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from Colombia

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The Effect of Child Disability on Parents' Labour Supply: Evidence from Colombia

Diego Amador*
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Abstract

Evidence from high-income countries has shown that having a child with disabilities (CwD) decreases parents' labour supply. However, little is known about this relationship in lower and middle-income countries. In this paper, we implement a non-linear difference in difference approach to estimate the causal effects of having a CwD on the labour supply of parents in urban Colombia. We use the first two waves (2010-2013) of the Colombian Longitudinal Survey (ELCA) and define treated households as those who did not have a CwD in 2010 but do have one in 2013 and compare them to those who did not have a CwD in any of the two periods. We find that having a CwD increases the probability of working for both parents, but especially for mothers. The effect on the probability of working is similar for single and married mothers. However, for married mothers the probability of working part-time increases while the probability of working full time decreases slightly. In the case of single mothers, the probability of both types of work increases.

Keywords: children, disability, labour supply, Colombia

JEL: J14, J22, I10

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El efecto de la discapacidad infantil sobre la oferta laboral de los padres: Evidencia para Colombia

Diego Amador*
Mónica Pinilla-Roncancio†

Abstract

La literatura ha encontrado que, en países de altos ingresos, la discapacidad infantil lleva a una reducción de la oferta laboral de los padres. Sin embargo, poco se conoce sobre esta relación en países de ingresos medios y bajos. En este trabajo implementamos un modelo de diferencias en diferencias no lineal para estimar el efecto causal de la discapacidad infantil sobre la oferta laboral de los padres en las zonas urbanas de Colombia. Usamos las dos primeras rondas (2010-2013) de la Encuesta Longitudinal Colombiana de la Universidad de los Andes (ELCA) y definimos a un hogar tratado como un hogar en que ninguno de los hijos tenía una discapacidad en 2010 pero alguno sí la tenía en 2013 y los comparamos con hogares que no reportan tener hijos con discapacidad en ninguno de los dos años. Encontramos que tener un hijo con discapacidad aumenta la probabilidad de que ambos padres trabajen, especialmente las madres. El efecto sobre la probabilidad de trabajar es similar para madres casadas y solteras. Sin embargo, para las madres casadas, la probabilidad de trabajar medio tiempo aumenta mientras que la probabilidad de trabajar tiempo completo disminuye. Por el contrario, tanto la probabilidad de trabajar medio tiempo como la de trabajar tiempo completo aumenta para madres solteras.

Palabras clave: niños, discapacidad, oferta laboral, Colombia

JEL: J14, J22, I10

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Introduction

Previous research has shown that having a child with disabilities (CwD) has a negative effect on parents' labour market participation in high-income countries (HICs) such as USA, Canada and Australia (See Powers 2001, Porterfield 2002, Gould 2004, Loprest and Davidoff 2004, McKay and Atkinson 2007, Lu and Zuo 2010, Brandon 2011, Wasi, den Berg et al. 2012). However, it is unclear if these results extend to lower and middle-income countries (LMICs), where public resources and institutions to support families with disabilities are limited and, in some cases, inexistent. In this article, we aim at bridging this gap by estimating the causal effect of having a CwD on the labour supply decisions of parents in urban Colombia.

We implement a non-linear differences in differences approach, using data from two waves of the Colombian Longitudinal Survey (ELCA 2010-2013), which is representative of urban areas of the country. We find that having a CwD increases the probability that both fathers and mothers work. However, the effect for fathers is smaller when compared to the one we find for mothers and, in some cases, statistically insignificant. For both single and married mothers, having a CwD leads to an increase in the probability of working of at least 10 percentage points. Nevertheless, when we look at the intensive margin, we find that married mothers are more likely to work part-time jobs and less likely to work full-time jobs. Single mothers, on the other hand, are more likely to work both types of jobs.

The visibility that people with disabilities and CwD have in the public agenda has increased in recent decades. Around the world, roughly 5% of children aged 14 years or younger lives with a moderate or severe disability (United Nations Children's Fund (UNICEF) 2013). In LMICs such as Colombia, the prevalence of disability and child disability is expected to be even higher due to the incidence of armed conflict, a more limited access to health care and social protection services and higher levels of

multidimensional and income poverty. According to the Colombian National Household Census (2005), 6.4% of the Colombian population and 2.6% of children aged 12 years or younger live with any type of disability (Departamento Nacional de Estadística (DANE) 2006).¹ The ways in which disability affects families has not yet been studied in detail in the country. In fact, there are not studies to date analysing the effect of disability on households' income, on the opportunities that people with disabilities and their families face or on their well-being.

The literature has identified that families of CwD face three different types of costs (Stabile and Allin 2012): *direct costs* related to health care and other expenses directly associated with having a CwD (e.g. extra equipment, rehabilitation services, household adaptations, etc.); opportunity costs of family members when providing care to CwD (*indirect costs*); and *long-term costs* associated with lower human capital accumulation by CwD. Both *direct* and *indirect costs* may affect the labour supply of parents of CwD. However, while *direct costs* should lead to an increase in their labour supply, *indirect costs* should work in the opposite direction. Thus, whether labour supply increases or decreases because of having a CwD will depend on the relative importance of each of these types of costs.

Our results suggest that, in the case of Colombia, the effect of CwD on parents' labour supply that comes from the *direct costs* dominates the one caused by the *indirect costs*. In fact, we find a large causal effect that goes in the opposite direction of what the literature has found using data from HICs. In the context of HICs, the negative effect of CwD on labour supply has highlighted the importance of parent's opportunity costs in determining how they adjust their labour supply choices to child disability.

¹ The definition of disability varies widely across surveys, so these numbers are not comparable to the ones reported by UNICEF (2013).

Gupta, Das et al. (2013), are the only other study that has looked at the association between child disability and the labour supply of mothers in LMICs. Because the authors use the India Human Development Survey (2004-2005), which is a cross-sectional source of information, it is unclear if the association between child disability and labour supply that they find can be interpreted as a causal relationship. Nevertheless, their results are consistent with our findings, showing that having a CwD increases the labour supply of parents, mothers in particular, in the context of LMICs.

The differences between HICs and LMICs in terms of institutions, social protection systems and the available support provided to families of CwD might be a possible explanation of the differences between our findings for Colombia and what others have found for HICs. Colombia has been characterised as having a truncated informal welfare state (Barrientos and Santibañez 2009) with a limited number of welfare services (Rosero 2013-14). There is currently no legislation or social policy aiming to assist people with disabilities, to cover for the extra costs of living with a disability, or to support parents or other family members providing care of children or adults with disabilities. This exacerbates the importance of *direct costs*, potentially shaping the positive labour supply response to having a CwD that we observe in Colombia.

