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Exit as entry in antipoverty programmes

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Abstract

The paper examines exit conditions in antipoverty programmes, conditional cash transfers in particular. The weight of current practice is to apply entry conditions to establish exit from programmes. The paper discusses (a) whether this practice is consistent with the underlying poverty index minimised by conditional cash transfers, and (b) the impact of exclusion on households at the margins of eligibility in the context of Colombia's Familias en Acción using a regression discontinuity design. We conclude that current practice in conditional cash transfer programmes as regards the use of entry conditions to assess programme exit is not supported analytically or empirically.

Keywords

conditional cash transfer, programme exit, Familias en Acción, Regression Discontinuity Design.

JEL Codes

I38, P36

1. Introduction

It is widely acknowledged that antipoverty transfers, including social pensions, children and family subsidies, employment guarantees, and conditional cash transfers make an important contribution to the reduction of poverty. Stampini and Tornarolli (2012) estimate that by 2010 conditional cash transfers reach 135 million people in Latin America, around a quarter of the population, and the poverty headcount ratio would have been 13 percent higher in their absence. Conditional cash transfers provide income transfers conditional on household investment in human capital, especially schooling and health care (Fiszbein and Schady 2009).[1] Programme entry is based on an assessment of the socio-economic status of households and, in some programmes, household demographic characteristics such as the presence of children. As regards programme exit, the dominant practice is to rely on a reassessment of entry conditions, with transfers terminated when participating households achieve a socio-economic status above entry conditions (Villa and Nino-Zarazua 2014). This paper examines programme exit in conditional cash transfer programmes conceptually, through an analysis of the underlying poverty index minimised by these programmes, and empirically, through an analysis of dropped households in Colombia's Familias en Acción. Our analysis finds that the use of entry conditions as exit conditions is not supported conceptually and can be associated with welfare losses for (some) excluded households. Our findings have implications for all antipoverty transfers programmes using socio-economic status to assess exit conditions.

To date, the literature on conditional cash transfers has focused largely on entry conditions, paying scarce attention to exit conditions (Medellín et al. 2015). A strand of literature has studied the factors leading to households being excluded from conditional cash transfer programmes. Gonzáles-Flores et al. (2012) studied programme exclusion in the urban context of *Oportunidades* while Alvarez et al. (2008) focused on the rural context. Programme exclusion might be due to failure to comply with conditions or other requirements, or with the outcome of recertification and audits. These studies find annual rates of exclusion were double those in rural areas (3 percent) and mainly affected households on the margins of eligibility. Around one half of exclusions following recertification were due to changes in households' durable assets, and around one quarter of them were due to measurement error in the eligibility score. The studies also find that recertification improves beneficiary selection. Another strand of literature focuses on estimating the effects of programmes on ex-participants, compared to never-participants, following exogenous exit. Barham et al. (2013a; 2013b) find that excluded children showed higher human capital levels than never participants, suggesting that truncated participation was better than no participation. The existing literature on exit from conditional cash transfers has not questioned whether entry requirements can be used reliably as exit conditions.

[1] They can be described more aptly as human development conditional income transfers.

Our paper examines the conceptual basis for employing entry requirements to establish programme exit, by revisiting the underlying poverty index conditional cash transfers programmes aim to minimise. Continuous poverty indexes, the family of poverty indexes focused on the poverty gap for example, place no value on transfers to households at or above the poverty line. Minimising a poverty index continuous at the poverty line would recommend concentrating transfers exclusively on households below the poverty line. In this context, implementing agencies would be justified in applying entry conditions to establish exit from the programme. However, this is at odds with the underlying objectives of conditional cash transfers. In contrast to income maintenance programmes compensating households for deficits in consumption and income (Atkinson 1995), conditional cash transfers aim to strengthen the productive capacity of households needed to ensure sustainable exit from poverty (Barrientos 2013; Fiszbein and Schady 2009). Conditional cash transfers are concerned with protection and promotion objectives. Programmes combining protection and promotion objective are not consistent with the application of entry conditions to establish programme exit. Below, we show that the rationale and objectives of conditional cash transfers are consistent with minimising a poverty index discontinuous around the poverty line because they place a value on preventing households above the poverty line from falling back into poverty (Bourguignon and Fields 1997). This implies it is inappropriate to rely on entry conditions to define exit.

What is the impact of exogenous exclusion on the welfare of participant households? The scarcity of studies on this point makes it difficult to establish whether the use of entry requirements as exit conditions is empirically a matter for concern. To address this issue we estimate a range of outcomes observed in 2011 among households participating in Colombia's *Familias en Accion* programme in 2006 but excluded following recertification in 2007. Over 60,000 participating households were excluded in 2007 because their welfare score, known as *Sisben*, was above the entry eligibility threshold. Using data for 2011, we observe the impact of exclusion from the programme on a range of household outcomes. Our identification strategy relies of a regression discontinuity design (RDD) with the 2006 *Sisben* score as the forcing variable. This approach enables us to compare the outcomes for excluded households, at the margins of eligibility, with the likely outcomes had they stayed in the programme.

