Effect of cash transfer program on entrepreneurship and living conditions in Loja, Ecuador

Johana Ochoa, Diana Morocho, Julio Granda and Lenin Peláez[a]

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Abstract. This study analyzes the effect of the Crédito de Desarrollo Humano (CDH) program on entrepreneurship and living conditions among the beneficiaries of the Bono de Desarrollo Humano (BDH), which is aimed at reducing the poverty rate and promoting the development of human capital. A Propensity Score Matching approach was used to estimate the causal effect of this program. The results show that CDH recipients are more likely to be self-employed through entrepreneurship and have better living conditions. However, a negative effect on housing quality was observed. These results can provide public agencies with tools to adjust their selection procedures.

Key words: Public policy; entrepreneurship; quality of life; public expenditure.

Efecto del programa de transferencia de efectivo en el emprendimiento y las condiciones de vida en Loja, Ecuador

Resumen. Este estudio analiza el efecto del programa Crédito de Desarrollo Humano (CDH) sobre el emprendimiento y las condiciones de vida de los beneficiarios del Bono de Desarrollo Humano (BDH), cuyo objetivo es reducir la tasa de pobreza y promover el desarrollo del capital humano. Se utilizó un enfoque de *Propensity Score Matching* para estimar el efecto causal de este programa. Los resultados muestran que los beneficiarios del BDH tienen más probabilidades de trabajar por cuenta propia a través del emprendimiento y gozan de mejores condiciones de vida. Sin embargo, se observó un efecto negativo en la calidad de la vivienda. Estos resultados pueden proporcionar a los organismos públicos herramientas para ajustar sus procedimientos de selección.

Palabras clave: políticas públicas; emprendimiento; calidad de vida; gasto público.

Clasificación JEL: I38;| L26; I31; H53.

[a] Universidad Nacional de Loja, Ecuador. Correos electrónicos: johanna.ochoa@unl.edu.ec, diana.morocho@unl.edu.ec; julio.granda@unl.edu.ec and lennin.pelaez@unl.edu.ec, respectively.

1. Introduction

Many households in developing countries suffer from a lack of opportunities, inequalities, and poverty, which is a social problem related to the lack of goods or services for their basic needs. Inequality constricts growth by obstructing the supply of labor and ideas into the economy and limiting opportunities for those not already at the top, thus slowing productivity growth. In addition, inequality can be affected by subverting the institutions that manage the market, making the political system ineffective and markets dysfunctional. Finally, demand is distorted through its effects on consumption and investment, which drag down and destabilize the short- and long-term growth in economic output.

Most governments and international institutions have developed different social protection policies to reduce vulnerability and poverty by helping people respond to shocks and manage risks (Fiszbein and Schady, 2009). Social protection instruments range from social assistance (such as pensions, free healthcare, conditional cash transfers (CCT), and school feeding) to social insurance (such as contributory pensions, unemployment insurance, and social health insurance), livelihood programs (*e.g.*, micro-credit, free fertilizer and seeds), and social services (orphanages, child protection).

We focus on CCT, which provides economic incentives to impoverished individuals to promote specific behaviors (Handa and Davis, 2006; Baird *et al*., 2014). CCT is one of the main social protection tools because poor people can choose how to spend money based on their needs; these programs are relatively cost-effective to implement and administer, especially because CCT can boost local economies through consumption and entrepreneurship. This tool has been widely implemented to alleviate poverty, enhance educational achievement, and incentivize entrepreneurship by investing in human capital. Similar programs implemented in other countries (such as PROGRESA in Mexico and *Avancemos* in Costa Rica) have proven effective in reducing poverty by improving households' financial situation without reducing their labor force participation (Skoufias and Di Maro, 2006; Meza-Cordero and Gulemetova, 2023). In the educational field, these programs have increased school attendance and the number of students completing their studies. For example, *Avancemos* increased school attendance by 27% and added an average of 0.72 years of schooling (Meza-Cordero and Gulemetova, 2023), while PROGRESA also reported long-term positive effects on education (Behrman *et al*., 2011).