Background

The effect of having a CwD on the labour supply of parents has not yet been fully established. Although the number of studies on this topic has increased during the last decades, there is still a lack of consensus about the main effects of child disability on the labour force participation of parents (mothers and fathers). The magnitude of the effect differs depending on the country, on the group analysed (father and mothers or married and single mothers) and on the definition of disability used.

In general, studies analysing the association between child disability and labour participation of mothers and fathers of CwD in HICs have not found significant results in the case of fathers (Brandon 2011, Burton, Chen et al. 2014). However, for mothers, these studies have found that having a CwD reduces their labour supply. Although, the magnitude of the effect differs between married and single mothers and between studies, this result is robust.

The effect of child disability on the labour supply of mothers, who are usually the principal caregivers of CwD, depends on two main factors: the costs of the disability and the severity of it (demand for care) (Gould 2004). First, if the costs associated with the disability are high and the family needs to bear them, mothers have more incentives to work or increase their number of working hours, aiming to earn additional income to cover the extra costs. Second, the demands of care increase with the severity of the impairment, meaning that the additional indirect costs of disability are closely related to the type and severity of the impairment of the child. In this context, mothers are more likely to stay at home and provide care for their CwD.

Using the Australian time-diary data, Brandon (2011) found that the effect of child disability was different for mothers and fathers. Indeed, mothers of CwD adjust their hours of paid employment when raising a CwD, decreasing the average number of working hours, compared to married mothers of children without disabilities and to their own partners. No effect was found for fathers of CwD. Yamauchi (2012), using the Longitudinal Study of Australian Children (2004, 2006 and 2008), also analysed the effect of having a child with long-term illness on their parents' labour supply. The results revealed a reduction in the labour supply of mothers of CwD aged 0 to 4 years, together with an 8% reduction on their household income. On the other hand, evidence of the effect of child disability on father's labour supply was weak. Similar findings

were obtained by Burton, Chen et al. (2014), who used the Statistics Canada National Longitudinal Survey of Children and Youth (1998 to 2008). They found that, compared to married mothers of children without disabilities, married mothers of CwD were less likely to engage in paid employment and worked a lower number of hours. In the case of fathers of the same children, the authors did not find any statistical significant differences in the probability of working when compared to fathers of children without disabilities.

Powers (2001) disaggregated the analysis by marital status. Using data from the 1992 Current Population Survey from the US, she found a significant reduction on the labour participation of single and married mothers of CwD. These results were confirmed by the same author in 2003, using data from the Survey of Income and Program Participation in the US, which allowed him to interpret these changes as causal effects (Powers 2003). Additionally, Corcoran, Noonan et al. (2005) used the Fragile Families and Child Wellbeing Study and found that mothers of CwD had an 8 percentage points lower probability of working than mothers of a child without disabilities, with greater negative effects for single mothers.

The relationship between type of impairments and parents' labour force participation was studied by Loprest and Davidoff (2004) using the National Health Interview Survey (NHIS 1999-2000). The authors concluded that single parents of children with activity limitations were significantly less likely to work and also worked a less number of hours. In addition, Wasi, den Berg et al. (2012) studied this association in the case of single and married mothers in the US. Their findings revealed a negative and significant relationship between being employed and having a CwD for single and married mothers. However, the magnitude was different depending on the

type of impairment the child had. Indeed, having a child with self-care limitations had the largest effect for both groups (single and married mothers).

The differences between the intensity of labour participation of mothers of CwD was studied by Porterfield (2002) using the Survey of Income and Program Participation (1994). He analysed if having a CwD is correlated with differences in the probability of working in a full-time or in a part-time job between single and married mothers in the US. His findings showed that mothers of children with and without disabilities reduced their labour supply after pregnancy; however, in the case of mothers of children without a disability, when the child was in school age, mothers were more likely to work compared to mothers of CwD. This study revealed that the magnitude of the relation between child disability and labour market participation was larger for single than for married mothers. Indeed, there were no differences between the probabilities of working between married mothers of children with and without disabilities but in the case of single mothers of CwD, they were 14% more likely to not participate in the labour force and 17% less likely to work full time, when compared to single mothers of children without disabilities.

As discussed before, a lack of knowledge exists on how child disability affects the labour supply decisions of parents in LMICs. To our knowledge, the study conducted by Gupta, Das et al. (2013) is the only one using data from a LMIC (India). Using cross-sectional data from the India Human Development Survey (2004-2005), the authors analyse the relationship between child disability and maternal work in India. Their findings suggest that having a CwD was positively correlated with labour market participation of mothers of CwD compared to mothers of children without disability. In addition, mothers of CwD who participated in the labour market, tend to work on average less hours per week when compared to mothers of children without disabilities.

Given that their empirical strategy did not control for systematic differences between households with and without CwD, it is difficult to interpret their findings as causal effects.

In general, empirical evidence in the effect of child disability and parents' labour participation is still limited to a small set of HICs. The results in high-income settings have reached similar conclusions; having a CwD reduces the probability of working for mothers, with differences in the magnitude of this effect between single and married mothers. On the other hand, empirical evidence in LMICs suggests a different association, meaning that child disability is positively correlated with parents' labour market participation. However, there is no empirical evidence on the causal effect of having a CwD in LMICs.

Data and sample

The Colombian Longitudinal Survey (ELCA for its acronym in Spanish) is the first longitudinal survey in Colombia. Its main objective is to provide information related to social and economic changes faced by individuals and households through the years. ELCA follows more than 6,000 urban households for 12 years. The first wave was conducted in 2010, and new waves are collected every three years. The survey gathers detailed information on employment, education and health for household heads, spouses, children and stepchildren younger than 10 years old (in 2010). General information on sociodemographic characteristics of other household members, dwelling characteristics and household expenditures is also obtained (CEDE and Universidad de los Andes 2011).

ELCA uses a probabilistic, stratified, multi-stage, clustered sampling framework, with the municipality as the Primary Sampling Unit. It is representative of households in socioeconomic stratum one to four (out of six with six being the highest

stratum) living in five regions of the country: Bogota, Central Region, Eastern Region, Atlantic and Pacific Regions. Although information was collected for households living in rural areas, the information was only representative for small farmers living in five micro-regions of the country (CEDE and Universidad de los Andes 2011). Therefore, we restrict our analysis only to urban settings. In short, our analysis can be thought of as referring to lower and middle class families in urban Colombia.