We focus on labour force participation, schooling, and eligibility effects, to capture the effects of exclusion on household resource allocation, human capital accumulation, and socio-economic status. We find adverse labour supply and human capital accumulation effects among excluded households. Our estimations show that the endogenous exit from the programme caused negative effects on children's school attendance, cumulative years of education, employment and sectorial affiliation.

Our findings make an important contribution to the study of exit conditions in conditional cash transfer programmes. To the best of our knowledge, this is the first paper providing an in-depth analysis of this important issue in a developing country

context. The findings have significant implications for the design and implementation of antipoverty transfer programmes.

This paper has six sections. Section 2 examines the implications of alternative poverty indexes for the design of exit conditions. Section 3 presents a simple model of the effects on labour supply and human capital accumulation associated with transfer receipt and, by extension, transfer withdrawal. Section 4 reviews entry and exit conditions in *Familias en Acción* and introduces the *Sisben* data. Section 5 discusses the RDD approach to estimation and tests its appropriateness. Section 6 discusses the main results and their implications. A final section concludes and discusses policy implications.

2. Conditional cash transfers and poverty index minimisation

A feature of recent antipoverty transfer, and particularly conditional cash transfers, is their focus on protection and promotion (Grosh et al. 2008; Ravallion, van de Walle, and Gautam 1995). Conditional cash transfers are designed to supplement the income and consumption of households in poverty while at the same time enhancing their productive capacity. Often the transfers include a nutrition or consumption component and a component aimed at reducing the costs of schooling and health service utilisation (Fiszbein and Schady 2009). Promotion outcomes are not restricted to conditional cash transfer programmes. Studies on social pensions also find that transfers targeted on older people are shared within households and help support investment in schooling and health care of household members (Barrientos 2008; Case and Deaton 1998). However, in social pensions the promotion objective is not an explicit objective of the programme. The focus on protection and promotion in antipoverty transfers reflects the view that poverty eradication is not limited to ensuring citizens reach a living standard consistent with satisfaction of basic needs, important as this is, but it must be interpreted more broadly as the goal of ensuring citizens themselves have the capacity to secure their livelihoods.

This point can be illustrated by comparing continuous and discontinuous poverty indexes. Taking a population N of consumption units i, with incomes y_i arrayed as $y_1 < y_2 <\ldots< y_q < z <\ldots< y_N$, where q is the number of units in poverty and z is the poverty line. A general class of additively separable poverty index P_c can be written as

$$P_c(y_1, y_2, \ldots, y_N \,;\, \mathrm{z}) \;=\; \frac{1}{N}\sum_{i=1}^{N} L(y) \qquad , \tag{1}$$

where $L(y)$ is continuous, differentiable, non-increasing and (strictly) concave over the interval $[0, z)$ and $L(y) = 0$ over the interval $[z, \infty)$. L(y) can be interpreted as a capturing the social loss from the poverty experienced by the ith poverty unit with $P_c(.)$ as the mean social loss. Bourguignon and Fields (1997) show that (1) nests several additively separable poverty measures including the poverty gap, so that $L(y) = (z -$

$y)/z$. It is straightforward to see from the poverty gap specification of $L(y)$ that any transfers reaching the population not in poverty will have no impact on measured poverty. For the purposes of an agency managing an antipoverty transfer programme, applying entry conditions as exit conditions maximises the poverty reduction effectiveness of a fixed and insufficient antipoverty budget. A continuous poverty index as in (1) captures the protection objective.

The promotion objective, on the other hand, values the capacity of households to generate their own resources to avoid poverty. It is consistent with social preferences for households to be self-reliant (Garfinkel and Haveman 1977; Haveman and Bershadker 2001). Introducing a discontinuity at the poverty line in the poverty index is one way to reflect these social preferences. This is equivalent to defining $L(z^-) = \delta$, where $L(z^-)$ is the limit of $L(y)$ as y approaches zero from below. Social loss from poverty in the ith unit now becomes $L(y) + \delta$ and the aggregate poverty index P_c now becomes P_d:

$$\mathrm{P}_d(y_1, y_2, \ldots, y_N\ ;\ \mathrm{z}) = \frac{1}{N}\sum_{i=1}^{N} L(y) + \delta = P_c + \delta \mathrm{q} \qquad (2)$$

Minimizing the poverty index P_d now takes account of sustainable exit from poverty, in this case as a fixed loss δ from consumption units previously above the poverty line but having fallen into poverty. For the purposes of an antipoverty agency, minimising P_d with a fixed but insufficient antipoverty budget now requires that attention is paid to promotion. A poverty index such as P_d, discontinuous at the poverty line, captures the combination of protection and promotion objectives observed in conditional cash transfer programmes. Minimising P_d is not consistent with employing entry conditions as exit conditions. The two are now distinct. Combining protection and promotion objectives, as conditional cash transfers do, requires minimising a poverty index that pays attention to sustainable exit from poverty.

