopot_h	1 if there is a child under 7 years who were born before May 1st 2001
rural	1 if rural area
time_hea	travel time to health center in minutes /100
time_hea2	travel time to health center in minutes ^2 /100
time_sch	travel time to school in minutes / 100
time_sch2	travel time to school in minutes ^2 / 100
time_hea_sch	travel time to health center x time to the school
time_alc	travel time to the town center
time_alc2	travel time to the town center ^2
timealchea	travel time to the town center x time to health provider
timealcsch	travel time to the town center x time to the school

TABLE A.2
FIRST STAGE IV ESTIMATIONS 1

	First Stage for program effect on HAZ			First Stage for program effect on EDA		
	Negative Binomial	**First Stage FA**	**First Stage HC**	**Negative Binomial**	**First Stage FA**	**First Stage HC**
Estimations	Months in HC	Conditional Money per Child¹ (mill)	Months in HC	Months in HC	Conditional Money per Child¹ (mill)	Months in HC
treat	0.525**	0.049***	0.599	0.472**	0.045***	0.681
	[0.234]	[0.013]	[0.891]	[0.229]	[0.012]	[0.826]
Potential conditional money per child¹ (mill)	-4.198*	0.168	0.209	-3.003	0.189	-1.069
	[2.177]	[0.119]	[5.552]	[2.096]	[0.116]	[5.228]
Potential conditional money per child¹ (mill) ^2	3.117	-0.014	8.961	2.623	-0.011	6.715
	[2.198]	[0.192]	[6.759]	[2.143]	[0.191]	[6.432]
age_m x potential conditional money per child¹ (mill)	-0.02	0.006**	-0.139	-0.054	0.005*	-0.048
	[0.071]	[0.003]	[0.160]	[0.068]	[0.003]	[0.149]
age_m^2 x potential conditional money per child¹ (mill)	0.001	0.000	-0.001	0.001	0.000	-0.002
	[0.001]	[0.000]	[0.002]	[0.001]	[0.000]	[0.002]
time_hc_b	-1.508***	0.007	-1.252	-1.443***	0.006	-1.371
	[0.294]	[0.008]	[1.407]	[0.285]	[0.007]	[1.376]
time_hc_b2	0.252*	-0.004	0.421	0.221	-0.003	0.5
	[0.145]	[0.004]	[0.542]	[0.140]	[0.004]	[0.519]
traveltimhogcom	-2.134***	0.003	-3.152**	-1.940***	0.005	-2.968**
	[0.305]	[0.009]	[1.341]	[0.296]	[0.008]	[1.277]
traveltimhogcom2	0.663***	-0.001	0.807	0.584***	-0.002	0.770
	[0.159]	[0.004]	[0.527]	[0.155]	[0.004]	[0.486]
travelhcb_treat	-1.165***	-0.005	-0.568	-1.066***	-0.006	-0.539
	[0.254]	[0.010]	[0.910]	[0.249]	[0.009]	[0.840]
travelhc_treat	0.522**	-0.018	0.969	0.423*	-0.016	0.801
	[0.238]	[0.011]	[0.916]	[0.233]	[0.011]	[0.856]
hc_hat_age		0.000	0.576***		0.000	0.616***
		[0.000]	[0.066]		[0.000]	[0.067]
hc_hat_age2		0.000	-0.004***		0.000	-0.004***
		[0.000]	[0.001]		[0.000]	[0.001]
treat_hc_hat_age		0.000	0.058		0.001	0.018
		[0.000]	[0.071]		[0.000]	[0.055]
age_m	0.167***	-0.000***	0.065***	0.168***	-0.000***	0.049**
	[0.006]	[0.000]	[0.025]	[0.006]	[0.000]	[0.023]