To date, two rounds of information are available for the analysis (2010-base line and 2013), with an attrition rate lower than 10% for the urban sample. The final urban sample including parents of children with and without disabilities consists of 7,117 people. We restrict our sample to only include parents (fathers and mothers) that reported having children aged 0 to 13 years (in 2013) with or without disabilities ($n=3,673$). In our difference in difference analysis, we only use information from parents who did not report a CwD in 2010 ($n= 3,574$). Out of these, 118 parents report having a CwD in 2013, which we will refer to as treated; 74 of these were women and 44 were men.

The small number of cases that can be found in survey data challenges the empirical analysis of the consequences of disabilities on other family members. This is a common problem of most empirical studies on this topic (Salkever 1982, Powers 2003, Gould 2004, Loprest and Davidoff 2004) and our data shares this feature, which strongly reduces our statistical power and thus our ability to detect potential effects. Furthermore, it prevents us from disaggregating our effects according to several socio-demographic characteristics (e.g. region) as we would have wanted.

In our analysis, we first use the sample of all mothers and fathers of CwD and then restrict ourselves to the sample of only mothers to explore potential heterogeneous effects according to their marital status. We choose to delve deeper into the effect of

child's disability on the labour supply of mothers for two reasons in particular. First, as we will show in the results section, our analysis shows a larger and more robust effect for mothers than for fathers. Second, as was presented in the background section, the literature has previously found differential effects according to marital status for mothers of CwD. Thus, we would like to be able to contrast our results to previous findings and determinate if there are differences between the findings from HICs and LMICs. As the results will show, the comparison between what we find for single and married mothers has important implications for the conclusions we draw regarding the relative importance of the direct and indirect costs that mediate the effects of having a CwD on parents' labour supply in Colombia.

Definition of disability

Parents (or direct informants) of all children and stepchildren younger than 10 years (in 2010) were asked questions about potential disabilities of their children. Using this information, we define a child as disabled if, because of a disease, accident or congenital factors, he or she was totally blind, completely deaf, could not speak, or had difficulty understanding or learning. In addition, we also define a child as disabled if he or she was 2 years or older and had difficulty moving, walking alone or with daily life activities such as bathing and eating. As we show in our descriptive analysis, there are systematic differences in terms of observable characteristics between households with and without a CwD which suggest that having a CwD is not exogenous. This motivates our choice of a difference in difference strategy to estimate the causal effect in which we are interested. Thus, we can only focus on children who did not fall into the category of having a disability in 2010, restricting CwD in our sample to those children who were not disabled in 2010 but were disabled in 2013. Thus, we think of our measure of disability as that of *acquired disability*.

As mentioned earlier, there is evidence of differences in the effects of CwD on parents' labour supply according to the type of disability (Loprest and Davidoff (2004). Thus, we would like to point out that our findings do not necessarily apply to families with children with *severe long term disabilities* (there are 66 children in our data who report a disability in both years and thus would fall into this definition of disability). Furthermore, the small number of children with an *acquired disability* in our sample (n=118) prevents us from further disaggregating our analysis according to types of impairments.

Dependent variables

We analyse two separate self-reported labour outcomes: whether a person works or not (extensive margin) and how much a person works (intensive margin). In the data, hours worked tend to group around mass points, which we interpret as working part-time and working full-time. Thus, when looking at the intensive margin, we use a categorical measure of labour supply that divides the population into three groups: a. not working; b. working part time and c. working full time or more. This categorization allows us to analyse the effects on the labour supply at the extensive and intensive margins simultaneously in a straightforward manner.

We categorize anyone who reported having worked the previous week as working, and those out of work, actively searching for a job, disabled or retired as not working. Conditional on working, we classify those who reported working less than 40 hours per week as working part time and those who worked 40 hours or more as working full time². Using these definitions, our two main dependent variables are a

² The Colombia law establishes that full time job corresponds to 48 hours per week. Nevertheless, our analysis revealed that on average individuals work 42 hours per week. Aiming to capture all population working at the margin of the average, 40 hours was selected as the cutoff between part time and full time.

dummy variable indicating whether a person works or not (p) and a categorical labour supply variable (h), which takes the value of 0 if the person does not work, 1 if she works part time, and 2 if she works full time.

Independent variables

In our estimations, we control for several household level characteristics. First, we include parents' individual characteristics such as age, age squared, gender and level of education, as these variables have been identified as common factors that affect individuals decisions related to work (Killingsworth and Heckman 1986, Willis 1986). Given the influence that household composition has on labour supply choices for adults, we also include the total number of children younger than 10 years and total household size. Although in Colombia everyone is supposed to be eligible for health insurance coverage, through either formal work contributions or government subsidies (for informal workers and those who are unemployed), some people in our sample report not being covered by any type of health insurance. Therefore, we also include a dichotomous variable that indicates if the person had any type of healthcare insurance. Finally, as a robustness check, when we estimate models with the sample of married women only, we also control for husband characteristics such as age, age squared, level of education, working status and average monthly labour income.

Our marital status variable for women, which we use to estimate heterogeneous effects, classifies a woman as “single” if she had never been married, was divorced, or was separated at the time of interview. We classify her as *married* if she was legally married or cohabiting with her partner. This categorization aims at distinguishing women who live in households with other potential earners, which we hypothesize as a

crucial determinant of how they adjust their labour supply choices in response to their children's disability.

Descriptive analysis

Table 1 presents the descriptive statistics for 2010 and 2013. For 2010, parents reported 2.53% of the children in the sample as disabled, with 80.1% of them being boys and an average age of 7.3 years. In total, 4.2% of households in urban areas in Colombia had at least one child with severe disability; of those, 6.24% were single parent households with female heads. In 2013, 2.0% of children were reported as disabled, with 60% of them being male and an average age of 7.2 years.

Of the 2% of CwD in 2013, 80.6% were “*new cases*” (i.e. children who were not reported as having a disability in 2010), which are the CwD that we use for our analysis. 54.1% of CwD in 2010 were classified as non-disabled in 2013. These differences between the fraction of households reporting CwD in 2010 and 2013 are explained by the difficulty of determining disabilities for young children (ages 0-6). According to the definition of disability used in the survey, many of these young children who were initially labelled as having a disability were later classified as not disabled (e.g. there was a lag in the development of motor skills). Children with limitations on their daily life activities were the group that presented the highest changes between years, with 65% of this group considered as disabled in 2010 but not in 2013, this is easily explained by the fact that young children are not independent in their daily life activities and as they get older they gain independence in these aspects.

In both years, parents of CwD have on average a significantly lower number of years of education compared with parents of children without disability. In addition, the percentage of parents working is lower for those with CwD. When compared to married

mothers of CwD, single mothers were older, roughly twice as likely to work, and worked longer hours.