3. Labour supply and schooling effects of exogenous programme exit

Conditional cash transfers are expected to lead to changes in the pattern of labour supply incentives faced by beneficiary households. Rubio-Codina (2010) develops a model of household labour supply which throws light on labour supply effects from human development income transfer programmes, and will help us think through the empirical work which follows. Starting with a household with members I, $1 \ldots I$, where adults are separated out as $a = 1, \ldots A$, children as $q = 1 \ldots Q$, and children receiving a transfer as $k = 1, \ldots K \leq Q$. The household maximises a utility function of the type

$$U = U(C, L, \ldots, L_I; X, \varepsilon), \qquad (3)$$

where C is household aggregate consumption and L_i is individual i's non-labour time. X represents observable household heterogeneity and ε denotes unobservable household heterogeneity. Each household member has total time available T divided in

hours h which can be allocated to non-labour and labour activities j, say including paid and unpaid work. Activities have a marginal return w_j. Children can allocate s time to schooling with w_i^s representing the direct cost of schooling, such as fees, uniforms, and transport. Y is non-labour income and P is the price of a composite commodity. The household budget constraint is

$$\sum_i \sum_{j \neq s} w_i^j h_i^j + Y \geq pC + \sum_{i=q} w_i^s h_i^s \qquad (4)$$

The transfer is in two parts, as in *Familias en Accion*, a household nutrition transfer $dY > 0$, and a transfer $t_s > 0$ for each child of school age conditional on school attendance $dw_k^s > 0$, where d denotes variation. This implies that the household nutrition part of the transfer works as pure income effect, whereas the schooling part of the transfer has in addition substitution effects (it reduces the costs of schooling w_i^s and therefore the relative price of education, while at the same time placing restrictions on the time allocation of children). The substitution effect can be divided into two: the effect of a variation in a members' labour supply in response to a change in its reservation wage, the own substitution effect; and a cross substitution reflecting the effect of a change in the reservation wage of one family member on all other family members' labour supply, the cross-substitution effect. Rubio-Codina writes the total effect of the antipoverty transfer on the hours of work for individual i in participant households as:

$$dh_i^j = \frac{\partial \hat{h}_i^j}{\partial w_i^s} dw_i^s + \sum_{k \neq i} \frac{\partial \hat{h}_i^j}{\partial w_k^s} dw_k^s (1 - t_s) + \left[-\sum_k h_k^j dw_k^s (1 - t_s) + dY \right] \frac{\partial h_i^j}{\partial Y} \quad \forall\, i, j \qquad (5)$$

where $\widehat{h_i^j} = \widehat{h_i^j}(w, p.u; X, \varepsilon)$ is the Hicksian (utility compensated) labour supply. The first term describes own-substitution effects of the transfer; the second term describes the cross-substitution effects; and the third term describes the income effects. The first term reflects the increased school time among children of school age, given the conditional part of the transfer. The second term sums up the cross-substitution effects arising from other children living in the household and benefiting from the transfer. This effect nets out mixed incentives.

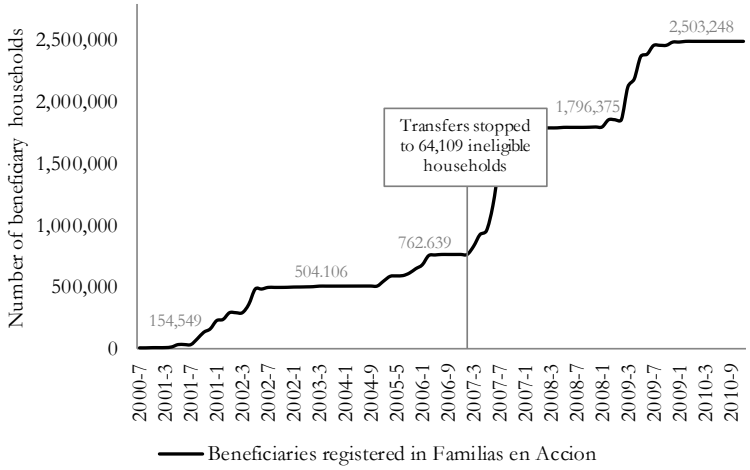
Exogenous exit from the programme effectively reverses these effects for excluded households. This is particularly the case at the margins of eligibility. An increase in the direct cost of schooling can be expected to reduce participation by adults in the labour market. To the extent that mothers provide most of the care for children, reduced school attendance increases their reservation wage, although this effect will depend on the ages of children in their care, particularly whether they are of school age. On the other hand, if children help with household chores, the increase in the reservation wage of mothers might be attenuated. The crucial issue here relates to whether children and adult paid and unpaid work are substitutes. The third term, the income effect, affects all members of the household and suggests an increase in adult work. This basic model

provides a framework with which to examine the process of labour re-allocation and schooling brought about by exogenous exit from the programme. The net re-allocation of labour is more significant for households had their children in school while participating in the programme.

4. Programme exit and data

Conditional cash transfer programmes have been introduced in most countries in Latin America and they are emerging in other regions (Barrientos and Villa 2015b; Fiszbein and Schady 2009). In Colombia, the *Familias en Accion* programme was introduced in 2001 as part of an integrated antinarcotics strategy know as *Plan Colombia*. *Familias en Accion* emulated conditional cash transfers in Mexico, Nicaragua, Brazil and Honduras, perceived to be effective in addressing poverty. Initially, the programme was intended to deliver income transfers to 600,000 households with children in extreme poverty living in small municipalities. In the second part of the decade, the programme was scaled up with a target of 2.5 million households by 2010. Figure 1 tracks the coverage of the programme. The income transfers are equivalent to 20 percent of household income on average. Conditions include school registration and attendance of children between 7 – 17 years of age, and health check-ups of infants between 0-6 years of age.