age_m2	-0.120***	0.000**	0.047**	-0.122***	0.000**	0.056**
	[0.006]	[0.000]	[0.024]	[0.006]	[0.000]	[0.023]
female	0.02	-0.001	-0.082	0.017	0.000	-0.140
	[0.047]	[0.001]	[0.291]	[0.046]	[0.001]	[0.281]
ln_order	0.342***	-0.002	0.804	0.334***	0.000	0.655
	[0.090]	[0.002]	[0.540]	[0.088]	[0.002]	[0.513]
ln_age_h	-0.204*	-0.007**	-1.479**	-0.271***	-0.007**	-1.219*
	[0.104]	[0.003]	[0.749]	[0.101]	[0.003]	[0.723]
ln_age_m	0.029	0.010***	-0.595	-0.043	0.011***	-0.638
	[0.138]	[0.004]	[0.843]	[0.133]	[0.004]	[0.810]
height_mot	-0.970**	-0.003	-2.295	-0.974**	-0.002	-2.471
	[0.423]	[0.012]	[3.165]	[0.410]	[0.011]	[3.038]
edu_m345	0.103*	0.000	0.485	0.105**	0.000	0.442
	[0.054]	[0.002]	[0.404]	[0.053]	[0.002]	[0.389]
edu_h345	0.113**	-0.001	-0.274	0.097*	-0.001	-0.329
	[0.056]	[0.002]	[0.439]	[0.054]	[0.002]	[0.418]
single	0.190**	-0.002	1.001*	0.187**	-0.001	0.917*
	[0.076]	[0.002]	[0.576]	[0.073]	[0.002]	[0.547]
n8_12_hog	-0.03	0.000	-0.058	-0.036	0.000	-0.001
	[0.039]	[0.001]	[0.228]	[0.038]	[0.001]	[0.219]
n13_17_hog	-0.115***	0.002*	-0.208	-0.108***	0.002	-0.123
	[0.041]	[0.001]	[0.256]	[0.039]	[0.001]	[0.250]
time2	-0.187***	0.001***	-0.212	-0.168***	0.001***	-0.185
	[0.060]	[0.000]	[0.216]	[0.058]	[0.000]	[0.196]
niniopot_h	-0.094	0.019***	-0.161	-0.110	0.018***	-0.177
	[0.166]	[0.004]	[0.334]	[0.159]	[0.003]	[0.312]
rural	-0.216***	-0.002	0.22	-0.197***	-0.002	0.164
	[0.069]	[0.002]	[0.470]	[0.068]	[0.002]	[0.453]
time_hea	-0.289*	-0.001	0.408	-0.259*	-0.002	0.431
	[0.151]	[0.004]	[1.083]	[0.147]	[0.004]	[1.029]
time_hea2	0.021	-0.001	0.203	0.019	-0.001	0.331
	[0.101]	[0.002]	[0.682]	[0.096]	[0.002]	[0.584]
time_sch	0.568	0.004	-2.715	0.25	0.004	-1.972
	[0.400]	[0.010]	[2.342]	[0.383]	[0.010]	[2.222]
time_sch2	-0.502	0.003	4.782***	-0.422	0.007	4.301***
	[0.332]	[0.009]	[1.317]	[0.324]	[0.010]	[1.259]
time_hea_sch	-1.139***	-0.005	0.71	-1.111***	-0.001	0.227
	[0.438]	[0.008]	[1.514]	[0.416]	[0.008]	[1.361]
time_alc	0.323**	-0.005	0.863	0.279**	-0.004	0.716
	[0.132]	[0.003]	[0.881]	[0.129]	[0.003]	[0.838]
time_alc2	-0.140***	0.000	0.198	-0.125**	0.000	0.235
	[0.054]	[0.001]	[0.289]	[0.053]	[0.001]	[0.275]
timealchea	0.189*	0.002	-0.392	0.166	0.002	-0.490
	[0.114]	[0.003]	[0.722]	[0.113]	[0.003]	[0.661]
timealcsch	0.480	0.006	-2.520**	0.548	0.003	-2.366**
	[0.367]	[0.007]	[1.146]	[0.357]	[0.007]	[1.097]
Constant	-20.296	0.000	0.354	-14.457	-0.001	1.157
	[6.144]	[0.019]	[5.098]	[11.165]	[0.018]	[4.888]
Municipality fixed effect	yes	yes	yes	yes	yes	yes
Observations	8640	8640	8640	9315	9315	9315
R-squared		0.56	0.36		0.56	0.36
Test inst	638.19	91.03	30.13	624.67	94.85	33.92
Prob inst	0.00	0.00	0.00	0.00	0.00	0.00