In 2013, ELCA included an additional question asking if parents provide informal care to children in their household. One third of parents provided informal care; 80% of these were mothers and only 20% fathers. Of the group of mothers, 47% were married women and 33% single mothers. The information contained in this variable could provide useful insights for a better understanding of the effects of disability and care on parents' labour supply. Nevertheless, the total number of parents of CwD who report providing informal care to their children is very low: we have 57 observations in our sample, 52 of which are women. Furthermore, the lack of information related to the intensity of care (e.g. number of hours per week), the impossibility of determining if parents provided care for other children in the household as well, and the fact that this information is not available in the 2010 round, prevents us from being able to use it in our analysis.³

³ We still performed an exercise in which we apply the same approach of our main analysis to estimate the differential effects for those women who report being caregivers and those who do not. The results from this exercise are consistent with and would reinforce the conclusions from our analysis. These results are available upon request.

Table 1. Descriptive statistics of characteristics of children with and without disabilities and their parents

	2010		2013	
	Children with disabilities (n=89)	Children without disabilities (n=4,192)	Children with disabilities (n=148)	Children without disabilities (n=6,285)
Age of CWD (mean in years)	7.3 (0.44)	4.6 (0.09)	7.2 (0.4)	6.0 (0.9)
Female	44.8% (.0446)	49% (.0096)	40% (.0432)	49% (.0085)
Male	55.2% (.0446)	51% (.0096)	60% (.0432)	51% (.0085)
Years education	1.5 (0.4)	1.92 (0.06)	2.55(0.30)	4.53(0.11)
	Parents of children with disabilities (n=136)	Parents of children without disabilities (n=4,658)	Parents of children with disabilities (n=222)	Parents of children without disabilities (n=5,023)
Age (mean in years)	39.3 (1.9)	38.6 (0.33)	40.6 (1.03)	42.4 (0.32)
Years education	6.8(0.6)	9.3 (0.15)	8.7 (0.66)	9.5 (0.16)
Working %	71.7% (.012)	80.5% (.0553)	74.30% (.0113)	77.8% (.046)
	Single mothers of children with disabilities	Married mothers of children without disabilities	Single mothers of children with disabilities	Married mothers of children without disabilities
Age (mean in years)	46.12 (1.45)	34.7 (1.8)	43.4 (1.81)	38.1 (1.96)
Years education	6.06 (1.2)	7.35 (1.03)	8.3 (0.75)	9.7 (0.7)
Working %	79.3% (.125)	68.2% (.1386)	79.23% (.082)	58.4% (.0985)
Average number of working hours (just for working mothers)	46.12 (5.1)	18.5(7.7)	46.4 (5.00)	35.6 (6.00)
Caregivers of CWDs	No information	No information	31.30% (.0952)	42.7% (.0986)

Source: Authors calculations using ELCA
Standard errors in parenthesis

Table 2 presents descriptive statistics (at base line) of dependent and independent variables included in the model. In this table, only parents with children with and without disabilities who had information for both years were included. On average, 64.6% of parents of CwD worked the week prior to the survey. This fraction is lower than the one for parents of children without disabilities (72.1%). However, among parents who are working, those with CwD work on average five more hours than parents without CwD, although this difference is not statistically significant. Their average income is also lower and they are more likely to work full time and less likely to work part time (37.12% vs. 39%) or not to work (54% vs. 57.5%). Parents of CwD also have lower levels of education. Although some of these differences between

parents of children with and without disabilities are not always significant, these descriptive statistics suggest that parents with CwD might have different sociodemographic characteristics than parents of children without disabilities in urban Colombia.

On average, mothers of CwD were less likely to work, had lower levels of education and, for those who were employed, their average monthly income was lower than for mothers of children without disabilities (although the difference is not statistically significant). Among married mothers, their husbands were more likely to be working, but earning an average income lower than the one of fathers of children without disabilities.

These differences in terms of observable characteristics between parents and households with and without a CwD reinforce the idea that having a CwD cannot be thought of as exogenous in an econometric model relating this condition to labour supply. This is particularly true in the case of *acquired disabilities*. The appearance of many of the types of disabilities that fall into this category may be correlated with other household characteristics (observable and unobservable). For instance, household income may be correlated with the amount of preventive care that a given child receives or the type of services that a child has access to. Similarly, the amount of care a child gets will depend on characteristics that are unobservable to us, such as how attentive parents are in the care of their children or how likely they are to seek medical attention when the child is sick. Thus, in this paper we exploit the longitudinal aspect of our data to account for these systematic differences between households with and without CwD

Table 2. Descriptive statistics - Parents with and without disabilities in base line (2010)

	Both parents (n=3,636)		Mothers (n =2,055)	
	Parents of children without disabilities	Parents of children with disabilities	Mothers of children without disabilities	Mothers of children with disabilities
<u>Parents characteristics</u>				
Working (%)	72.1% (0.014)	64.6% (0.072)	57.0% (0.02)	49.5% (0.10)
No working (%)	27.9% (0.14)	35.41% (0.072)	43.02% (.0202)	50.44% (0.105)
Working part time (%)	14.54% (0.01)	10.8% (0.03)	16.97% (0.012)	10.84% (0.04)
Working full time (%)	57.53% (0.016)	53.77% (0.08)	40.01% (0.024)	38.72% (0.11)
Average number of hours worked the previous week	50.76 (0.70)	55.74 (4.65)	45.81 (1.26)	47.73 (8.9)
Average age	38.95 (0.363)	37.12 (1.12)	37.48 (0.41)	35.9 (1.41)
Average years of schooling	9.32 (0.18)	8.35 (0.38)	9.31 (0.26)	8.24 (0.49)
Average number of children in the household (10 years or younger)	1.57 (0.022)	1.77 (0.30)	1.61 (0.07)	1.77 (0.30)
Health care insurance (%)	92.67% (0.008)	89.98% (0.031)	93.79% (0.007)	90.60% (0.04)
Average Labour income (COP)	1,158,218 (38,269)	985,148 (99,922)	753,488 (45,022)	644,920 (127,738)
Average total household income (COP)	1,073,358 (37,136)	925,508 (98,374)	685,192 (43,602)	581,037 (93,308)
<u>Region of residency</u>				
Atlantic (%)	24.54% (0.01)	25.67% (0.05)	22.5% (0.026)	7.82% (0.046)
Oriental (%)	17.02% (0.02)	6.66% (0.26)	20.89% (0.05)	8.83% (0.08)
Central (%)	22.64% (0.02)	21.75% (0.08)	28.87% (0.04)	59.55% (0.16)
Pacific (%)	14.1% (0.01)	17.02% (0.04)	15.11% (0.02)	12.2% (0.06)
Bogota (%)	21.69% (0.02)	28.9% (0.08)	12.63% (0.02)	11.59% (0.07)
<u>Husband information</u>				
Working (%)			89.02% (0.02)	91.42% (0.04)
Average labour income (COP)			1,128,299 (58,738)	1,041,893 (136,701)
Average age			36.03 (0.42)	34.73 (2.22)
Average years of schooling			9.71 (0.30)	8.11 (0.61)