Figure 1: Number of beneficiaries in *Familias en Accion* 2000 – 2010



Source: Authors' calculation based on administrative data from *Familias en Accion*.

In its first phase, the programme was implemented in municipalities with less than 100,000 inhabitants with at least one financial institution. 732 out of the 1,100 Colombian municipalities met these criteria. The selection of households was based on *Sisben* scores. *Sisben* is a poverty identification system introduced in 1994. It is based on information from a household survey used to estimate the income generation capacity of households applying for government support. The survey collects information on the living conditions of the household, provision of running water, waste

collection, electricity and sewage, household composition and education endowments. Households' productive capacity is estimated by applying a set of weights to their observed variable values resulting in a *Sisben* score with a range of 0 - 100 (Bottia, Cardona, and Medina 2008; Castañeda and Lindert 2005).

Since 1994 the *Sisben*'s survey and algorithm has changed three times. Before 2006, households with a *Sisben-I* score at or below 38.5 and 18, in urban and rural areas respectively, were considered to be in extreme poverty and therefore entitled to participate in *Familias en Accion*. In 2007 the programme entered a second phase aimed at expanding coverage up to 1,7 million households. Motivated by reports of manipulation of *Sisben* scores by applicants and municipal officials (Camacho and Conover 2011), the government developed a new survey instrument and a new formula to estimate *Sisben* scores. The new formula has never been made public, as the original one was. The *Sisben-II* score threshold applied to establish eligibility for *Familias en Accion* became 11 and 17.5, in urban and rural areas, respectively. After applying the new formula, 64,106 households, out of 762,639 households participating in the programme, became ineligible and support to them was terminated in 2007.

To estimate the effects of exclusion from the programme, we rely on *Sisben* survey data for 2006 and 2011 (*Sisben-I* and *Sisben-III*). The 2006 *Sisben* data includes information for 32,247,627 people, corresponding to nearly 72 percent of the Colombian population. The 2011 *Sisben* data contains information for 28,489,569 people. Merging the 2006 and the 2011 data revealed an attrition rate of 18.2 percent, mainly due to migration or death of the claimant's mother. Below, we show that attrition does not pose a problem for internal validity of our analysis. We focus on households living in the 732 municipalities selected at the start of the programme. The working dataset includes 5,972,444 people who participated in *Familias en Accion* in 2006 and have valid data for 2011. They account for 1,235,844 households that participated in the programme in the period 2001-2010.

Table 1 provides descriptive statistics for households in our working dataset at the 2006 baseline. One half of them own their own dwelling, with 85.6 percent having electricity service coverage, 50 percent live in dwellings with brick walls and 35.3 percent have earth floors. The average age of children in the sample is 7.49 years of age, with a mean school attendance rate of 72.6 percent. Male heads are found in 72.2 percent of households. The mean age of the head of household is 42.8 years. They have only 3.6 mean years of schooling, implying that on average they failed to complete elementary education. Just over 73 percent of heads are employed but only 3 percent of them contribute to health insurance, an indicator of formal employment.

Table 1: Household characteristics in 2006

Pre-intervention characteristics	Overall
Dwelling	
Own of the dwelling	0.513
	[0.500]
Electricity	0.856
	[0.351]
Brick walls	0.508
	[0.500]
Earth floor	0.353
	[0.478]
Average household members	4.421
	[2.852]
Average age of children	7.491
	[3.755]
Household's children attend school	0.726
	[0.446]
Head of the household	
Male	0.722
	[0.448]
Age	42.82
	[14.857]
Years of education	3.613
	[3.054]
Employed	0.732
	[0.443]
Employed with health insurance	0.300
	[0.170]
Observations (households)	1,235,844

Source: authors' calculations based on Sisben data 2006.
Note: standard deviations in brackets.

We are able to observe 2011 outcomes for households participating in the programme in 2006, including households excluded in 2007 and those remaining the programme. Our analysis will focus on labour supply and schooling outcomes providing an insight into household resource allocation and human capital accumulation effects associated with exclusion.

5. RDD methodology

Following Barrientos and Villa (2015a) and Hahn, Todd, and Klaauw (2001), we exploit the discontinuities around the eligibility threshold, as a source of exogenous variation, in order to identify a RDD. We apply the optimal bandwidth as derived by Imbens and Kalyanaraman (2011), supplemented by alternative bandwidths as robustness checks as described in Calonico et al. (2014a; 2014b).