Regarding entrepreneurship, while not the primary objective of CCTs, increasing human capital can lead to improved business skills (Jones, 2016). Previous studies have explored the relationship between CCTs and agricultural production. Specifically, Todd *et al.* (2010) found that conditional cash transfers in Mexico can positively impact agricultural production by enabling households to allocate more resources to productive inputs and activities. Similarly, Banerjee *et al*. (2015) concluded that transfers of productive assets, training, and financial support resulted in sustainable improvements in participants' well-being.

The effect of CCT has been analyzed in depth in different contexts and regions. Most agree that these policies have a positive impact on poverty rates and the level of opportunities (Parker and Skoufias, 2000; Maluccio and Flores, 2005). However, less attention has been paid to the transmission mechanisms of this positive effect, and it is necessary to consider the short- and long-term effects. First, previous literature suggests that monetary transfers have a positive short-term effect on reducing income or consumption poverty (Fiszbein and Schady, 2009), but a non-significant effect has been found when these policies are evaluated, primarily by lowering child labor (Araujo *et al*., 2017; Banerjee *et al*., 2017). One of the main transmission mechanisms is entrepreneurship (Sutter *et al*., 2019), which has been considered a driver of economic development (Desai, 2011) by promoting economic activity and self-support (De Mel *et al*., 2008; Bruton *et al*., 2013). Therefore, a direct positive effect of CCT is complemented by an indirect impact through entrepreneurship, which can generate stable income and wealth for beneficiaries.

The novelty of our paper is twofold. First, we examined whether CCT positively affects beneficiaries' living conditions by employing non-parametric methods to avoid bias in the estimates. Second, although several papers have studied the impact of these public policies on consumption or child labor, limited attention has been given to their effect on entrepreneurship. Therefore, this paper's contribution is to evaluate the effect of the Ecuadorian cash transfer program on the probability of entrepreneurship.

For our analysis, we used data from the National University of Loja, which collected data on Bono de Desarrollo Humano (BDH) and Crédito de Desarrollo Humano (CDH) beneficiaries among the total population supported in the city of Loja. The survey includes detailed information about social and economic characteristics, entrepreneurship, and living conditions for 2018-2021. With this information, we applied the Propensity Score Matching (PSM) approach to estimate the causal effect of being a beneficiary of CDH by

comparing the CDH group with a matched BDH sample with the same characteristics.

We report two main results. First, regarding entrepreneurship, we find that individuals who receive support from the CDH show higher probabilities of being entrepreneurs. Thus, participation in this program positively influences local economic activity. Second, we find a positive effect of the program on perceived living conditions, namely, CDH participants consider they have a higher capacity to satisfy their basic needs. However, when considering the housing quality index, we find that non-beneficiaries have better housing conditions than CDH beneficiaries. In addition, we show that the participation profile is characterized by the individual's age and the number of dependents in the household.

The outline of the paper is as follows. After the introduction, section 2 provides the theoretical framework. Section 3, presents the main variables used for our analysis and the methodology. In section 4, we summarize the main results. Finally, in section 5, we present our conclusions and final remarks.

2. BACKGROUND AND LITERATURE

Here, we analyze the theoretical foundations of public policies to reduce poverty and inequality and promote entrepreneurship. Implementing conditional cash transfer programs requires an analysis of the economic and social contexts.

On the one hand, poverty is considered the most influential economic and social problem faced by most nations (Tasos *et al*., 2020). For example, in Latin America (LA), there are 220 million poor people (43% of the population), of whom 98 million are homeless. Ecuador has experimented a reduction in these rates (Vásquez-Corral, 2022), showing levels below LA with 28% of the total population living in poverty, of which 7.6% is in extreme poverty; however, the levels are still very high; thus, it is necessary to evaluate the effectiveness of the policies implemented to reduce these indicators.

According to Brady (2019), the causes of poverty are related to behavioral, structural, and political characteristics. The behavioral approach focuses on economic and cultural stimuli, considering that poverty is the result of people's inability to decide and cope with the increasing risks of an uncertain and globalized world, such as young mothers or voluntary unemployment (Bertrand *et al*., 2004). Regarding structural characteristics, it is considered that the primary determinant of the poverty condition is the context in which

individuals live, specifically, the demography and labor market. In this case, the individual's capacities are relegated, and the entire effect comes from the environment. Finally, the previous literature concludes that poverty results from unequal income distribution.

