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ABSTRACT

How children's schooling and work is affected when their father leaves permanently: Evidence from Colombia*

This paper investigates how the permanent departure of the father from the household affects children's school enrolment and work participation in rural Colombia. Our results show that departure of the father decreases children's school enrolment by around 4 percentage points, and increases child labour by 3 percentage points. After using household fixed effects to deal with time-invariant unobserved heterogeneity, and providing evidence suggesting strongly that estimates are not biased by time varying unobserved heterogeneity, we also exploit an interesting feature of our setting, a conditional-cash transfer programme in place, and show that it counteracts the adverse effects. This, and other pieces of evidence we give, strongly suggests that the channel through which departure affects children is through reducing income. It also highlights the important safety net role played by such welfare programmes, in particular for very disadvantaged households, who are unlikely to find formal or informal ways of insuring themselves against such vagaries.

JEL Classification: I20, J12, J22 and O16
Keywords: child labour, conditional cash transfer, credit and insurance market failures, income loss, permanent departure, safety net and schooling

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1 Introduction

A major disruption to family life can have serious consequences for children. A particularly traumatic event is the permanent departure of the father from the household. There are at least three different channels through which this can affect children's human capital accumulation, and in particular their school and work participation (more discussion of the following points is to be found in Case et al, 2004 and Gertler et al, 2004). First, it is likely to involve a substantial income loss, and this may be important for school choices in the presence of credit and insurance market failures. Second, the balance of decision-making power within the household may change, with the preferences of remaining adults gaining increased importance, which may have important consequences for children. Third, the loss of a parent can have significant emotional and psychological consequences for children. The importance of the first and third channels was highlighted in a World Bank Development Outreach report (Bell et al, 2006).

'if parents sicken and die while their children are still young, then all the means needed to raise the children so that they can become productive and capable citizens will be greatly reduced. The affected families' lifetime income will shrink, and hence also the means to finance the children's education, whether in the form of school fees or taxes. On a parent's death, moreover, the children will lose the love, knowledge and guidance which complement formal education.'

Some countries, particularly in Africa, have put in place policies to provide education and health support to children who have lost one or both parents. These policies appear to be a response to the increase in HIV-associated mortality, which has

resulted in millions of children losing parents to AIDS. Yet loss of a parent due to death or divorce whilst a child is still young is a pervasive phenomenon. Despite this, there is surprisingly little evidence on how children are affected by the loss of one or more parents (exceptions are referred to below) and on how policies may protect them against such adversities. In this paper, we first investigate how the permanent departure of the father from the household affects children's school enrolment and work participation. [1] We then examine the extent to which a conditional cash transfer programme, which is in place in our setting on a permanent basis, mitigates these effects. We consider departures due to death or divorce, and that are thus permanent. We are interested in school and work participation because of their importance for the human capital accumulation of children; moreover child work also affects family income and therefore current poverty, which is indeed the reason why we may expect it to increase to compensate for unexpected income losses.

A central concern for our exercise and this literature is that divorce or widowhood are not exogenous with respect to other determinants of child outcomes (see van de Walle, 2011, for related selection issues). Previous work has attempted to exploit exogenous variation to overcome this problem, for instance in divorce laws (Gruber, 2004) and child sex composition (Dahl and Moretti, 2008). In this paper, we provide several pieces of evidence that build considerable confidence in the quasi-random nature of the departure of the father. First, we show that observable characteristics (*before* the departure happened) of households in which the father did and did not subsequently depart are very similar. Although reassuring, the concern remains that unobserved heterogeneity may differ between these two types of households. We deal

[1] Note that departure of mother is also an important issue and may have different effects compared to those stressed in this paper. However, we have insufficient variation in the data to allow us to look at this.

with time-invariant unobserved heterogeneity by allowing for household fixed effects in a three year panel of households. So, in line with related literature (for instance De Janvry et al, 2006), our empirical method assumes common trends across both types of household. Note that this is conditional on a set of covariates, making it more credible. Importantly, in order to assess the plausibility of this common trends assumption, we do two things. First, we check whether pre-departure trends in children's schooling in households where parents subsequently divorce are the same as trends in children's schooling in households where parents do not subsequently divorce, and show that they appear to be. Second, we compare pre-departure trends in per capita income across both types of household and are further reassured by the fact that they are similar. Of course the common trends assumption can never be tested and ruled out completely, so to further build confidence in the quasi-random nature of the departure we carry out a falsification exercise by checking whether current child activities are correlated with future departure of the head: the idea here is that *future* departure should not lead to a significant effect on *current* activities if departure is effectively quasi-random. We find, reassuringly, no evidence that it does.

We find that the father's permanent departure affects adversely the schooling of both boys and girls, and it increases their participation in paid work. These findings are particularly pronounced for the relatively less well-off, who are likely to face the more severe liquidity constraints, and is consistent with the father's departure affecting activities through the income reduction associated with it. Indeed, we examine the extent to which the conditional cash transfer programme *Familias en Acción* helps protect children against the vagaries of the event. We find that it protects their schooling and offsets the increased child labour after the father's departure,

suggesting that the main impact of the event is through the income loss associated with it, as well as providing evidence of the CCT programme acting as a safety net.