Let $Y_i(1)$ and $Y_i(0)$ be a potential outcome (e.g. school attendance) observed for household i if the transfers from *Familias en Accion* are stopped or if the household continues with the benefits from the programme, respectively. Exit from the programme depends on household i obtaining a *Sisben* score, X_i, greater than the eligibility threshold, $\bar{x}$, that is $X_i > \bar{x}$. The average treatment effect of the intervention is then given by:

$$\tau = E[Y_i(1) - Y_i(0)|X_i = \bar{x}] \tag{6}$$

The treatment effect is then estimated non-parametrically by defining an estimand that accounts for the levels of the outcome on each side of the threshold, $\tau = \mu^+ - \mu^-$, with $\mu^+ \equiv \lim_{x \to \bar{x}^+} \mu(x)$, $\mu^- = \lim_{x \to \bar{x}^-} \mu(x)$ and $\mu(x) = E(Y_i|X_i = x)$. The most commonly used estimator for τ is given by a local polynomial of order p also on both sides of the eligibility threshold of the *Sisben* score:

$$\hat{\tau}_p(h_n) = \hat{\mu}_{+,p}(h_n) - \hat{\mu}_{-,p}(h_n) \tag{7}$$

where h_n is the bandwidth over which the kernel-based non-linear approach takes place. Instead of choosing an arbitrary bandwidth, we allow a data-driven algorithm following Imbens and Kalyanaraman (2011) who proposed an optimal bandwidth that minimises the minimum square error (MSE):

$$\hat{h}_{IK,n,p} = \left\{ \frac{\hat{V}_{IK,p}}{2(p+1)\hat{B}_{IK,p}^2 + \hat{R}_{IK,p}} \right\}^{\frac{1}{(2p+3)}} n^{\frac{-1}{(2p+3)}} \tag{8}$$

where $\hat{V}_{IK,p}$ and $\hat{B}_{IK,p}$ are the estimators of the asymptotic variance and the asymptotic bias of $\hat{\tau}_p(h_n)$, respectively, and $\hat{R}_{IK,p}$ is introduce to prevent the denominator from being small and start with limited values of the bandwidth. To check the robustness of our estimates, we also run our RDD with the optimal bandwidth proposed by Calonico et al. (2014b) implemented with the Stata's user written command rdrobust.

Our strategy to identify the impact of exclusion from *Familias en Acción* relies on the structure of the working dataset. It includes (a) *Sisben* data collected by 2006; (b) the outcome of programme eligibility tests in 2007; and (c) *Sisben* data collected as follow-up in 2011. The analysis focuses on the discontinuity in the distribution of outcomes observed in 2011 associated with an exogenous termination of support for households

in 2007, based on 2006 *Sisben* data. The appropriateness of the RDD relies on the absence of discontinuity in the outcome variables observed in 2006. This is confirmed below. Two recent studies have applied a RDD to *Sisben* data and tested for the appropriateness of the data. Baez and Camacho (2011) employ RDD to study potential manipulation of the *Sisben* score. They use a similar setting to the one adopted in this paper. Barrientos and Villa (2015a) rely on a RDD to study the labour supply effects of participation in *Familias en Acción*. These studies test for possible manipulation in *Sisben* score and find no evidence of such behaviour in the post 2006 period by applying the test proposed by McCrary (2008).

The distribution of the selected outcomes exhibits continuity in the 2006 data. Table 2 below shows RDD estimates for each selected outcome prior to the exclusion of beneficiaries in 2007 by using Imbens and Kalyanaraman's optimal bandwidth (IK-BW), testing for a placebo effect. The analysis focuses on labour force participation and sectorial affiliation outcomes among adults, on school attendance and completed years of education among children below 18 years of age, and on socio-economic status as measured by *Sisben* scores. Whether workers contribute to a health insurance scheme serves as a proxy for affiliation to formal employment. As Table 2 below shows that there is no evidence of discontinuity, placebo or anticipation effects on the distribution of the relevant outcome variables at the threshold of eligibility when no ineligible withdrawal was made. None of the estimates is significant. It is also apparent from these results that the RDD is not confounded by potential contamination arising from a possible selection bias.

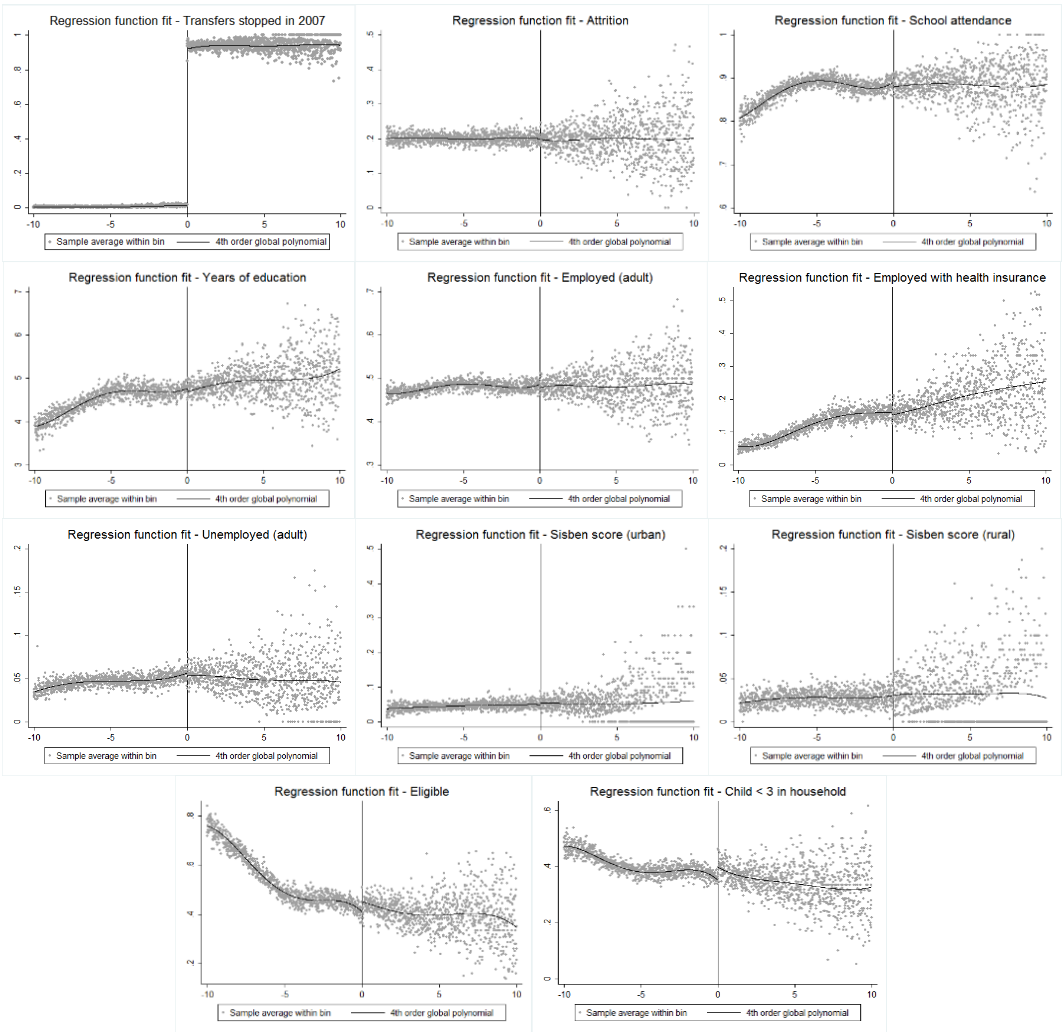
Table 2: Placebo RDD estimates for selected outcomes in the pre-intervention period

