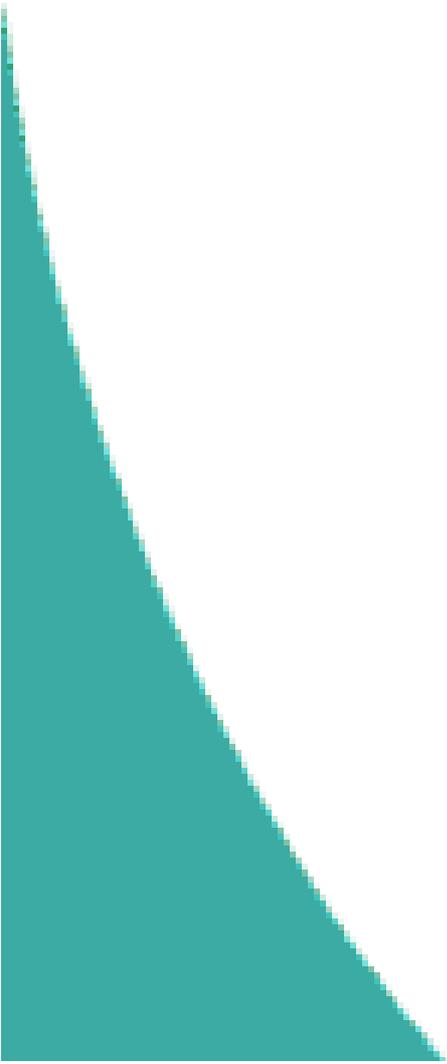


THE SHORT-TERM IMPACT OF A CONDITIONAL CASH SUBSIDY ON CHILD HEALTH AND NUTRITION IN COLOMBIA

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1. Introduction

Conditional cash transfer (CCT) programmes are becoming an extremely popular policy for improving the education and health outcomes of poor children in developing countries. CCT programmes aim to increase human capital investment among poor households in order to break the intergenerational transmission of poverty. Countries in which they are being implemented under the support of the World Bank and other international financial institutions include Mexico, Honduras, Nicaragua, Brazil, Turkey and Mozambique. While the implementation details vary from country to country, many of the programmes are modelled on the Mexican PROGRESA. In the typical CCT, mothers receive cash transfers if their school-age children attend

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school and preventive healthcare visits. The targeting of children's health and education is the essence of the long-term poverty alleviation objective of CCT programmes. Such transfer programmes are also aimed at the short-term reduction of poverty, through the provision of immediate funds to indigent households.

In this report, we will focus on the programme *Familias en Acción* (FA), the large-scale CCT implemented by the Colombian government since 2001–02. In particular, we will provide estimates of how the programme has influenced nutrition and health-related indicators for children in the short term, roughly one year after its implementation. See Attanasio, Fitzsimons and Gómez (2005) and Attanasio and Mesnard (2005) for summaries of how the programme influenced education and consumption indicators.

There are several reasons why CCTs might not have their intended effect. First, the mere existence of a programme such as FA does not mean that individuals will enrol in it. The cost of keeping up with the conditions might be too large relative to the size of the transfer. Households might anticipate this and not enrol. Administrative obstacles might also deter households from enrolling in the programme. Second, the programme might be a substitute for already-existing interventions which might be better than or as good as FA. Third, the conditionality notwithstanding, transferring cash to poor households does not necessarily mean that it will be spent in the way deemed desirable by the programme's designer. Households could use part of the transfer payment to consume tobacco, alcohol or other 'adult' commodities, which would generally be considered undesirable. Similarly, families could increase consumption of leisure in response to the receipt of money from the programme. Households could also devote most of the resources to the improvement of other household members rather than children. For these and other reasons, programmes such as FA should be evaluated to ensure that public resources are not wasted.

The existing evidence on the impact of CCT programmes on children's nutritional status is not unequivocal. Morris, Flores et al. (2004) analyse the impact of PRAF, the CCT implemented in Honduras. They find that households increase their demand for preventive care due to CCT. However, PRAF did not improve children's nutritional status (IFPRI, 2003). Morris, Olinto et al. (2004) find null effects of the Brazilian nutritional CCT on children's nutritional status. On the other hand, Gertler (2004) finds that PROGRESA reduced children's illness rate as well as the prevalence of anaemia. Moreover, children aged between 12 and 36 months who were exposed to the programme grew one centimetre more than children who were not. These effects refer to the short-term impact (one year), while evidence on the long-term impact on nutritional status is still not available.