Our work first fits into the growing literature in developing countries on parental deaths and children's education. This literature investigates the importance of different channels in explaining the observed impacts (Beegle et al, 2006b, Case et al, 2004; Gertler et al, 2004; Yamano and Jayne, 2005; Evans and Miguel, 2007; van de Walle, 2011). In short, it generally finds adverse effects on education, particularly on primary school participation. The literature generally does not consider the effects on child labour however, which is clearly an important economic activity amongst children in developing countries and one which may be particularly responsive to an adverse event that induces a substantial income reduction. Importantly, the event we consider is not only due to death but also (indeed, mainly) to divorce, which is also shown to have significant impacts on children activities. Our work also fits into the strand of the literature that considers the relationship between children's work participation and other negative income shocks, such as labour market shocks (Parker and Skoufias, 2006), and/or crop losses (Jacoby and Skoufias, 1997; Beegle et al, 2006a; Dehejia and Gatti, 2005; Duryea et al, 2007; Dammert, 2007; Guarcello et al 2003; Gubert and Robillard, 2008). In line with this literature, our results are consistent with the presence of credit and insurance market failures in rural Colombia.

The paper also provides evidence of CCT programmes acting as a safety net, in particular attenuating the negative income effects on children's activities entailed by permanent departure of the father in poor countries. Indeed, CCT programmes are a fast growing part of safety net policy, and there is evidence that they provide

households with protection against short-term shocks, both systemic and idiosyncratic. For instance, De Janvry et al (2006) have shown that the Mexican PROGRESA programme fully protected children's schooling from shocks due to unemployment and illness of the household head, as well as natural disasters in the community. Maluccio (2005) shows that the Nicaragua Red de Protección Social protected household's total and food expenses and children's school attendance against the effect of the Central America coffee crisis in 2000-2001. In a recent contribution, Gitter et al (2011) provide evidence of CCT programmes mitigating the effects of negative shocks on physical development in early childhood. Our results are very much in line with these papers, suggesting that CCT programmes provide a safety net against income losses. A distinctive feature of our work is that we consider income losses likely to be permanent, which are likely to be even more difficult to insure against than transitory reductions to income.

The remainder of the paper is structured as follows. In section 2 we describe the data that we use in this research. After presenting the empirical methodology used to estimate the effects of father's departure on schooling and child labour decisions and discussing the main results in section 3, we study in section 4 whether the CCT programme in place in the environment we consider has cushioned the poor households in our sample against these effects, and we conclude in section 5.

2 Data

2.1 Background

We use three years of panel data from a survey of households and individuals in rural Colombia. These data have been collected to evaluate the large scale welfare

programme *Familias en Acción* (FeA from hereon), which has been in place in rural areas of Colombia since 2002, and which has since expanded to cover urban areas. The programme aims at alleviating poverty by fostering human capital accumulation among the poorest households through conditional subsidies for investments into education, nutrition and health.

The first wave of data collection for the evaluation of the programme took place in 2002, when around 11,500 households were interviewed. We refer to this as the first survey. A year later, after the programme started, a second wave of data was collected, and a third wave was collected in 2006. We refer to these as the second and third surveys respectively. In this paper, we consider the effects of the father's departure on children's outcomes in the second and third surveys. This is because the event that we are considering is the permanent departure of the father *since the previous wave*, which is thus not defined for the first wave.[2] The socio-economic data are rich, reflecting face-to-face interviews that lasted on average 3.5 hours.

2.2 Descriptive statistics

We follow the school and work status of the children in households with at least one child aged 7-14 at the first survey across surveys 2 (1 year later) and 3 (3.5 years later), up until they are at most 17 years of age. As we are considering the effects of departure of the father since the previous wave, we restrict the sample to households in which both parents are present at the first survey.[3]

[2] However the first wave is used in the analysis in three ways - to construct departure of the father since this wave, to control for pre-departure characteristics, and to have baseline data to use in estimating the programme impacts as explained in section 4.

[3] This sample selection criterion means that we retain 9,287 out of 12,652 households with a 7-14 year old at the first survey. The reason why we do not keep mono-parental households is because the departure of the father (if present) in such households would raise additional issues, which would be difficult to disentangle.

2.2.1 Outcomes

We consider two outcomes - school enrolment, which relates to whether the individual is enrolled in school at the time of the survey[4], and paid work participation, which includes all types of paid economic activities, as well as main activities that involve looking for work. Table 1 shows the proportions of our sample enrolled in school and participating in work, by age, separately for males and females. We see that school participation rates are high amongst children aged 7-11, corresponding to primary school.[5] The first substantial drop in school enrolment is observed at age 12, at the transition from primary to secondary school. Another point worth noting is that school enrolment of females is higher than that of males. Engagement in work is around three times higher for males than for females, and is very low for both, below 5%, before the age of 12 (participation in paid work is not recorded for individuals below age 10).

[TABLE 1 HERE]

2.2.2 Permanent departure of the father

In order to capture a potentially very important disruption to family life, we restrict attention to the *permanent* departure of the child's father since the previous survey. Divorce is not measured directly in the survey, so it is constructed by combining information on marital status of the child's mother at times t-1 and t, and status of the father at time t. In particular, if her marital status at time t is divorced, at time t-1 is

[4] School enrolment is defined on the basis of whether the child is registered at school in the academic year corresponding to the survey.