Source: Authors calculations using ELCA
Standard errors in parenthesis

Empirical Strategy

We analyse whether the presence of a CwD in a household has a direct effect on the labour supply of parents. In our analysis, we separately investigate the effects of CwD on the extensive and intensive margins of labour supply. We allow these effects to be

different for mothers and fathers and further analyse if the effect is different for married and single mothers. Because each group faces different constraints when making labour supply decisions, looking at potential differences in the effects for single and married mothers allows us to learn something about the mechanisms behind such effects.

Our analysis uses a difference in difference approach to identify the causal effects of child disability on parents' labour supply. As our descriptive analysis shows, treated households (those who did not have a CwD in 2010 but do have one in 2013) differ from other households in some observable dimensions such as levels of education, region of residency, labour income (pre-treatment), total household income and age. Although some of these differences are not statistically significant at conventional levels, this may be due to lack of statistical power. Thus, we interpret these observed differences as evidence suggesting that treated households are also potentially different in dimensions that are unobservable to us. Our approach controls for such differences if these are constant over time. In other words, our main assumption is that any unobservable characteristics affecting labour supply that correlate with having a CwD do not change between 2010 and 2013. As we mentioned earlier, this is the first article that uses longitudinal data to identify the causal effect of disabilities on parents' labour supply in a LMICs.

Our two outcome variables are categorical. For this reason, we use non-linear models in our empirical strategy: a probit model to analyse the effects on the decision of whether to work or not and a multinomial probit model to differentiate between working part-time jobs and full-time jobs. Furthermore, we are interested in evaluating potential differences in these effects according to gender and marital status. Because the estimators of the treatment effects in this context are not entirely standard, we describe below the objects we are interested in estimating and analysing.

We begin with the estimation of the treatment effect on the treated for the probit model without any heterogeneous effects. In this case, we define the following difference-in-difference probit model:

$$P(p_{it} = 1|D_i, d_t, T_{it}, X_{it}) = \Phi(\beta_0 + \beta_1 D_i + \beta_2 d_t + \beta_3 T_{it} + X'_{it}\gamma) \quad (1)$$

Here, the variable D_i indicates whether person i is in a treated household or not and is constant across time; d_t is a dummy variable that takes the value of 1 in 2013 and 0 otherwise; and X_{it} is a vector of household characteristics, some of which change over time. We are mainly interested in variable T_{it} , which takes the value of 1 if there is a CwD in i 's household at time t . This variable is essentially the interaction between D_i and d_t . The causal effect of a CwD on parents' labour supply is given by the average partial effect (APE), also known as the average marginal effect, with respect to T_{it} ⁴:

$$APE(d_t = 1, D_i = 1) = E_X \left[\frac{\partial P(p_{it} = 1|T_{it}, X_{i2013}, d_t = 1, D_i = 1)}{\partial T_{it}} \right] \quad (2)$$

Most of our analysis, however, is based on the estimation of heterogeneous treatment effects. For instance, we are interested in potential differences in the effects for women and men. In this case, let G_i be a dummy variable indicating whether i is a woman or not. We then expand the probit model to include this dummy variable as well as its interactions with d_t and T_{it} :

$$P(p_{it} = 1|D_i, d_t, T_{it}, G_i, X_{it}) = \Phi(\beta_0 + \beta_1 D_i + \beta_2 d_t + \beta_3 T_{it} + \beta_4 G_i + \beta_5 G_i * d_t + \beta_6 G_i * T_{it} + X'_{it}\gamma) \quad (3)$$

⁴ We are interested in the average treatment effect on the treated (ATT) so we look at the APE for treated households.

Here we are interested in the APE's for those with $G_i = 1$ (women) and those with $G_i = 0$ (men). For instance, the causal effect for women is given by the APE, evaluated at $G_i = 1$ (as well as $D_i = 1, d_t = 1$):

$$APE(d_t = 1, D_i = 1, G_i = 1) = E_X \left[\frac{\partial P(p_{it} = 1 | T_{it}, X_{i2013}, G_i = 1, d_t = 1, D_i = 1)}{\partial T_{it}} \right] \quad (4)$$

If we wanted to obtain the treatment effect without conditioning on gender from this same specification, we can take the average of the previous expression with respect to variable G as well:

$$APE(d_t = 1, D_i = 1) = E_{X,G} \left[\frac{\partial P(p_{it} = 1 | T_{it}, X_{i2013}, G_i, d_t = 1, D_i = 1)}{\partial T_{it}} \right] \quad (5)$$

Notice that the previous effect differs from the one in equation $APE(d_t = 1, D_i = 1, G_i = 1) = E_X \left[\frac{\partial P(p_{it} = 1 | T_{it}, X_{i2013}, G_i = 1, d_t = 1, D_i = 1)}{\partial T_{it}} \right]$ (4) because here we allow the effect to be different for men and women, even if we are calculating the average effect without conditioning on gender.

Finally, to analyse the intensive margin of labour supply, we specify a multinomial probit model. By including not working as one of the categories, we are able to analyse the effects on the extensive margin and the intensive margin simultaneously in a straightforward manner. The dependent variable in this case, h , takes the value of 0 if the person does not work, 1 if she works part-time, and 2 if she works full-time. Just as in the extensive margin case, the treatment effect on the treated is given by the APE with respect to T_{it} , evaluated at $D_i = 1$ and $d_t = 1$. The definition of the treatment effects conditional on gender are analogous to the ones defined in the

simple probit case as well. All of these definitions are exactly the same when we estimate heterogeneous effects according to marital status instead of gender.