Behrman and Hoddinott (2005a) also evaluate the impact of PROGRESA on children's nutritional status. Despite the randomised design of PROGRESA, they find that it is crucial to control for unobserved heterogeneity through

differences-in-differences because the administration of a nutritional supplement did not in practice follow the randomised design. They find important impacts on the height of children aged 12–36 months. However, it is not clear whether the effect that they observe is due to the nutritional supplement or due to the cash transfer component of the programme.¹ While there is well-established evidence about the positive impact of nutritional supplements on children’s nutritional status (Rose, Martorell and Rivera, 1992; Rivera et al., 1995; Behrman et al., 2005b), the evidence on the extent to which increased income translates into increases in food consumption remains controversial. FA does not administer a nutritional supplement as PROGRESA does; consequently, our results will be easier to relate to the role played by the cash transfer and by the information that mothers should receive at growth and development check-ups.

In this report, we will also study the interaction between FA and *Hogares Comunitarios* (HC). HC is a large-scale nurseries programme that has been operating in Colombia since 1984. Children attending the nurseries receive a lunch and two snacks that include a nutritional beverage called *bienestarina*. We believe that the interaction between different nutritional programmes has not been studied before.

The report is laid out as follows. Section 2 describes the programme FA as well as the context in which the programme was implemented. Section 3 outlines the evaluation methodology that underlies the analysis. Section 4 presents our estimates of the effects of the programme on child health and nutrition. Section 5 analyses the interaction between FA and HC. Section 6 concludes. We believe that the coexistence of different nutritional programmes is a widespread phenomenon, but we are not aware of previous research that investigates it.

2. The programme *Familias en Acción* and its background

2.1 The programme *Familias en Acción*

Familias en Acción is a large-scale welfare programme that has been implemented in 650 municipalities in Colombia as of May 2005. The programme has paid \$US183,258,944 to mothers between April 2001 and

¹ PROGRESA includes some interventions that FA does not. In particular, PROGRESA requires pregnant women to visit clinics to obtain prenatal care, while FA does not. Attendance at meetings at which health, hygiene and nutrition issues are discussed is compulsory for PROGRESA family members, while FA only encourages them to attend such meetings.

November 2004.² There are 411,837 families enrolled in FA as of September 2004.³

A family is eligible only if it satisfies the following criteria: (i) it lives in a municipality where the programme is implemented; (ii) it holds a Colombian citizen card; (iii) it has children under 18; and (iv) it is formally classified as being in the lowest level of the official socio-economic classification as of December 1999.⁴ Typically, these are the poorest 20% in Colombia. Mothers who enrol in the programme will receive a cash transfer if they comply with the conditions required by the programme. They will receive a monthly nutritional subsidy of about \$US15.38 if they have children aged 0–6 who participate in the health component of the programme. If they have school-age children (6–17), they are also entitled to a school subsidy which depends on the level of school attended. For primary-school children, the subsidy is \$US4.61, while for those in secondary school, it is \$US9.23. These are the figures for 2002; the levels are updated annually for inflation. The nutritional subsidy is per mother, independent of the number of children; the schooling subsidy is per child.

Eligible municipalities are those with fewer than 100,000 inhabitants that are not capitals of departments and that have enough health and education infrastructure to guarantee that there are no supply bottlenecks in the functioning of the FA programme. There must also be a bank office in the municipality, so that the money can be transferred to the mothers. Finally, the municipality has to have followed an administrative procedure to obtain the programme.

Mothers receive the nutritional transfers (targeted at children under 7) only if their children keep up with the conditions of the programme. In particular, children under 7 have to attend the visits established in the Growth and Development programme. This is a nationwide programme that schedules preventive healthcare visits in which children are measured and weighed to assess their nutritional status. The frequency of the visits varies by age. Children between 8 and 17 years old have to be formally enrolled in school and attend classes in order for the mother to receive the subsidy. Newborns and 7-year-olds are not eligible for the programme.

² We have used the exchange rate of \$US1 = 2,600 Colombian pesos.

³ Updated information about the programme can be found at http://www.plancolombia.gov.co/Programas/Familias_Accion/index_Familias_Accion.htm.

⁴ In particular, it has to be registered in SISBEN 1 as of December 1999. SISBEN is a composite welfare index derived from the optimal scaling algorithm.

2.2 Pre-programme situation

Here, we give a brief description of the child health and nutrition situation in the municipalities before the programme was implemented. The data in Table 1 were collected in a sample of treatment municipalities. The sampling details are described in Section 3. The data were collected before families received payments and the conditions for receiving the payments had to be verified. However, the enrolment process had already started in most municipalities.