[5] The school system in Colombia operates as follows. Compulsory education is free and lasts for nine years, and consists of basic primary (five years, ages 7 through 11) and basic secondary (educación básica secundaria, four years, ages 12 through 15). The secondary school system also includes the middle secondary cycle (educación media, two years, ages 16 and 17). Successful completion of studies leads to the Bachillerato. Students must pass an entrance examination/test for access to universities.

married, and if father's status at time t is 'no longer in the household', we consider this to be a divorce. Deaths are coded directly in the survey. Departure of the father has occurred in just under 7% of our sample of households (i.e. those with at least one 7 to 14 year old at the first survey). The main reason for permanent departure is divorce (68%), the second is death (16%), and the remainder is for an unknown reason. For this latter group, we know that the mother also left the household, so we are careful to control for this in all of the analysis.[6]

Despite its reasonably low occurrence, this event is likely to be a very significant one in a child's life. The average age of fathers who departed is 43, and it results in a substantial income reduction: 90% of these fathers were working at the first wave.[7] To give some idea as to the extent of the income loss associated with the departure, total household consumption is lower by around 13% in households in which the father departed compared with households in which he did not (controlling for household composition). Total labour earnings are around 20% lower (both significant at the 1% level).[8]

Whether such events are fully anticipatable or not, it is unlikely that the households in our sample have ways to fully insure against the income losses they entail, in

[6] There is also a small percentage (1.2%) of households in which the father has left for an unknown reason, but the mother has remained in the household and reports being married, so we assume that these are temporary departures. Therefore we do not pool it with permanent departure, though we control for it in all regressions.

[7] In addition to income losses, the permanent departure is likely to have a number of other important repercussions. First, the father is likely to be one of the key decision-makers in the household, so such a departure may bring about important changes in bargaining power and decision-making within the household, which may affect children's education and work. Second, the father can be an important figure head for children. As it is very difficult to disentangle these channels with the available data we do not rule them out, but we pre-empt findings by noting that most of the evidence we discuss is strongly consistent with income loss being the key factor affecting children's activities.

[8] We see this as a lower bound of the magnitude of the departure in terms of total household adult earnings, as it includes labour supply responses to it, which are likely to mitigate the potential adverse effects on income. This figure excludes earnings from children to mitigate this problem.

particular as they live in rural municipalities where credit and insurance markets are typically thin (Edmonds, 2006). In these conditions, we expect them to affect household decisions to send their children to school/work.

2.2.3 Internal Validity

An important concern with permanent departure, and indeed one that has received much attention in the related literature, is that it may not be exogenous to the outcomes of interest, children's work and schooling. This is particularly the case for divorce, which is the reason for departure in the majority, around four fifths, of households experiencing a departure (see Gruber, 2004). For instance, couples may split up due to having different preferences over investment in children, in which case we may be picking up the effects of preferences rather than divorce *per se*.[9] We stress that we use a panel of households for our analysis, which allows us to control for time-invariant unobserved confounding factors through fixed effects.

This does not of course address the concern that there may be differential time trends in households where the father does and does not depart. In Table 2 we compare (pre-departure) characteristics of households that do and do not go on to experience departure of the father. We see that there are some differences across households, though mainly in relation to education, which is time-invariant and thus dealt with using fixed effects. Note also that we control for observable time-varying characteristics in our regression to improve conditional exogeneity of this event.

[9] It must also be acknowledged that departure of the father may not be a random event even when it is due to death, though we believe this to be much less of a concern.

[TABLE 2 HERE]

In order to examine the plausibility of the common trends assumption, we look at whether trends in children's schooling were the same in both types of household *before* the departure happened. To do this, we use two periods of school enrolment data from before the departure - at the time of the first survey (2002), and the year before (collected retrospectively at first survey). We see from Table 3 that we cannot reject that trends are the same in both types of household, as shown by the insignificant coefficient on the interaction between the type of household ("departure") and the year dummy. This builds more confidence in the common trends assumption.

[TABLE 3 HERE]

Further reassuring evidence comes from comparing trends in household per capita income in both types of household, before any departure of the father. If they are similar, there is no reason to believe they would not have been so if departure had not occurred. Results in Table 4 show that the evolution of per capita household labour income (measured retrospectively in the first (2002) survey) in departure and non-departure households in the three years 1999, 2000 and 2001, is very similar prior to the departure.

[TABLE 4 HERE]

Though the evidence above is very reassuring, it remains the case that the common trends assumption can never be tested and ruled out completely. To build more confidence in the quasi-random nature of the departure event, we check in Table 5 whether current child activities are correlated with future departure of the father: the idea here is that *future* departure should not lead to a significant effect on *current*

activities if departure is effectively random. To do this, we regress current children's activities (schooling/work at time t) on future permanent departures (at time t+1) and find, reassuringly, insignificant correlations between them.

[TABLE 5 HERE]

Whilst all of the evidence provided above does not (and can not) establish exogeneity of departure of the father, it builds confidence in the quasi-random nature of departure of the father and makes us considerably more comfortable with this assumption.