Results

Effects of CwD on the probability of working

We begin our analysis by looking at the effects of child disability on the probability that a parent (mother or father) works. Table 3 shows the estimated APE⁵, as defined in the previous section, for both parents and for women and men separately under different specifications. Column 1 shows the estimated effect when we do not include control variables in the estimation. This estimate suggests that having a CwD increases the probability that a parent works by 11 percentage points (pp). Column 2 allows for different effects for men and women but still does not include any control variable. Although the average effect remains at 11 pp, the estimates show an effect for women (14 pp and statistically significant) that is more than twice the size as the effect for men (6.5 pp and not statistically significant). Columns 3 and 4 show these same estimates when we include our control variables⁶. The estimate for the effect of having a CwD on the probability that a parent works remains at 11.6 pp. and is statistically significant. When we allow the effect to differ by gender (column 4), the estimate for the average effect remains virtually unaltered (10.4 pp). In this case, we also continue to find a large difference between the effects for women (13.2 pp) and men (7.3 pp). These results coincide almost exactly to the ones we obtain when we estimate the effects for

⁵ To make the presentation of these results easier, we only show the APE's in the tables with our results, as they are the estimates for the treatment effects we are interested in. The estimates for the parameters in all models estimated in this article (i.e. coefficients for all of our control variables), have the expected signs (tables with these estimates are available upon request). Also, as we have discussed repeatedly, the small number of cases of CwD in our sample limits the statistical power of our estimations. We are careful about not drawing strong conclusions based on estimates that are not statistically significant. However, besides the standard errors, we have chosen to include the p-values for all of the APE's in the tables with our results to allow the reader to better judge our estimates

⁶ The estimates in column 3 are obtained from estimating (1) and calculating the APE described in equation (2). Column 4 uses estimates from equation (3) and uses equation (5) for the overall effect and equation (4) for the gender-specific effects. Columns 1 and 2 use the same equations as columns 3 and 4, respectively, but without control variables.

women and men in separate equations (columns 5 and 6). In all of these specifications, the effect for women remains statistically significant while the one for men does not. Nevertheless, due to our low statistical power, the difference between the effects for men and women is not statistically significant at any conventional level. These results show a large causal effect of child disability on the probability that the mother works. For fathers, there is suggestive evidence of a causal effect as well, which in any case would be smaller than the effect we find for mothers.

Table 3. Average Partial Effect (APE) of having a CwD on the probability of working (fathers and mothers)

	(1)	(2)	(3)	(4)	(5)	(6)
<u>All</u>						
APE	0.116	0.110	0.116	0.104		
Standard error	0.060	0.054	0.058	0.052		
P-value	0.052	0.043	0.045	0.044		
<u>Women</u>						
APE		0.142		0.135	0.136	
Standard error		0.081		0.078	0.079	
P-value		0.080		0.084	0.085	
<u>Men</u>						
APE		0.065		0.062		0.057
Standard error		0.064		0.059		0.053
P-value		0.311		0.297		0.283
Controls	No	No	Yes	Yes	Yes	Yes
Sample	All	All	All	All	Women	Men
Heterogenous effects by gender	No	Yes	No	Yes	-	-
Observations	7050	7050	7050	7050	4114	2936

Controls include schooling, age and age squared, number of young children in household, household size, healthcare affiliation status and region fixed effects.

Source: Authors calculations using ELCA

Based on the results from the previous analysis, we look deeper into the effect of having a CwD on the probability that the mother works. In Table 4, we estimate heterogeneous effects according to marital status. Just as in Table 3, columns 1 and 2 include the estimated effects when we do not include control variables in the estimation. To make comparisons easier, column 3 in this table is identical to column 5 in Table 3 and shows the estimated effect for all women when analysed together. In column 4, we allow the effect to be different for single and married mothers but, as the results show,

the effect on the probability that they work is the same for the two groups. These results are confirmed when we estimate the effects separately for each of these groups in columns 5 and 6.

Table 4. Average Partial Effect (APE) of having a CwD on the probability of working (single and married mothers)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>All</u>							
APE	0.142	0.149	0.136	0.135			
Standard error	0.081	0.085	0.079	0.083			
P-value	0.080	0.080	0.085	0.103			
<u>Married</u>							
APE		0.150		0.138	0.139		0.146
Standard error		0.104		0.103	0.103		0.111
P-value		0.149		0.180	0.178		0.188
<u>Single</u>							
APE		0.147		0.128		0.125	
Standard error		0.129		0.116		0.112	
P-value		0.257		0.270		0.263	
Controls	No	No	Yes	Yes	Yes	Yes	Yes
Sample	All	All	All	All	Married	Single	Married
Heterogenous effects by marital status	No	Yes	No	Yes	-	-	-
Husband controls	No	No	No	No	No	No	Yes
Observations	4114	4114	4114	4114	3140	974	2824

Controls include schooling, age and age squared, number of young children in household, household size, healthcare affiliation status and region fixed effects.

Source: Authors calculations using ELCA

Effects of CwD on the probability of working full-time and part-time jobs

We now turn our attention to our multinomial analysis in which we allow for two different types of work: part-time and full-time. This specification aims at analysing the effects on the intensive margin and extensive margin together. In particular, we are interested in seeing if those parents who now work as a result of having a CwD are working part-time or full-time and also if there is a movement in the opposite direction, with parents who work decreasing their labour supply while still working.

Table 5 shows the results from the multinomial probit estimation for men and women together and is analogous to Table 3. Each column represents a different specification and shows the APE for the probability of not working, working part-time

and working full-time. Columns 1 and 2 include the estimates when we do not include control variables. We focus, however, on the estimates when we do include these controls, which can be found in columns 3-6. As it column 3 shows, the 11 pp increase in the probability that a parent works seems to be distributed between an increase in both part-time and full-time work. However, when we allow the effects to be different for women and men, we find totally different patterns for them (column 4). For mothers, the switch appears to be directed exclusively towards part-time work, with the change in the probability of not working (-13.3 pp) matching perfectly with the change in the probability of working part-time (13.5 pp). On the other hand, the results for fathers tell a very different story. Although none of the estimated effects are statistically significant, the results suggest that fathers switch from not working (-7.2 pp) towards working full-time (9.7 pp) and, if anything, there is also a small move from part-time to full-time work. We would like to stress that, statistically speaking, we do not have enough evidence to rule out that there is no change at all in the labour supply choices of fathers. However, we take this as strong suggestive evidence that the patterns for men and women differ substantially.

We now consider the different patterns for single and married mothers and find equally interesting and revealing differences. Column 3 in Table 6, which already includes control variables, shows the pattern for all mothers when analysed jointly and coincides with column 5 in Table 5. The specification in column 4 allows for heterogeneous effects and shows that married mothers increase part-time work by a larger magnitude than the estimated decrease in the probability of not working (17.3 vs -13.1 pp, respectively). This is explained by a decrease in the share of married mothers who work full-time (-4.2 pp), although this particular APE is not statistically significant. We interpret this evidence as a combination of two different effects: an increase in

labour supply at the extensive margin (more mothers work) and a small decrease in the labour supply at the intensive margin among those who already worked.