Table 1. Indicators for children under 7 years old

| Indicator (children under 7) | Urban | Rural |
|---|--------------------|--------------------|
| Proportion with chronic malnutrition | 21.2% (1.7 ppt) | 23.4% (2.6 ppt) |
| Proportion with global malnutrition | 11.6% (1.6 ppt) | 11.4% (1.4 ppt) |
| Proportion that had diarrhoea symptoms during the 15 days prior to the interview | 19.0% (1.4 ppt) | 15.5% (1.8 ppt) |
| Proportion that had infectious respiratory disease symptoms during the 15 days prior to the interview | 46.4% (3.6 ppt) | 41.8% (2.1 ppt) |
| Proportion that complied with the Growth and Development check-up schedule | 35.6% (4.5 ppt) | 27.9% (4.6 ppt) |
| Proportion that were correctly vaccinated against DPT | 77.4% (2.0 ppt) | 73.2% (2.6 ppt) |

Standard errors in parentheses.
ppt = percentage points.

The indicators in the table show a severe prevalence of malnutrition in this poor population. They also show that the incidence of symptoms of infectious respiratory disease is very high. This is not uncommon in very poor populations. Pryer (2003) reports that 40% of children aged 0–4 were suffering from coughs and colds in the slums of Dhaka (Bangladesh).

3. Methodology

3.1 Sampling design

Given that selection into FA treatment, for political reasons, could not be random, special care was taken in the sample design of the evaluation to maximise the comparability between treatment and control towns. The sample universe was the municipalities with fewer than 100,000 individuals. The municipalities in the relevant universe were classified into 25 strata according to geographical region, population size, proportion of the population living in the urban part of the municipality and the value of a synthetic index for quality

of life (QLI), as well as education and health infrastructure.⁵ Two treatment municipalities were randomly selected from each stratum among the municipalities participating in FA. For each treatment municipality, a ‘similar’ control municipality was chosen from the same stratum among the set of municipalities not participating in FA. In practice, most control municipalities are towns without a bank (but satisfying the other requirements). In summary, treatment municipalities were randomly selected, and control municipalities were matched to the treatment municipalities on the basis of geographical region, education and health infrastructure, population size, proportion of the population living in the urban part of the municipality and QLI.

3.2 Evidence in favour of the common-trends assumption

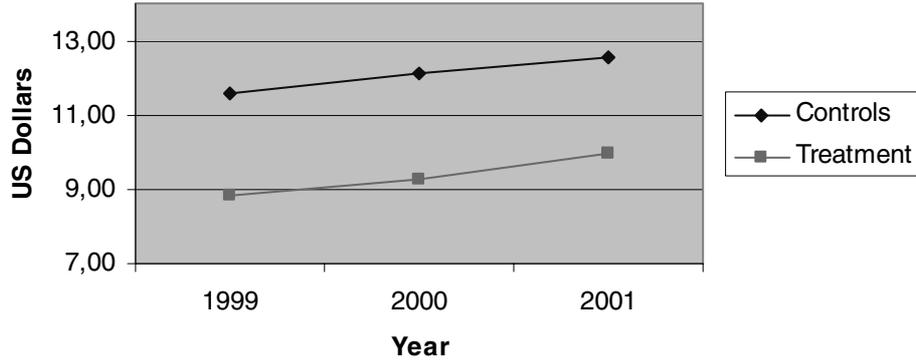
Even though the sampling design tried to minimise differences between treatment and control municipalities, one would still expect that some differences prevail between them: for example, towns without a bank might be poorer than towns with one. These differences could bias the results, as variation in the post-programme outcomes could be due to them rather than to the programme. We use the differences-in-differences approach to purge our estimates of the programme impacts from pre-existing differences. In essence, we will be comparing not the levels of the variables after the programme but their change between baseline and follow-up. The crucial assumption that the differences-in-differences method makes is that the outcome variable would have grown the same between baseline and follow-up in both treatment and control municipalities had the FA programme not taken place. This is commonly known as the common-trends assumption. Clearly, this assumption cannot be tested, but examining the past behaviour of the outcome variables can give us an indication of how likely it is that this assumption will hold. In particular, if the outcome variables had evolved in the past completely differently between treatment and control municipalities, then this assumption would be difficult to maintain.