Robust standard errors in brackets. (Standard errors in first stage regresions are clustered at household level)

* significant at 10%; ** significant at 5%; *** significant at 1%

¹ Only includes nutritional component

TABLE A.3

IV ESTIMATIONS 1

AVERAGE TREATMENT EFFECT OF FA AND HC ON NUTRITIONAL AND MORBIDITY OUTCOMES

TREATMENT FA MEASURED AS CONDITIONAL MONEY PER CHILD

(ONLY NUTRITIONAL PAYMENTS)

	HAZ	Chronic Malnutrition	Risk of Chronic Malnutrition	WAZ	Global Malnutrition	Risk of Global Malnutrition	WHZ	Acute Malnutrition	Risk of Acute Malnutrition	EDA	IRA
Conditional money pc (mill) [1]	0.620***	-0.101	-0.329***	0.978***	-0.187***	-0.367***	0.837***	-0.098***	-0.119	-0.216**	-0.254*
	[0.225]	[0.086]	[0.110]	[0.237]	[0.066]	[0.113]	[0.238]	[0.030]	[0.081]	[0.092]	[0.142]
Months in HC	0.010**	-0.003*	-0.004**	0.005	-0.001	-0.001	-0.003	0.001	0.000	-0.002*	-0.004***
	[0.004]	[0.002]	[0.002]	[0.004]	[0.001]	[0.002]	[0.004]	[0.000]	[0.001]	[0.001]	[0.002]
age_m	-0.032***	0.008***	0.013***	-0.032***	0.002***	0.010***	-0.016***	0.000	0.001**	-0.002***	0.001
	[0.003]	[0.001]	[0.001]	[0.003]	[0.001]	[0.001]	[0.002]	[0.000]	[0.001]	[0.001]	[0.001]
age_m2	0.025***	-0.006***	-0.010***	0.027***	-0.002***	-0.008***	0.016***	0.000	-0.002***	0.001	-0.002**
	[0.002]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.002]	[0.000]	[0.001]	[0.001]	[0.001]
female	0.131***	-0.038***	-0.053***	0.127***	-0.011	-0.060***	0.045**	-0.001	-0.004	-0.009	-0.01
	[0.026]	[0.010]	[0.012]	[0.024]	[0.007]	[0.012]	[0.022]	[0.002]	[0.008]	[0.007]	[0.010]
ln_order	-0.464***	0.136***	0.167***	-0.424***	0.072***	0.132***	-0.195***	0.003	0.02	0.003	-0.027
	[0.052]	[0.020]	[0.022]	[0.050]	[0.015]	[0.023]	[0.047]	[0.005]	[0.015]	[0.015]	[0.021]
ln_age_h	0.264***	-0.074***	-0.070**	0.160**	-0.038*	-0.038	-0.013	-0.013**	-0.007	-0.038**	-0.016
	[0.067]	[0.025]	[0.029]	[0.065]	[0.020]	[0.030]	[0.057]	[0.006]	[0.020]	[0.019]	[0.027]
ln_age_m	0.265***	-0.051	-0.093**	0.173**	-0.032	-0.086**	0.040	0.017***	-0.009	-0.016	0.033
	[0.083]	[0.032]	[0.037]	[0.080]	[0.024]	[0.038]	[0.070]	[0.007]	[0.023]	[0.023]	[0.034]
height_mot	5.543***	-1.624***	-2.164***	3.543***	-0.676***	-1.407***	0.216	0.011	-0.062	-0.091	-0.168
	[0.272]	[0.102]	[0.110]	[0.261]	[0.083]	[0.119]	[0.229]	[0.023]	[0.078]	[0.072]	[0.109]
edu_m345	0.090**	-0.024*	-0.037**	0.089***	-0.018*	-0.049***	0.048	-0.006**	-0.003	-0.009	0.031**
	[0.035]	[0.013]	[0.015]	[0.033]	[0.010]	[0.016]	[0.030]	[0.003]	[0.010]	[0.010]	[0.014]
edu_h345	0.093**	-0.024*	-0.021	0.075**	-0.013	-0.024	0.023	0.001	-0.004	-0.005	-0.019
	[0.036]	[0.014]	[0.016]	[0.035]	[0.010]	[0.016]	[0.031]	[0.004]	[0.011]	[0.010]	[0.015]
single	-0.080*	0.032*	0.026	-0.059	0.004	0.019	-0.011	0.004	0.005	0.015	0.02
	[0.046]	[0.018]	[0.020]	[0.043]	[0.013]	[0.020]	[0.038]	[0.005]	[0.014]	[0.014]	[0.019]
n8_12_hog	0.026	-0.007	-0.014	0.040**	-0.005	-0.01	0.034*	-0.001	0.002	0.004	0.018*