2.3 Attrition

Overall, around 13% of households have left the sample in either survey two or three.[10] Attrition is a concern if the reason for leaving the sample is related to the behaviour being modelled, as might be the case if, for example, households from which the father departs are more likely to drop out of the sample. To address this, we compare the baseline characteristics (at first survey) of households that did and did not subsequently leave the sample. This comparison is shown in Table 6. As expected, households that own a house are significantly less likely to attrit compared to those that do not; and those living at relatively high altitudes are more likely to attrit. Other than that, attrition is not systematically related to any of the variables considered in the table. Whilst this is reassuring, it of course does not alleviate concerns that the households may be different along unobservable dimensions, so potential selection biases in the data cannot be ruled out, which we need to account for in our empirical work. The methods we used to correct for this are discussed in Section 3 and all results presented take into account this possible selection problem, although it makes little difference to the effects we estimate.

[10] Attrition at the individual level is extremely rare, at less than 1%.

[TABLE 6 HERE]

3 Effects of departure of father on schooling and child labour

3.1 Main Specification

To estimate the effects of the departure of the father on children's school and work participation, we estimate the following model

$$y_{ijt} = \alpha_1 + \alpha_2 V_{jt} + X'_{ijt}\alpha_3 + W'_{ht}\alpha_4 + f_j + \delta_t + u_{ijt} \qquad (1)$$

where *i* denotes child, *j* denotes household and *t* denotes time, t=1…3, y_{ijt} is a discrete indicator for participation in school or work, V_{jt} is an indicator that takes the value 1 if the father has left the household permanently since wave 1, and 0 otherwise. So, if the father left between waves 1 and 2, then V_{j2} =1 and V_{j3} =1; if the father left between waves 2 and 3 then V_{j2} =0, V_{j3} =1. Note that by definition, V_{j1} =0.[11] X_{ijt} is a vector of observed time-variant characteristics including age of the child, number of siblings and quadratics, W_{ht} includes observed characteristics of the household head at the time of the survey (gender, education level, relationship to the child) and the composition of adults in the household at the time of the survey, all of which are likely to change between surveys for households in which the father has departed, f_j includes unobserved time-invariant household characteristics, δ_t is a survey round dummy, and u_{ijt} is an error term that we assume to be *iid*. The coefficient of interest is α_2, the effect of departure of the father on the outcome of interest (school or work participation).

We estimate equation (1) using a linear probability model (LPM) and cluster the standard errors at the municipality level to adjust for possible correlations of

[11] As discussed in section 2.2.2, our sample is restricted to those in which the father is present at baseline (survey 1). We only observe departures *after* survey 1.

household decisions within the same municipalities. Although the dependent variable is discrete, in our case the main advantage of the linear model over discrete choice models is that it is considerably easier to incorporate fixed effects. Another point to note is that in our application most of the explanatory variables are discrete and take on only a few values, strengthening the case for the LPM (Wooldridge, 2002, Chapter 15). Though a potential limitation of the LPM is that it can yield predicted probabilities outside the unit interval, in our case this is not a big concern as less than 3% of predictions lie outside the unit interval. Note also that we checked for robustness of our results to this linear specification, by estimating a fixed effects logit model (Honoré, 2002). The estimates, though less precisely estimated as they are based on the subset of children who changed their activity over time, point to the same patterns of coefficients as are discussed in the main text on the basis of LPMs.[12]

As discussed above, an important issue in considering the effects of the permanent departure of the father from the household on child activities is that it may be correlated with unobserved household characteristics that have a direct effect on child schooling and work. To net out the effects of unobserved characteristics that are fixed over time and may lead to spurious correlations between this event and children's outcomes, we use a fixed effects model. Note also that Section 2 showed that the common trends assumption is likely to be reasonable in our context.

Another issue that arises in estimating equation (1) is that non random attrition, if present, will yield inconsistent parameter estimates. To investigate this potential problem, we use a standard correction in a two-step sample selection model

[12] These results are available from the authors upon request.

(Heckman, 1979). The probability that the individual does not leave the survey, shown in equation (2), is estimated using a Probit

$$\Pr(S_{ijt} = 1) = \beta_1 + \beta_2 Z_{jt-1} + X'_{ijt-1}\beta_3 + \beta_4 t + \eta_j + v_{ijt} \qquad (2)$$

where S_{ijt} takes the value one if child *i* from household *j* does not leave the survey in between wave *t-1* and wave *t*, and zero otherwise, Z_{jt-1} are the instruments used for identification, discussed below, X_{ijt-1} are individual and household characteristics at wave *t-1*, *t* is a time dummy variable, and η_i is a household-level fixed effect, which may be correlated with f_j in equation (1).

As already mentioned, most of the attrition in our sample is at the household level. Moreover, very few households (3.7%) have migrated out of their village of residence (see Mesnard, 2009) so attrition is mostly due to non-willingness to answer. Therefore, the instrument set Z_{jt-1} includes the interview date (day of the month) and whether the respondent to the household questionnaire is the head or spouse, both measured in the previous survey for all households, whether they subsequently attrit or not. Both may affect the overall experience of the interview and thus willingness to be re-interviewed. We believe that exclusion restriction that they have no independent effects on the outcomes of interest is plausible, particularly as they relate to the previous wave, so they are unlikely to affect the activities of children reported in the following survey.

The estimates from equation (2) are shown in Table A1 in the appendix. The instruments are jointly significant at the 1 per cent level. We use these estimates to construct the inverse mills ratio, which is appended to the set of control variables in

equation (1). The selection correction term turns out to be in most cases not significant at convention levels, and the estimates change very little when it is included in equation (1). Nonetheless, we report all our results taking into account this selection correction. We also tested the robustness of our results to attrition by reweighting the sample in line with Wooldrige (2002) to correct for potential biases and do not present these results as they are very similar.