Table 5. Average Partial Effect (APE) of having a CwD on the labour supply (fathers and mothers)

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>All</u>					
APE for Pr (not working)	-0.116	-0.111	-0.117	-0.104		
Standard error	0.060	0.055	0.058	0.052		
P-value	0.052	0.043	0.043	0.044		
APE for Pr (part-time)	0.070	0.061	0.074	0.067		
Standard error	0.058	0.056	0.057	0.055		
P-value	0.224	0.271	0.197	0.218		
APE for Pr (full-time)	0.046	0.049	0.044	0.037		
Standard error	0.068	0.062	0.068	0.061		
P-value	0.500	0.427	0.521	0.549		
	<u>Women</u>					
APE for Pr (not working)		-0.143		-0.135	-0.134	
Standard error		0.082		0.078	0.079	
P-value		0.079		0.083	0.088	
APE for Pr(part-time)		0.122		0.129	0.129	
Standard error		0.076		0.077	0.076	
P-value		0.111		0.092	0.088	
APE for Pr(full-time)		0.022		0.006	0.005	
Standard error		0.082		0.082	0.082	
P-value		0.792		0.939	0.951	
	<u>Men</u>					
APE for Pr (not working)		-0.065		-0.060		-0.056
Standard error		0.064		0.059		0.053
P-value		0.313		0.304		0.287
APE for Pr (part-time)		-0.023		-0.019		-0.020
Standard error		0.080		0.076		0.074
P-value		0.770		0.800		0.790
APE for Pr (full-time)		0.088		0.079		0.076
Standard error		0.095		0.091		0.086
P-value		0.355		0.384		0.379
Controls	No	No	Yes	Yes	Yes	Yes
Sample	All	All	All	All	Women	Men
Heterogenous effects by gender	No	Yes	No	Yes	-	-
Observations	7050	7050	7050	7050	4114	2936

Controls include schooling, age and age squared, number of young children in household, household size, healthcare affiliation status and region fixed effects.

Source: Authors calculations using ELCA.

Recall the results in Table 4 had shown a very similar change in the probability that a mother works for single and married women. The results in column 4 of Table 6, however, show different patterns once the intensive margin of labour supply is considered. As opposed to married mothers, the increase in the share of single mothers

who work (11.8 pp) appears to be equally distributed among working part-time (5.6 pp) and full-time (6.2 pp). This suggests that, for single women, the effect goes mainly in the direction of increasing labour supply, with different degrees by which labour supply increases at the intensive margin.

Table 6. Average Partial Effect (APE) of having a CwD on the labour supply (single and married mothers)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	<u>All</u>						
APE for Pr(not working)	-0.143	-0.150	-0.134	-0.133			
Standard error	0.082	0.085	0.079	0.083			
P-value	0.079	0.079	0.088	0.110			
APE for Pr(part-time)	0.122	0.132	0.129	0.139			
Standard error	0.076	0.079	0.076	0.077			
P-value	0.111	0.094	0.088	0.071			
APE for Pr(full-time)	0.022	0.018	0.005	-0.006			
Standard error	0.082	0.083	0.082	0.085			
P-value	0.792	0.830	0.951	0.945			
	<u>Married</u>						
APE for Pr(not working)		-0.150		-0.134	-0.135		-0.145
Standard error		0.104		0.103	0.103		0.111
P-value		0.148		0.193	0.189		0.191
APE for Pr(part-time)		0.152		0.162	0.160		0.217
Standard error		0.095		0.093	0.092		0.098
P-value		0.110		0.079	0.084		0.027
APE for Pr(full-time)		-0.001		-0.028	-0.024		-0.072
Standard error		0.099		0.105	0.103		0.108
P-value		0.990		0.788	0.815		0.504
	<u>Single</u>						
APE for Pr(not working)		-0.147		-0.129		-0.130	
Standard error		0.130		0.117		0.111	
P-value		0.257		0.267		0.244	
APE for Pr(part-time)		0.068		0.064		0.075	
Standard error		0.129		0.130		0.124	
P-value		0.598		0.625		0.546	
APE for Pr(full-time)		0.079		0.066		0.055	
Standard error		0.140		0.129		0.123	
P-value		0.574		0.610		0.656	
Controls	No	No	Yes	Yes	Yes	Yes	Yes
Sample	All	All	All	All	Married	Single	Married
Heterogenous effects by marital status	No	Yes	No	Yes	-	-	-
Husband controls	No	No	No	No	No	No	Yes
Observations	4114	4114	4114	4114	3140	974	2824

Controls include schooling, age and age squared, number of young children in household, household size, healthcare affiliation status and region fixed effects.

Source: Authors calculations using ELCA

Aiming to check the robustness of the results, we also used as dependent variable the *labour force participation*, which also categorizes unemployed individuals

(actively searching for work) as participating in the labour market. Following the same logic, we estimated models for both parents, only for fathers and for single and married mothers. We found similar results in all the estimations (results available upon request)⁷.

Discussion

In the short run, households with CwD face two types of costs related to disability (Stabile and Allin 2012). On the one hand, disability usually implies a series of additional direct health care costs and other expenses (e.g. extra equipment, rehabilitation services, household adaptations, etc.), in order to cover these costs, households may choose to work more as a whole. When there is more than one potential earner, however, it is unclear if these costs would lead both parents to work more or if only one of them would do so. On the other hand, CwD demand additional care and attention, which increases the opportunity cost of working faced by parents or other household members assuming the role of caregivers (*indirect costs*). All else equal, this higher opportunity cost should induce households to work less overall and spend more time with CwD. Nevertheless, for households with two earners, these indirect costs may lead to further specialization; one member might work more while the other one reduces his or her labour supply, as was found by Brandon (2011), and Burton, Chen et al. (2014).

Thus, whether having a CwD increases or decreases a particular parent's labour supply will depend on the relative importance of direct and indirect costs. This relative importance is determined both by characteristics of the household itself and by external conditions. Inside the household, as we have pointed out, there are potential differences

⁷ In what follows, we will not distinguish between working and participating in the labour market.

between one-parent and two-parent households in terms of the magnitude and the direction of the effect that comes from each type of cost. Outside the household, at the institutional level, the availability of social programmes that may cover some or all the extra costs of disability and the existence of formal care services can also play a key role. Thus, the “*direct cost effect*” would manifest itself more strongly when there is a lack of social programmes to cover for the additional expenses that come with a disability. The lack of child care services that may attend CwD, on the other hand, increases the opportunity cost of working. All of these mechanisms working on potentially different directions make the sign and magnitude of the net effect of CwD on parents’ labour supply unknown *a priori*. It is then an open question to be assessed empirically.