	[0.022]	[0.009]	[0.010]	[0.020]	[0.006]	[0.010]	[0.018]	[0.002]	[0.007]	[0.006]	[0.009]
n13_17_hog	0.079***	-0.023***	-0.030***	0.086***	-0.015**	-0.027***	0.053***	-0.001	-0.01	0.003	0.014
	[0.023]	[0.009]	[0.010]	[0.021]	[0.007]	[0.010]	[0.019]	[0.002]	[0.007]	[0.007]	[0.010]
time2	-0.001	-0.001	0.003	-0.009	0.003	-0.005	-0.02	0.006**	0.007	0.008	-0.086***
	[0.020]	[0.008]	[0.009]	[0.020]	[0.006]	[0.010]	[0.020]	[0.003]	[0.008]	[0.009]	[0.013]
niniopot_h	-0.058	-0.002	0.023	0.061	0.004	0.000	0.142**	-0.013	-0.062**	-0.022	0.014
	[0.072]	[0.023]	[0.032]	[0.074]	[0.019]	[0.032]	[0.070]	[0.010]	[0.025]	[0.026]	[0.030]
rural	0.017	0.001	-0.012	-0.017	0.009	0.000	-0.033	0.000	0.014	-0.025**	-0.023
	[0.042]	[0.016]	[0.018]	[0.040]	[0.012]	[0.019]	[0.036]	[0.004]	[0.013]	[0.012]	[0.018]
time_hea	0.066	-0.028	0.011	-0.032	0.051*	0.04	-0.106	0.020**	0.059**	0.030	0.000
	[0.101]	[0.035]	[0.041]	[0.093]	[0.027]	[0.042]	[0.082]	[0.010]	[0.029]	[0.027]	[0.037]
time_hea2	0.014	0.017	-0.001	0.107*	0.000	-0.067***	0.131**	-0.004	-0.032*	0.006	-0.013
	[0.066]	[0.019]	[0.026]	[0.059]	[0.014]	[0.026]	[0.053]	[0.005]	[0.019]	[0.015]	[0.020]
time_sch	0.105	0.023	-0.157*	0.154	0.000	-0.088	0.11	-0.019	-0.066	-0.026	-0.122
	[0.225]	[0.078]	[0.095]	[0.213]	[0.058]	[0.093]	[0.191]	[0.019]	[0.066]	[0.059]	[0.087]
time_sch2	-0.22	-0.027	0.190***	-0.035	0.023	0.005	0.145	-0.011	0.021	0.064	0.062
	[0.136]	[0.054]	[0.066]	[0.161]	[0.039]	[0.068]	[0.177]	[0.016]	[0.070]	[0.059]	[0.071]
time_hea_sch	0.045	-0.029	-0.046	-0.109	0.043	-0.035	-0.192	0.029	-0.001	-0.032	-0.062
	[0.214]	[0.056]	[0.085]	[0.199]	[0.043]	[0.082]	[0.169]	[0.021]	[0.065]	[0.049]	[0.073]
time_alc	-0.173**	0.051*	0.048	-0.035	-0.036*	0.007	0.099	-0.024***	-0.067***	-0.013	0.015
	[0.080]	[0.029]	[0.036]	[0.077]	[0.021]	[0.035]	[0.069]	[0.008]	[0.024]	[0.022]	[0.031]
time_alc2	0.054*	-0.012	-0.016	0.04	0.007	-0.026**	0.012	0.004*	0.002	0.011	-0.008
	[0.030]	[0.011]	[0.012]	[0.027]	[0.007]	[0.013]	[0.025]	[0.002]	[0.007]	[0.008]	[0.013]
timealchea	-0.077	0.003	0.022	-0.134**	-0.009	0.087***	-0.118*	-0.003	0.022	-0.018	0.028
	[0.069]	[0.024]	[0.030]	[0.065]	[0.017]	[0.031]	[0.061]	[0.005]	[0.019]	[0.017]	[0.028]
timealcsch	0.252	-0.042	-0.085	0.132	-0.053	0.012	-0.020	0.008	0.061	-0.008	0.023
	[0.174]	[0.041]	[0.080]	[0.181]	[0.035]	[0.079]	[0.139]	[0.013]	[0.061]	[0.040]	[0.071]
Constant	-7.614***	2.250***	3.012***	-3.477***	0.877***	1.950***	1.385***	0.007	0.112	0.460***	0.324**
	[0.460]	[0.169]	[0.192]	[0.441]	[0.135]	[0.203]	[0.389]	[0.040]	[0.131]	[0.109]	[0.164]
Municipality fixed effect	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	8640	8640	8640	8640	8640	8640	8640	8640	8640	9315	9314
R-squared	0.22	0.14	0.16	0.14	0.07	0.1	0.1	0.02	0.05	0.04	0.06

Robust standard errors in brackets (standard errors clustered at household level)

* significant at 10%; ** significant at 5%; *** significant at 1%