Estimates from the equation of interest, equation (1), are shown in Table 7. We see from column 2 that the departure of the father increases significantly participation in paid work, by around 3 percentage points. Interestingly we see from column 1 that the increase in child labour comes entirely from schooling (and not leisure) since the departure of the father has a significant negative effect on school enrolment, of around 4 percentage points.[13] The effects are not significantly different by gender (columns 3 and 4).

An important reason why these negative effects on schooling and positive effects on work may be expected, discussed in section 2, is the fact that households in which the father left due to death or divorce incur a substantial reduction in income. Moreover, it is unlikely that labour opportunities for children would decrease following departure of the father, contrary to the case of income shocks due to crop losses (Gitter and Barham, 2009). We investigate the extent to which the income loss associated with the departure of the father explains the estimated impacts, by interacting with father's education (as at first survey, i.e. pre-departure), a proxy for household income.[14] The

[13] This suggests that child labour and schooling are strong substitutes, in contrast to Ravallion and Wodon (2000) who find that increases in schooling in Bangladesh following a welfare programme only partially come from decreased child labour.

[14] High educated =1 if incomplete secondary or higher; =0 if complete primary or lower.

relatively less well off are indeed more likely to face credit constraints and insurance market failures, and have fewer formal ways to mitigate the impacts of such income losses. We do this for both schooling and paid work, as shown in columns 5 and 6. We see that effects are driven by those with a low educated father.

[TABLE 7 HERE]

Finally, we were worried that the impacts may differ according to whether the father dies or departs as a result of a marriage breakup, in particular as the father may continue sending transfers after break up.[15] Though we cannot look at this directly[16], we also ran a specification in which we controlled separately for death and divorce; the coefficients are of the same sign and are not statistically distinguishable from each other, though the effects of death are very imprecisely estimated due to its low occurrence.

4 Does the CCT programme help cushion households?

We next investigate whether the conditional cash transfer programme helps cushion children's activities against the father's departure. There is a growing literature on safety net role played by CCTs but little work has been done to study the case of risk entailed by permanent loss of income. To investigate the interactions between the programme effects and the father's departure for children's schooling and work we estimate the following model:

[15] Transfers may be important, though *a priori* it is hard to predict how transfers may differ across the two types of departure: divorced fathers may make transfers to the household which may compensate for the loss of income, but so also may the extended family or state in the case of death.

[16] Whilst we observe overall transfers to the household we do not observe the origins of them.

$$y_{ijt} = \alpha_0 + \alpha_1 V_{jt} + \alpha_2 V_{jt} * T_{jt} + \alpha_3 T_{jt} + \alpha_4 V_{jt} * F_j + \alpha_5 V_{jt} * \delta_t + X'_{ijt}\alpha_6 + W'_{ht}\alpha_7 + \delta_t + f_j + u_{ijt} \quad (3)$$

where F_j is an indicator equal to one if the household lives in a treatment area and 0 otherwise[17]; T_{jt} is an indicator equal to one if household *j* lives in a municipality that is receiving treatment at time *t* and 0 otherwise and all other notations are the same as in equation (1). The coefficient α_2 measures the extent to which the programme mitigates the effect of the departure of father.

In the way of background, we note that the programme was targeted to just over half of all municipalities. In order to evaluate the programme's impacts, a representative stratified sample of treatment municipalities was constructed, and municipalities from the same strata that were excluded from the programme were chosen as controls.[18] Controls were chosen to be as similar as possible to each of the treatment municipalities in terms of population, area, and an index of quality of life. The final evaluation sample was made up of approximately 100 eligible households randomly selected in each of the 122 municipalities chosen, 57 (65) of which were treatment (controls). Attanasio et al (2010) contains an evaluation of its key impacts.

Here we are interested in the interaction effect with permanent departure of the father and not in the effect of the programme per se. We control for time-invariant factors using fixed effects, and also for time-varying ones such as age and household composition. Nonetheless, there remains the concern that unobserved differences may still bias our estimates of the programme impacts and its interactions with departure of

[17] The area fixed effect is captured by the household fixed effect f_j such that f_j is only entered as an interaction term with time varying variables in this fixed effects specification.
[18] The evaluation design was carried out by a consortium led by the Institute for Fiscal Studies, and included the authors of this paper.

father in this non-experimental setting. To address this concern, we use a difference-in-difference method, augmented with propensity score matching, to estimate the programme impacts. This assumes that, in the absence of the programme, control and treatment municipality would have had similar trends in child work and education outcomes (in line with Attanasio et al, 2010). Since we are interested in the interaction between receiving the CCTs and permanent departure of the father, we augment this difference-in-difference model by adding the interaction term, noted V*T above, and all interaction terms necessary to control for potential differential time trends and area fixed effects across treated and non-treated households.[19,20]

We see from Table 8 that in the absence of the programme, departure of the father reduces school enrolment and increases child labour, particularly amongst the relatively less educated households (left hand columns): this is picked up by the coefficient α_1 which estimates the effect of departure in control areas. Added to this, the second row, α_2, shows that in areas in which the programme is in place, these adverse effects are offset (as shown by $\alpha_1+\alpha_2$). Other coefficients of interest in the table show that the 'raw' effect of the programme (i.e. for the large majority of households not affected by departure of the head), given by α_3, is to increase school enrolment and reduce child labour, as seen in Attanasio et al (2010).