Figure 1, compiled using retrospective information collected in the survey, shows the evolution of per-capita household labour income in treatment and control towns for the three years before the programme was implemented.⁶ The graph shows that, while there is a difference in the level of average per-capita household income between treatment and control towns, this difference is constant over time and average income has evolved in a parallel way in the two types of municipality.

⁵ The QLI was computed by the Colombian government in 1993 using the results of an extensive household survey that included information on the head of household’s educational achievement, children’s educational attendance, fuel used to cook, main water source and other hygiene conditions.

⁶ The number of people in the household is assumed to be constant over time and equal to its value at the baseline.

Figure 1. Historical per-capita household labour income



We have also estimated the following regression for per-capita household labour income for the years 1999, 2000 and 2001 (clustered standard errors are shown in parentheses):

$$y_{i,t} = 11.55 - 2.73T_i + 0.57D_{[2000],i,t} + 0.97D_{[2001],i,t} - 0.14D_{[2000],i,t} \times T_i + 0.20D_{[2001],i,t} \times T_i$$

(0.51) (0.84) (0.23) (0.27) (0.27) (0.34)

where

- t = year (1999, 2000 or 2001)
- $y_{i,t}$ = household labour income in US dollars for i^{th} household in period t
- T_i = 1 if i^{th} household lives in a treatment municipality
= 0 otherwise
- $D_{[2000],i,t}$ = 1 if $t = 2000$
= 0 otherwise
- $D_{[2001],i,t}$ = 1 if $t = 2001$
= 0 otherwise

The regression results show that the difference in per-capita household labour income between treatment and control towns is the same independent of the year. Consequently, per-capita household labour income has evolved in the same way in treatment and control towns. The same conclusion holds when we control for covariates. We will evaluate the effects of the programme on child nutrition, which is clearly associated with household income. So the fact that the common-trends assumption on per-capita household labour income has held in the past is comforting.

3.3 Estimation of programme impacts

In order to estimate the impact of the programme on the average level of the outcome variable, y , we will estimate the following regression:

$$y_{i,t} = f(\alpha_0 + \alpha_1 A_{i,t} + \alpha_2 T_i + \alpha_3 A_{i,t} \times T_i + \alpha_4 X_i + \varepsilon_{i,t}), \quad i = 1, \dots, N; \quad t = 0, 1$$

where

$y_{i,t}$ = value of the outcome variable for i^{th} child in period t
 T_i = 1 if i^{th} individual lives in a treatment municipality
= 0 otherwise
 $A_{i,t}$ = 1 if $t = 1$
= 0 if $t = 0$

Here, i refers to the individual; $t = 0$ refers to the baseline period, which is before families had started to receive payments; $t = 1$ refers to one year of the programme having been implemented. The vector of variables X_i refers to individual, household and municipality variables before the programme was implemented. They are used to adjust for possible differential trends in the evolution of the outcome variable between treatment and control municipalities. The function $f(\cdot)$ will be linear if the dependent variable is discrete and it will be the cumulative distribution function for the normal when the dependent variable is continuous.

The estimate of α_3 will indicate how much the average level of the outcome variable has changed due to the FA programme. Note that the FA treatment level is defined at the municipality level and not at the household level. This means that all eligible households living in the municipality are assigned to the treatment independently of whether or not they enrol, so the effect that we estimate has an *intention-to-treat* interpretation. Our model estimates the effect of the programme on the average eligible household living in a municipality where the programme is being implemented. Notice that this is different from the effect of the programme on a household that enrolls in the programme, as not all eligible households enrol in the programme. Formally, our impact estimate is the product of the impact of the programme on those households that enrol and the proportion of eligible households that enrol in the programme. In particular, if few households enrolled in the programme because it was not very attractive, then our impact estimate would be low.

4. Results

In this section, we show the impact estimates of FA over several outcome variables. We divide the section into two subsections, reporting the impact of FA on (i) child health outcomes (child nutritional status and morbidity) and (ii) child health inputs (nutritional intake and compliance with the schedule of preventive healthcare visits).

4.1 Impact of FA on child health outcomes

The relation between height and age is thought to be a long-term measure of nutritional status. In children, low height for age and gender indicates chronic undernourishment. The relation between height and age is usually expressed using a so-called Z-score – 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. As is standard in this literature, we will use the NCHS/WHO reference population. Children are usually said to be chronically undernourished or stunted when the value of the height-for-age Z-score is below -2 .