	Estimand	IK-BW	Observations
Children (< 18)			
School attendance	-0.0021	1.69	1,848,369
	(0.0081)		
Male	-0.0142	1.84	945,987
	(0.0112)		
Female	-0.0003	2.20	902,382
	(0.0102)		
7 - 11	-0.0020	2.23	856,308
	(0.0070)		
12 - 17	-0.0032	1.92	992,061
	(0.0131)		
Years of education	0.0336	1.90	1,848,348
	(0.0587)		
Male	-0.0111	1.68	945,975
	(0.0738)		
Female	0.1280	1.90	902,373
	(0.0891)		
7 - 11	-0.0206	1.59	945,975
	(0.0469)		
12 - 17	0.0444	1.22	856,304
	(0.0798)		
Adults			
Employed	-0.0052	2.09	2,856,019
	(0.0070)		
Female	-0.0022	1.80	1,500,962
	(0.0080)		
Male	0.0047	2.02	1,355,057
	(0.0092)		
Employed with health insurance	-0.0023	3.44	1,366,200
	(0.0118)		
Female	-0.0023	4.39	336,459
	(0.0160)		
Male	-0.0022		1,029,741
	(0.0136)	3.44	
Unemployed	-0.0085	2.70	2,856,019
	(0.0301)		
Female	0.00274	4.28	1,500,962
	(0.0027)		
Male	-0.0176	2.43	1,355,057
	(0.0554)		
Household			
Eligible (*Sisben-II*)			
Urban	0.0015	2.36	627,015
	(0.0412)		
Rural	0.0072	1.98	608,829
	(0.0259)		
Attrited	0.0115	3.59	1,235,844
	(0.0099)		
Presence of children (< 3)	0.0089	5.077	1,235,844
	(0.0079)		
Urban	0.0120	3.41	627,015
	(0.0112)		
Rural	-0.0059	4.584	608,829
	(0.0144)		

Source: authors with data from Sisben 2006.
Notes: * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 2 below illustrates the distribution of selected outcomes over the running variable in 2011 three years after the exclusion of ineligible households. The *Sisben-II* score was rescaled with zero representing the eligibility thresholds for urban and rural areas. Starting with the distribution of treatment status, it is apparent from the Figure that participation in the programme is sharply discontinuous at the eligibility threshold, with only a few households with scores above the threshold managing to remain in the programme after 2007. The next panel investigates whether attrition of households between 2006 and 2011 is correlated with the eligibility threshold condition. This is rejected by the estimates. Adult household members also show some discontinuity at the eligibility threshold on labour markets outcomes, indicating lower labour force participation rates and lower affiliation to formal jobs. Discontinuity on school attendance rates and completed year of education. School attendance is lower for excluded children can be observed for children at the eligibility threshold. This translates into lower completed years of education for excluded children. These findings are examined in more detail in the next section.

Figure 2: Mosaic of selected outcomes



Source: Authors' estimation based on Sisben 2006 and 2011 data.

6. Results and Discussion

Table 3 below presents our main results. The table presents estimates based on the Imbens and Kalyanaraman optimal bandwidth and on the alternative bandwidth proposed by Calonico et al. (2014b) as a robustness check. As a further check on the consistency of our estimates, we include RDD estimates assuming an arbitrary threshold of minus and plus two points away from the *Sisben* score eligibility threshold. The Table shows the results for schooling, labour force participation, and household socio-economic status and demographics.