[TABLE 8 HERE]

[19] This specification could also be considered as a triple differences methodology to test for heterogeneous impacts of the programme across households affected by a permanent departure of the head and others.

[20] Another factor that we account for in estimating the interaction between the programme and the father's departure is that, in violation to the guidelines, around half of the treatment municipalities started to receive the treatment before the pre-programme (baseline) survey was carried out, so we do not have pre-programme data for these municipalities. Therefore we also estimate the model on a sample of "pure" treatment areas and control areas, so dropping observations from these deviant areas. These results (available upon request) are very similar to those presented here.

Finally, as a robustness check, we restrict the comparison to treatment areas falling within the common support, i.e. the region over which treated individuals have a counterpart in the group of controls (according to the propensity score). In line with Attanasio et al (2010), we do this by matching treatment and control observations using kernel-weighted propensity score matching, and impose common support by dropping 10% of the treatment observations at which the propensity score density of the control observations is the lowest. The results are qualitatively similar and shown in Table A2 of the Appendix.

The fact that the welfare programme provides insurance to protect the very poor children from the adverse consequences of father's departure is, perhaps, not very surprising to the extent that the conditional cash transfers received represent a sizeable share of income for these households, around 20% of their monthly labour income (see Mesnard, 2009), and that the drop in household total earnings entailed by father's departure is of a similar magnitude. Moreover, the programme has been put in place on a permanent basis, which gives some credence that the insurance it provides will continue as long as the child is enrolled in school. Interestingly this result is somewhat distinct from De Janvry et al (2006), who have shown that PROGRESA did not prevent children from working more following shocks due to unemployment and illness of the household head, as well as natural disasters in the community though it fully protected their schooling.

Taken together, the pattern of results points towards the existence of credit and insurance market imperfections, with adverse implications for children, who play an important role in cushioning the household against the income losses entailed by departure of fathers. Whilst one cannot rule out the psychological impacts of a parent

departing playing a role too, we believe they are of secondary importance to the income loss channel. In particular, we have no reason to believe that psychological impacts would be stronger amongst the less well educated and no easy way to explain why the programme would mitigate such effects.

5 Conclusions

This paper has investigated the link between the permanent departure of the father from the household and the school enrolment and work participation of children in rural Colombia. We find that permanent departure of the father decreases schooling, by around 4 percentage points, and increases child labour, by around 3 percentage points. We further provide evidence that these effects are mainly driven by households with relatively less educated heads, which, of the indigent households in our sample, are the very poorest. We have also shown that receiving conditional cash transfers offsets these adverse consequences, offering the households adequate insurance against such vagaries.

Our results have a number of important policy implications. First, they suggest that credit and insurance market failures are potentially important in the context of rural Colombia, and can contribute to lower human capital accumulation of children. Second, an event such as the permanent departure of the father has potentially important consequences for the schooling and work of children, which are comparable in magnitude to the impacts of varying household labour income by around 20%, as was estimated in previous work using quasi experimental methods (Attanasio et al, 2010). Third, such adverse effects can be mitigated by conditional cash transfer programme targeted to very poor households, in particular for the low educated,

which are particularly vulnerable to such permanent income losses since they are unlikely to find formal or informal ways of insuring themselves against them.

The latter finding is the first of this kind, and offers an important agenda for future work. An important question is whether this finding also holds for investments other than schooling (such as children's health and nutrition) and in other contexts and environments. Another question is whether this should be taken into account in the design of safety nets and their targeting to lone parents, as it may also have the unintended consequence of promoting single parenthood. A final thought is on the particular relevance of these findings for sub-Saharan Africa, which has seen a dramatic rise in orphanhood due to the prevalence of HIV/AIDS, with currently around 1 in 10 children orphaned. Families and communities have been sharing the burden of this, and it is maybe time for government support to be put in place to help households cope with this.

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7 Tables

Table 1 School and work participation, by age and gender

	Boys			Girls		
	School enrolment %			School enrolment %		
Age at wave 1	**Wave 1**	**Wave 2**	**Wave 3**	**Wave 1**	**Wave 2**	**Wave 3**
7	0.904	0.928	0.963	0.923	0.954	0.970
8	0.935	0.951	0.933	0.961	0.959	0.947
9	0.952	0.943	0.895	0.966	0.960	0.918
10	0.933	0.907	0.813	0.958	0.950	0.867
11	0.917	0.885	0.764	0.935	0.901	0.835
12	0.854	0.783	0.675	0.896	0.856	0.786
13	0.788	0.750	0.577	0.830	0.788	0.633
14	0.661	0.610	0.457	0.775	0.751	0.536
N		*6,341*			*5,767*	
		Paid work			**Paid work**	
10	0.013	0.013	0.062	0.003	0.003	0.017
11	0.023	0.042	0.097	0.006	0.010	0.021
12	0.046	0.084	0.145	0.018	0.021	0.054
13	0.093	0.132	0.226	0.026	0.035	0.051
14	0.178	0.228	0.291	0.047	0.069	0.083
N		*3,945*			*3,460*	

Table 2 Comparison of pre-departure characteristics across households that do and do not experience subsequent departure