Table 2 shows the impact of the FA programme on nutritional status. It indicates that the youngest children (under 24 months) benefited from the programme, as their Z-score increased by 0.161.⁷ For a 12-month-old child, this would be equivalent to 0.43 centimetres. This translates into a 0.069 decrease in the probability of being chronically undernourished. Older children do not seem to have benefited from the programme in terms of nutritional status.

Table 2. Impact of FA on children's nutritional status

| Age | Height-for-age Z-score | Probability of chronic undernourishment |
|--------------|-------------------------------|--|
| <24 months | 0.161* (0.085) | -0.069** (0.034) |
| 24-48 months | 0.011 (0.055) | 0.004 (0.022) |
| >48 months | 0.012 (0.033) | -0.021 (0.014) |

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

Table 3 shows the impact of the programme on the weight of newborns. Those living in urban areas increased their weight by 0.578 kilograms due to FA.

Table 3. Impact of FA on newborns' weight

| Area | Kilograms |
|-------------|--------------------|
| Rural | 0.176 (0.159) |
| Urban | 0.578** (0.143) |

** Statistically significant at the 5% level.

Table 4 shows the impact of the programme on the probabilities that the carer reports that the child has suffered from diarrhoea symptoms and symptoms of respiratory disease during the 15 days prior to the interview. FA has reduced the probability of reporting diarrhoea symptoms by approximately 0.10 for children aged less than 48 months who live in rural areas. The impacts of FA in

⁷ This estimate was obtained using Propensity Score Matching.

urban areas and on respiratory disease could not be detected at statistically significant levels.

Table 4. Impact of FA on the probability of diarrhoea and respiratory disease symptoms being reported

| Area, age | Diarrhoea | Respiratory disease |
|---------------------|---------------------|----------------------------|
| Rural, <24 months | -0.106* (0.059) | -0.056 (0.083) |
| Rural, 24–48 months | -0.109** (0.037) | -0.005 (0.054) |
| Rural, >48 months | -0.015 (0.026) | -0.012 (0.056) |
| Urban, <24 months | 0.150 (0.103) | -0.094 (0.103) |
| Urban, 24–48 months | -0.033 (0.041) | 0.034 (0.101) |
| Urban, >48 months | -0.042 (0.026) | -0.010 (0.080) |

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

4.2 Impact of FA on child health inputs

Table 5 shows the impact of the programme on the number of days that children aged 24–60 months have consumed certain foods. The results in the table imply that children’s intake of protein and vegetables has increased considerably due to the programme.

Table 6 shows the impact of the programme on the probabilities that children have complied with the Growth and Development (G&D) programme and with the DPT vaccination schedule. During visits under the G&D programme, children’s nutritional status is monitored and mothers receive advice about child nutrition. Consequently, compliance with the G&D programme is potentially important for the child’s nutritional status. We estimate that FA has had an important effect on compliance with the G&D programme for children under 48 months, and that it has increased the probability of adequate DPT vaccination for children under 24 months.

Table 5. Impact of FA on children's food intake (number of days)

| Food | 24–48 months old | | 49–60 months old | |
|------------|-------------------|-------------------|-------------------|-------------------|
| | Urban | Rural | Urban | Rural |
| Milk | 0.23 (0.26) | 1.07*** (0.26) | 0.81*** (0.21) | 1.09*** (0.28) |
| Cheese | 0.39* (0.22) | 0.22* (0.15) | 0.58*** (0.16) | 0.58*** (0.16) |
| Eggs | 0.56* (0.34) | 0.45* (0.24) | 0.30* (0.21) | 0.84*** (0.21) |
| Beef | 0.70*** (0.19) | 0.30 (0.30) | 0.46** (0.23) | 0.54** (0.27) |
| Chicken | 0.28** (0.14) | 0.37*** (0.08) | 0.25** (0.10) | 0.38*** (0.12) |
| Fish | 0.20 (0.26) | 0.32* (0.18) | 0.12 (0.21) | 0.37** (0.16) |
| Pork | 0.08 (0.10) | 0.24*** (0.08) | 0.03 (0.04) | 0.29*** (0.10) |
| Pulses | –0.001 (0.29) | 0.46* (0.25) | 0.38* (0.16) | 0.49* (0.29) |
| Vegetables | 0.92*** (0.24) | 0.91*** (0.24) | 1.03*** (0.22) | 1.23*** (0.17) |
| Fruit | –0.21 (0.25) | 0.45* (0.26) | 0.17 (0.25) | 0.10 (0.25) |

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table 6. Impact of FA on the probability of compliance with preventive healthcare

| Age | G&D programme | DPT vaccination |
|--------------|--------------------|-------------------|
| <24 months | 0.228** (0.067) | 0.089* (0.047) |
| 24–48 months | 0.332** (0.115) | 0.035 (0.026) |
| >48 months | 0.015* (0.008) | 0.032 (0.039) |

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

5. The impact of FA and existing nutritional interventions

Nutritional interventions are usually implemented in poor settings. Consequently, it is very likely that they overlap with other nutritional interventions already in place. Analysing the interaction between new and existing interventions constitutes a good opportunity to study how best to improve nutrition in poor settings.