Starting with schooling, the estimates provide evidence on the impact of the programme exclusion on human capital accumulation. They are of particular concern given this is the main objective of *Familias en Acción*. The estimation results are consistently negative. Children from families at the margins of eligibility in 2006 and excluded in 2007 show lower school attendance of just below 1 percentage point. This result applies for males and females and for younger and older children. All estimates are significant at the 5 percent level. The only variation in the estimates is a significantly lower school attendance rate among older children compared to younger children. Given high rates of school attendance among children in the sample, a 1 percent lower attendance is relatively small, but cumulative effects could be significant. The estimates for completed years of education are significantly lower for children from families at the margins of eligibility and excluded in 2007. The shortfall in completed years of education for children in excluded households is estimated at 0.12 years. This applies to males and females and to younger and older children. The estimates indicate that boys have a significantly higher shortfall in completed years of education compared to girls (0.147 and 0.086 years respectively); and older children show a significantly higher shortfall than younger children (0.11 and 0.07 years respectively).

The estimates on schooling can be interpreted as the loss in human capital accumulation for children excluded from the programme compared to the counterfactual situation had they remained in the programme.

The sample of adults includes everyone aged 21 and over, over 2.8 million people. For the sample as a whole, the estimated difference in labour force participation in 2011 at the threshold of 2006 eligibility is small and negative but not statistically significant. Disaggregating by sex shows important differences between males and females. For males, *Familias en Acción* participants at the threshold of eligibility in 2006 but excluded in 2007 show a 1.3 percentage point higher participation rate. This is significant at the 1 percent level. Excluded females at the threshold of eligibility in 2006, show a 2 percent reduction in labour force participation, also significant at the 1 percent level. The estimated effects are kin line with the expectations from the labour supply model in Section 3.

The estimates for whether adults in employment contribute to a health insurance scheme, an indicator of whether jobs are in the formal sector, indicate a lower incidence of contribution status for excluded participants at the margins of eligibility of around 1 percentage point. This is statistically significant at the 1 percent level. This estimate is important given the very small share of *Familias en Acción* participants who are in formal employment at the baseline (Table 1 above shows only 30 percent of heads of household contribute to a health insurance plan). Disaggregating by sex shows that the lower formal employment effect applies only to males and not to females.

Higher participation observed among excluded male participants confirms the predictions of the labour supply model in Section 3. The withdrawal of transfer receipt, equivalent to an exogenous shortfall in unearned income, leads to a rise in participation among males. Considering the labour force participation and sectorial affiliation together, we can speculate that the observed difference in male employment reflects a shortening of job search for males in excluded households. This is consistent with a predicted income effect. For females excluded from the programme, lower participation rates are likely to reflect a net effect from the income shortfall on the one hand and a reduction in school attendance among children of school age and/or reduced capacity to afford childcare for children below school age. Among females, substitution effects appear to dominate income effects. A related literature for high income countries has documented the labour force participation incentives associated with income subsidies complementary to women's employment (Kleven 2014; Kolm and Lazear 2010). The relevance of these findings for conditional cash transfers in developing countries has been noted (Gahvari and Mattos 2007). The findings on the negative effects of exclusion on female employment mirror the positive effects of *Familias en Acción* participation on the labour force participation of women with young children established in the literature (Barrientos and Villa 2015a).

Table 3: RDD estimates for selected outcomes

	Control mean within BW	IK-BW IK	BW	CCT-BW Estimand	BW	IK-BW Cut-off - 2	Cut-off + 2	Obs.
Children (< 18)								
School attendance	0.880	-0.0093***	1.56	-0.0090***	1.37	0.0039	-0.0020	1,848,369
		(0.0034)		(0.0034)		(0.0030)	(0.003)	
Male	0.868	-0.0095**	1.503					945,987
		(0.0049)						
Female	0.893	-0.0088**	1.84					902,382
		(0.0044)						
7 - 11	0.955	-0.0079***	2.02					856,308
		(0.0031)						
12 - 17	0.818	-0.0115**	1.55					992,061
		(0.0054)						
Years of education	4.696	-0.1238***	1.59	-0.1169***	1.25	-0.0084	0.0053	1,848,348
		(0.0308)		(0.0296)		(0.0273)	(0.0330)	
Male	4.494	-0.1479***	1.79					945,975
		(0.0408)						
Female	4.902	-0.0866**	1.83					902,373
		(0.0367)						
7 - 11	2.440	-0.0701***	1.73					945,975
		(0.0408)						
12 - 17	6.576	-0.1114***	1.23					856,304
		(0.0329)						
Adults								
Employed	0.480	-0.0022	2.29	-0.0031	2.29	0.0020	0.0036	2,856,019
		(0.0031)		(0.0034)		(0.0030)	(0.0092)	
Female	0.244	-0.0208***	1.34					1,500,962
		(0.0051)						
Male	0.752	0.0130***	1.45					1,355,057
		(0.0045)						
Employed with health insurance	0.157	-0.0096***	2.28	-0.0098**	1.94	0.0013	0.0047	1,366,200
		(0.0035)		(0.0040)		(0.004)	(0.0032)	
Female	0.203	-0.0026	1.95					336,459
		(0.0084)						
Male	0.142	-0.0111**	2.26					1,029,741
		(0.0044)						
Unemployed	0.051	-0.0017	2.44	-0.0026*	1.76	0.0012	-0.0026	2,856,019
		(0.0014)		(0.0016)		(0.0013)	(0.0021)	
Female	0.032	-0.0014	2.73					1,500,962
		(0.0014)						
Male	0.072	-0.0006	3.15					1,355,057
		(0.0021)						
Household								
Eligible (*Sisben-III*)	0.440	0.0385***	1.56	0.0440***	1.20	-0.0012	-0.0029	1,235,844
		(0.0055)		(0.0066)		(0.01)	(0.0060)	
Urban	0.352	0.0170***	1.82					627,015
		(0.0064)						
Rural	0.564	0.0419 ***	2.28					608,829
		(0.0073)						
Presence of children U-3	0.374	0.0414***	1.59	0.0410***	1.459	0.005	0.0008	1,235,844
		(0.0061)		(0.0058)		(0.004)	(0.0056)	
Urban	0.376	0.0419***	1.46					627,015
		(0.0072)						
Rural	0.380	0.0367***	3.307					608,829
		(0.0081)						