	Permanent departure of father (D)		
Characteristic, survey 1 ↓			
	D=1	**D=0**	*P-value*
Age of household head	43.02	42.37	*0.248*
Age of spouse	37.9	37.3	*0.182*
Education of head			
None	0.280	0.232	***0.043***
Incomplete primary	0.536	0.637	***0.000***
>= Complete primary	0.182	0.131	***0.014***
Education of spouse			
None	0.20	.197	*0.916*
Incomplete primary	0.631	0.660	*0.187*
>= Complete primary	0.169	0.143	*0.143*
Household composition			
Ave # of kids ≤ 6	0.389	0.463	***0.035***
Ave # of boys 7-11	0.714	0.727	*0.720*
Ave # of girls 7-11	0.705	0.674	*0.357*
Ave # of boys 12-17	0.631	0.646	*0.716*
Ave # of girls 12-17	0.585	0.594	*0.822*
Ave # of female adults	1.250	1.2495	*0.614*
Ave # of male adults	1.404	1.404	*0.456*
School enrolment rate of 7-14 yr olds in household	0.914	0.894	*0.075*
Household monthly consumption	422032	442015	*0.095*
Programme area	0.703	0.681	*0.380*
Altitude	574.50	599.59	*0.478*
# households	*435*	*5819*	

NOTES:- Characteristics listed pertain to first survey. The sample consists of households where, at first survey, both parents are present and there is a 7-14 year old. P-values based on standard errors clustered at the municipality level.

Table 3 Pre-departure trends in children's school enrolment

	School enrolment
Year =2002	0.0335
	(0.0051)**
Departure*Year=2002	0.0239
	(0.0146)
N	23,404

NOTES:- Dependent variable is school enrolment. 2001 is the reference year.
Household fixed effects controlled for. Also control for child age, gender.
Standard errors, clustered at municipality level, in parentheses.
N is the number of children in our sample across two waves (2001, 2002)
with non-missing school enrolment data.

Table 4 Pre-departure trends in per capita household labour income

	Per capita income
Year= 2000	0.5113
	(0.1117)**
Year= 2001	1.0967
	(0.1442)**
Departure*Year=2000	-0.0662
	(0.4566)
Departure*Year=2001	0.6594
	(0.5923)
N	14,487

NOTE. - Dependent variable is per capita household labour income. 1999 is the reference year. Household fixed effects controlled for. Standard errors, clustered at municipality level, in parentheses. N is the number of households across 2 periods (1999, 2000, 2001) with non-missing income data.

Table 5 Current Activity and Future Departure

	Current Schooling (time t)	Current Work (time t)
Future Death (time t+1)	0.0014 (0.0235)	-0.0037 (0.0322)
Future Divorce (time t+1)	0.0225 (0.0198)	0.0201 (0.0180)
p-value joint significance	0.524	0.5095
Sample size	23,531	15,937

NOTES:- Standard errors, clustered at municipality level, in parentheses.
N is the number of children in the sample across two waves (2001, 2002).
Schooling observed for all children in sample, i.e. ≥7; work observed for children ≥10.

Table 6 Comparison of characteristics across households that leave the sample at any time after the first survey and those that do not

Survey 1 characteristics ↓	**Did not attrit**	**Did attrit**	***P-value difference***
Age of head	42.42	42.36	*0.8700*
Age of spouse	37.31	37.45	*0.6342*
Head no education	0.232	0.249	*0.2760*
Spouse no education	0.1952	0.2120	*0.2542*
Head some education	0.6312	0.6207	*0.5540*
Spouse some education	0.6567	0.6654	*0.6176*
Head high education	0.1354	0.1260	*0.4521*
Spouse high education	0.1480	0.1224	*0.0494*
Treated area	0.6835	0.6756	*0.6438*
Altitude	577.36	726.43	*0.000*
Crop loss at first survey	0.129	0.129	*0.967*
Owns house	0.6496	0.5320	*0.000*
# individuals	5381	857	

NOTES:- Household-level regressions. Standard errors, clustered at municipality level, in parentheses.

Table 7 Marginal effects of the father's departure on children's schooling and work

	(1)	(2)	(3)	(4)	(5)	(6)
	school	**paid work**	**school**	**paid work**	**school**	**paid work**
Departure[1]	-0.0415 (0.0174)*	0.0334 (0.0153)*	-0.0439 (0.0232)	0.0406 (0.0212)*	-0.0558 (0.0196)**	0.0371 (0.0171)*
Departure * girl			0.0049 (0.0240)	-0.0150 (0.0217)		
Departure * high ed father (measured at first survey)					0.0744 (0.0312)*	-0.0203 (0.0294)
Observations	32,983	25,386	32,983	25,386	32,983	25,386

NOTES:- Marginal effects from a fixed effects linear probability model reported (see equation (1)). Also control for departure of father for unknown reason, departure of mother, time dummy, age dummies, sibling and household composition, education of mother. Robust standard errors clustered at municipality level in parentheses. $^{+}$ significant at 10%; *significant at 5%; ** significant at 1%. Schooling observed for all children in sample, i.e. ≥7; paid work only observed for children ≥10.