Our results suggest that direct costs are the main drivers of how urban Colombian households adjust their labour supply in response to having a CwD. We find evidence that both men and women increase their labour supply because of having a CwD, with a larger increase in the case of mothers of CwD compared to fathers of CwD (at least 10 pp). These results contrast with the ones from previous studies conducted in HICs, where mothers are less likely to work because of having a CwD. We interpret these important differences, as strong evidence of the importance of direct costs in Colombian. The fact that female labour force participation is lower than male’s potentially explains, to some extent, why the increase for mothers is larger than the one for fathers⁸. In essence, female labour supply, at least in the extensive margin, is more elastic than male labour supply. Crucially, the large effect we find for mothers does not vary with marital status. Thus, at the extensive margin, the presence of a second

⁸ In 2016, the labour force participation rates among men and women in Colombia were around 64%, with 74% for men and 54% for women (DANE, 2016).

potential earner does not seem to counteract the large effect that comes from the direct costs of disability.

We also look at how these changes in labour supply are distributed among part-time and full-time work, trying to capture potentially differential effects once we account for adjustments at the intensive margin as well. We find evidence of the indirect cost effect pushing labour supply in the opposite direction in the case of married mothers. Specifically, we find that the increase in labour supply for single women is divided among part-time and full-time work. On the other hand, the increase in labour supply for married mother is concentrated exclusively in part-time jobs. If anything, there is some evidence of a small decrease in the probability of working full-time for this group of women, although the estimates of these changes are not statistically significant. As discussed earlier, two parent households have a higher ability to share the economic burden and the need for care of having CwD. Therefore, the indirect cost effect moderates how much married mothers increase their labour supply at the intensive margin, which we do not observe for single mothers.

We would like to emphasize that, as opposed to what previous research suggest happens in HICs, the effect of child disability on the labour participation of mothers is positive. Our results show an increase in the probability of working for both single and married women, with an increase in the probability of working part-time for married women specifically. These results are similar to the ones found by Gupta, Das et al. (2013) using data from India. Our findings suggest that, in LMICs, the lack of institutions or transferances aiming to support families and to cover for the extra costs of disabilities increases the magnitude of the direct cost effect on the labour supply of mothers. In the case of married women, the combination of this effect and the ability to

share economic and time demands with their partner creates a mixed effect on the labour supply. Still, direct costs are more important than indirect costs.

Our results point to detrimental consequences of the way parents adjust their labour supply to having a CwD. First, both parents, but especially mothers, spend more time working *and* providing care to their children. Second, the increase of labour participation of both parents implies that CwD spend less time with both of their parents, which might lead to further limitations in their development exacerbating the negative consequences of their disability. As opposed to what has been found in HICs, where there seems to be a substitution of time in the labour market for time at home caring for the CwD, the large effect of direct costs pushes parents, and especially mothers, to work more at the same time their children demand more time and attention.

These adverse effects reinforce the need for social programmes that may assist families by covering some of the extra costs that come with a disability, as well as some that provide formal care services for CwD. Although there are differences between married and single women, it is evident that mothers of CwD face important constraints, which hinder their ability to adjust and redistribute their time. Single mothers appear to be particularly affected by this lack of support, as they often do not have the possibility of choosing between working and caring and, in most cases, they need to distribute their time between these two activities.

Limitations

The results presented in this article provide important empirical evidence of the effect that a child's disability has on the labour supply of parents in urban Colombia. Although the evidence we have presented here is an important contribution to this field, this study has some limitations. First, we analysed what we called *acquired child disability* and therefore we did not include severe congenital child disabilities, which might have a

larger effect on the labour supply of parents of CwD. In addition, not all impairments have the same effect. Indeed, severe physical or mental impairments tend to have higher direct and indirect costs compared to hearing or visual impairments. Given our data constraints, we were not able to consider these potential differences in the analysis.

A second limitation is the small number of cases of CwD in our sample, which limited the statistical power of the analysis. This is a common problem in studies about the effects that a disability brings on labour supply or other choices (Salkever 1982, Powers 2003, Gould 2004, Loprest and Davidoff 2004). Most of the estimated effects we find are large enough that we can reject the hypothesis that there are no effects, particularly in the case of married women. When we compare groups, such as single and married mothers, we cannot claim, statistically speaking, that their effects differ. However, the magnitude of these effects and the fact that these are consistent across models give us confidence in our conclusion that there are in fact differences in how these groups adjust their labour supply in response to having a CwD. Furthermore, the different responses between men and women and between single and married mothers are consistent with how the two effects we have discussed – direct and indirect costs – should manifest differentially among these groups.

Third, due to the sample design of ELCA, we limited our analysis to urban areas only. In Colombia, rural households are poorer than urban households, and the availability of health facilities is lower. We would expect that, qualitatively speaking, having a CwD in rural areas would have a similar effect on the labour supply of parents as the one we find for urban households. Nevertheless, it is important to formally study and quantify the effects for rural households and identify potential differences with what we find in this article.

Finally, a fourth limitation is the lack of information related to parents' caregiver status in 2010. Questions aiming to identify whom the main caregiver of children with and without a disability were included only in 2013, which limited our ability to analyse the possibly different effect of being a caregiver of CwD on parents' labour supply. Furthermore, being the caregiver of a child -and reporting oneself as such- is a choice that may reflect or be related to many other aspects of the mother or the household's characteristics, one that is also potentially made together with labour supply decisions. Although we did not present the results in here, we estimated models using the caregiver status in 2013 to determine the heterogeneous effects. The main results corroborate the findings we have presented in this article. Nevertheless, given the small sample (52 observations of mothers who reported being the main caregiver of CwD) and the limitations in the definition of caregiver status, we chose not to include these in our analysis. The results of these estimations are available upon request.

Conclusions

This is the first study analysing the causal effect of child disability on parents' labour participation in urban Colombia. Using data from two waves of the Colombian Longitudinal Survey (ELCA 2010-2013), we implemented a difference in difference approach to identify the causal effects of having CwD on the labour supply of parents. Our findings suggest that contrary to what is observed in HICs, the direct costs of child disability in Colombia are stronger than the indirect costs. Indeed, having a CwD increases the probability that both single and married mothers work. Married mothers are more likely to work part-time jobs, and single mothers tend to work in both part-time and full-time jobs. These results suggest that there is a need to create social protection programmes aiming to cover for the extra costs of disability and reduce the negative effects that child disability has on the labour supply of parents. In addition, it is

also necessary to establish policies to provide economic and social support to households and parents of CwD in Colombia.

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