Source: Authors with data from Sisben 2006 and 2011.

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%.

The bottom part of Table 3 presents findings on the effects of exclusion on households' socio-economic status, as measured by *Sisben-III* scores in 2011, and on household demographics. The first set of results focuses on household eligibility according to the *Sisben-III* score, where the dependent variable is a binary eligibility indicator. This suggests that excluded households in 2007 are 3.8 percentage points more likely to be eligible in 2011 than households at the margins of eligibility remaining in the programme. The impact of exclusion on eligibility in 2011 is greater, 4.2 percentage points, in rural areas. These findings point to a significant drop in socio-economic status as measured by *Sisben* scores and contradict expectations that excluded households would leave extreme poverty sustainably

The results on household demographics indicate there is a significant increase in the presence of children under three years among excluded households at the margins of eligibility in 2006, a 4.1 percentage point increase. This suggests excluded households at the margins of 2006 eligibility responded to the exclusion from *Familias en Acción* by having more children.

Taken together, these results suggest that exclusion from *Familias en Acción* resulted in negative and significant effects on the allocation of household resources, human capital accumulation, and socio-economic status for some households at the margins of eligibility in 2006.

7. Conclusions

The paper examined exit conditions in conditional cash transfer programmes. The weight of current practice is to apply entry conditions to establish exit from programmes. The main conclusion from the analysis reported in this paper is that this practice is not supported conceptually and can generate measurable negative effects on resource allocation and human capital accumulation among excluded households.

The combination of protection and promotion objectives in conditional cash transfer programmes is not consistent with the minimisation of poverty indexes continuous at the poverty line and therefore inconsistent with the use of entry conditions to assess programme exit. Conditional cash transfers place a value in sustainable exit from poverty. They are consistent with minimising a poverty index sensitive to households falling back into poverty and therefore discontinuous at the poverty line. They are consistent with exit conditions taking account of the likelihood of staying out of poverty (alternatively, the likelihood of falling back into poverty). Exit conditions are distinct from entry conditions.

We investigated empirically the effects of exogenous programme exit on households excluded from Colombia's *Familias en Acción*. Relying on a RDD we found that children in households excluded from the programme show lower school attendance and fewer completed years of education compared with children in households that remained in the programme. There were significant effects on the allocation of

household productive resources, essentially a reduction in labour force participation among women, an increase in labour force participation among men, and a reduction in formal employment. Households excluded from the programme in 2007 show higher eligibility than households remaining in the programme in 2011, indicating a drop in their socio-economic status as measured by *Sisben* scores. The estimated effects are in line with predictions from labour supply models of the impact of transfers. For households at the margins of eligibility in 2006, exclusion results in adverse outcomes on resource allocation, human capital accumulation, and socio-economic status. Current practice in conditional cash transfer programmes as regards the use of entry conditions to assess programme exit has measurable adverse welfare effects on excluded households at the margins of eligibility.

Agencies implementing conditional cash transfer programmes are paying increasing attention to exit conditions and have adopted a range of strategies to address this issue (Cecchini and Madariaga 2011; Medellín et al. 2015). Innovations include guaranteeing the receipt of transfers for a specified period of time following changes in socio-economic conditions of participant households; reduced level of transfers for households exiting programmes but remaining vulnerable to poverty; and strategies to improve the employability of exiting households, sometimes referred to as 'graduation' (Banerjee et al. 2015). In 2013, *Familias en Acción* introduced a guaranteed two years leave to remain in the programme for households with *Sisben* scores above the entry threshold and up to a vulnerability threshold. Research on these strategies will throw light on their relative effectiveness. These innovations in programme design and implementation are in line with the findings in the paper. They effectively align programme design as regards exit conditions with the underlying rationale and objectives of conditional cash transfers, reflected in the minimisation of a poverty index discontinuous at the poverty line.

Research into the analytical grounding for these strategies remains a challenge for the future. Minimising a poverty index discontinuous at the poverty line raises important issues regarding the distribution of an insufficient poverty budget among the target population, especially among those in poverty and those not in poverty but vulnerable to poverty. This remains an agenda for future research.

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