Table 8 Programme interacted with departure:

Marginal effects on schooling and paid work

	Low educated only		**All**	
	(1)	(2)	(3)	(4)
	school	**paid work**	**school**	**paid work**
Departure (α_1)	-0.1009 (0.0417)*	0.0354 (0.0311)	-0.0734 (0.0351)*	0.0291 (0.0260)
Departure * Treated (α_2)	0.1505 (0.0553)**	-0.1797 (0.0861)*	0.1059 (0.0566)+	-0.1440 (0.0745)+
Treated (α_3)	0.0141 (0.0124)	-0.0178 (0.0081)*	0.0119 (0.0114)	-0.0185 (0.0075)*
First survey	0.1017 (0.1007)	-0.3279 (0.0819)**	0.0696 (0.0929)	-0.2691 (0.0746)**
Second survey	0.0216 (0.1059)	-0.2825 (0.0856)**	-0.0096 (0.0980)	-0.2258 (0.0778)**
Departure * Treatment area (α_4)	-0.0756 (0.0708)	0.1640 (0.0938)+	-0.0568 (0.0685)	0.1343 (0.0803)+
Departure * First survey (α_5)	-0.0143 (0.0343)	-0.0041 (0.0267)	-0.0198 (0.0287)	(0.0016) (0.0232)
Observations	28,748	22,645	32,983	25,833

NOTES:- Marginal effects from a fixed effects linear probability model reported (see equation (1)). Also control for departure of father for unknown reason, departure of mother, age dummies, sibling composition, education of mother. Omitted survey dummy is third survey. Robust standard errors clustered at municipality level in parentheses. + significant at 10%; *significant at 5%; ** significant at 1%.

8 Appendix

Table A1. Probability of not leaving the sample, marginal effects

	Dep vble=probability of not leaving the sample
female	0.0050+
	(0.0030)
dummy variable survey 3	0.0354**
	(0.0068)
house	0.0564**
	(0.0212)
urban	0.0075
	(0.0066)
_Idate_2	0.0067
	(0.0151)
_Idate_3	-0.0068
	(0.0197)
_Idate_4	0.0119
	(0.0153)
_Idate_5	0.0299
	(0.0118)
_Idate_6	0.0050
	(0.0159)
_Idate_7	0.0273+
	(0.0129)
_Idate_8	-0.0072
	(0.0176)
_Idate_9	0.0006
	(0.0158)
_Idate_10	0.0219
	(0.0121)
_Idate_11	0.0221
	(0.0145)
_Idate_12	-0.0196
	(0.0241)
_Idate_13	-0.0104
	(0.0193)
_Idate_14	-0.0060
	(0.0183)
_Idate_15	-0.0018
	(0.0193)
_Idate_16	-0.0233
	(0.0214)
_Idate_17	0.0115
	(0.0169)
_Idate_18	0.0206
	(0.0143)
_Idate_19	-0.0030
	(0.0205)
_Idate_20	-0.0057
	(0.0227)

_Idate_21	0.0006
	(0.0216)
_Idate_22	0.0109
	(0.0165)
_Idate_23	0.0030
	(0.0180)
_Idate_24	0.0032
	(0.0150)
_Idate_25	0.0183
	(0.0135)
_Idate_26	0.0023
	(0.0181)
_Idate_27	0.0021
	(0.0157)
_Idate_28	0.0220
	(0.0138)
_Idate_29	0.0273+
	(0.0115)
_Idate_30	0.0352*
	(0.0102)
_Idate_31	0.0271
	(0.0121)
respondent_head	0.0126
	(0.0175)
respondent_spouse	0.0572**
	(0.0252)
Observations	23,679
p-value test of joint significance of instruments	0.0000
Robust standard errors in parentheses	
** p<0.01, * p<0.05, + p<0.1	

NOTES:- Marginal effects from a probit model (see equation (2) in text). Robust standard errors clustered at municipality level in parentheses. + significant at 10%; *significant at 5%; ** significant at 1%.

Table A2 Programme interacted with departure:

Marginal effects on schooling and paid work, common support only

	Low educated only		All	
	(1)	(2)	(3)	(4)
	school	**paid work**	**school**	**paid work**
Departure (α_1)	-0.0884 (0.0421)*	0.0327 (0.0332)	-0.0625 (0.0358)$^{+}$	0.0271 (0.0279)
Departure * Treated (α_2)	0.1682 (0.0583)**	-0.1804 (0.0807)*	0.1199 (0.0611)*	-0.1533 (0.0724)*
Treated (α_3)	0.0167 (0.0129)	-0.0179 (0.0081)*	0.0143 (0.0117)	-0.0192 (0.0075)*
First survey	0.1157 (0.1031)	-0.3362 (0.0791)**	0.0809 (0.0951)	-0.2785 (0.0742)**
Second survey	0.0320 (0.1081)	-0.2927 (0.0831)**	-0.0011 (0.1002)	-0.2369 (0.0777)**
Departure * Treatment area (α_4)	-0.0944 (0.0708)	0.1573 (0.0890)$^{+}$	-0.0733 (0.0711)	0.1378 (0.0789)$^{+}$
Departure * First survey (α_5)	-0.0147 (0.0330)	0.0037 (0.0297)	-0.0219 (0.0278)	0.0080 (0.0255)
Observations	25,428	19,693	29,294	22,581

NOTES:- See notes to Table 7. Note further that we match treatment and control observations using kernel-weighted propensity score matching, and impose common support by dropping 10% of the treatment observations at which the propensity score density of the control observations is the lowest.