As we mentioned before, *Hogares Comunitarios* is a large-scale nurseries programme that provides lunch and two snacks, as well as a nutritional supplement, to children attending a community nursery (HC, which can be accessed by eligible households for a small monthly fee).⁸ Children who decided to enrol in FA could not attend an HC.

The existence of HC is important for the evaluation of FA because the two programmes are likely to interact. For instance, FA might not seem effective, just because children are using it to replace HC. Alternatively, children might not enrol in FA because they prefer to attend the nursery of the HC programme.

Table 7 shows attendance rates at HC nurseries one year after the implementation of FA. There are very important age effects in attendance at HC nurseries: the attendance rate is higher for children aged 2–4. Attendance rates are much higher in municipalities where the FA programme has not been implemented. This suggests that many mothers opted out of HC in order to enrol their children in FA.

Table 7. Attendance rates at HC nurseries

| Age in years | Municipalities where FA was implemented | Municipalities where FA was not implemented |
|--------------|---|---|
| 0 | 0.7% | 7.8% |
| 1 | 7.4% | 19.0% |
| 2 | 16.0% | 33.0% |
| 3 | 21.6% | 38.1% |
| 4 | 13.0% | 33.8% |
| 5 | 5.4% | 15.5% |
| 6 | 2.0% | 5.7% |

In order to study the interaction between the two programmes, we estimate a Probit model that the child is enrolled in FA using only data from treatment municipalities. The Probit model includes age, parents' education, distance to

⁸ More information about the HC programme can be found in Attanasio and Vera-Hernández (2004).

the HC, distance to the healthcare centre and some other household and community characteristics. Using these estimates, we predict for every child in the sample the probability of being enrolled in FA. Then we split the sample between those with a high probability and those with a low probability of being enrolled in FA. The effect of FA on height-for-age Z-scores is then estimated for each subsample. Results from linear models are shown in Table 8.

Table 8. Impact of FA programme on height-for-age Z-scores

| Age | Probability of being enrolled in FA | | Probability of being enrolled in HC | |
|--------------|-------------------------------------|-----------------|-------------------------------------|------------------|
| | High | Low | High | Low |
| <24 months | 0.28** (0.08) | 0.03 (0.15) | 0.09 (0.12) | 0.22** (0.08) |
| 24–48 months | 0.15 (0.12) | –0.18 (0.11) | 0.13 (0.13) | –0.00 (0.09) |
| >48 months | 0.16** (0.06) | 0.05 (0.06) | 0.18** (0.09) | 0.10** (0.04) |

** Statistically significant at the 5% level.

The results in the first pair of columns in Table 8 show that FA had a considerable impact on those children with a high predicted probability of enrolling in FA who lived in treatment municipalities, and that it had a null impact on those children with a low predicted probability of enrolling in FA although they lived in treatment municipalities. This highlights that the benefits of enrolling in FA are heterogeneous in the population. Moreover, to a certain extent, the results constitute a validation of our approach, as we do not find impacts of FA for children for whom we would not expect to find positive impacts of FA.

The second pair of columns in Table 8 report a similar exercise, but splitting the sample according to whether the children have a high or a low predicted probability of being enrolled in HC. This probability is estimated using a Probit on enrolment in the HC programme using only the control municipalities, and then predicted for the whole sample. These results are less clear than those in the previous pair of columns. We tend to find positive impacts of FA for those children with a low probability of being enrolled in HC and hence, probably, with a higher probability of enrolling in FA. An exception is the effect that we find for those older than 48 months with a higher probability of being enrolled in HC.

6. Conclusions

In this report, we have provided estimates of the impact of the programme *Familias en Acción* on child health in the average eligible family living in the municipalities where the programme was implemented. According to our

estimates, FA improved the nutritional status and morbidity of young children. In particular, it increased their consumption of protein and vegetables. It also substantially increased attendance at growth-monitoring visits. The effect of FA on child nutrition is heterogeneous with respect to the probability of participating in already-existing nutritional programmes.

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