On the other hand, unequal income distribution in Latin America and the Caribbean (LAC) is associated with disparities in the distribution of human and physical assets, as well as unequal access to markets and services (Gandelman *et al*., 2011), which also implies problems in covering basic needs. For instance, in the Mexican case, several studies point out inequality in terms of living conditions, particularly due to the reduced accessibility to social services, such as healthcare, housing, and education (Oehmichen, 2001; Saporito, 2011).

This topic has received attention from various international organizations and governments by placing poverty alleviation at the top of the development agenda. Many poor households are liquidity-constrained, affecting them in two ways. First, lack of income can directly affect households' access to goods and services. Second, an indirect transmission mechanism can make it difficult for borrowers to invest in entrepreneurship. Policymakers have implemented several public policies such as Conditional Cash Transfers (CCT). In LA, CCT started in Brazil in the 1990s, continued in Mexico, Honduras, and Nicaragua, and have eventually been applied throughout the region. CCT can be oriented to reduce poverty, improving nutrition, investing in human capital, and empowerment. In this sense, numerous studies have analyzed the impact of these programs on school enrollment and living conditions (Behrman *et al*., 2011; Ponce and Bedi, 2010; Schultz, 2004), but entrepreneurship has received less attention (Nieto, 2019).

Entrepreneurship involves the discovery, evaluation, and exploitation of opportunities (Shane, 2003), which can be associated with two situations. First, entrepreneurship is oriented toward capitalizing on profit by taking advantage of an unexploited opportunity (Acs, 2006; Desai, 2011). Second, entrepreneurship activities can also be determined by necessity, namely, individuals engage in and promote economic activities to avoid unemployment (Temkin, 2009). The latter situation characterizes public policy beneficiaries, as they often lack access to stable employment—their primary and often only source of income. The literature also distinguishes between formal and informal entrepreneurship, which is characterized by the registration status of appropriate government agencies. The latter is usually related to an unskilled labor force (Temkin, 2009) and low-quality products (La Porta and Shleifer, 2014).

First, these economic activities can favor access to higher income levels, which have a direct positive effect on the level of poverty. Second, entrepreneurship can empower marginalized individuals and create opportunities for social change. Additionally, business growth can create employment and increase productivity, indirectly reducing poverty. Therefore, entrepreneurship can address poverty and social exclusion by stimulating economic growth and job creation (Kimmitt *et al*., 2020; Sutter *et al*., 2019). Thus, policies that generate employment and wage income are crucial for reducing poverty, such as microfinancing, which has funded most entrepreneurial activities.

In the Ecuadorian context, the government has developed different strategies and public policies to reduce poverty rates and inequality. In particular, BDH is a CCT program oriented to households with high poverty levels. The BDH program was created in 2003 by merging two existing programs: Bono Solidario and Beca Escolar. This program selects beneficiaries using an individual strategy participation named system of selection of beneficiaries of social programs (SELBEN), which identify those households with structural deficiencies (Ponce and Bedi, 2010). Since its implementation, the value of the voucher has experienced progressive increases: from USD$ 15 in its initial years, to USD$ 30 in 2007, USD$ 35 in 2009, and finally USD$ 50 in 2013. This amount can reach USD$ 55 per month, adjusted according to the number of children and the household's socioeconomic status.

This program has two main objectives: reducing extreme poverty through monthly monetary transfers to beneficiaries and improving human capital formation among low-income families.

In this sense, CCT can affect income poverty and inequality as well as social outcomes such as attainment in education and health, and it can also affect economic performance. BDH can help households alleviate credit constraints by fostering savings, investment, and access to credit. They allow households to smooth consumption, and secure and accumulate assets by promoting access to economic opportunities. Previous studies have found a positive effect of this program, especially regarding to school enrolment (Vos *et al*., 2001; Schady and Araujo, 2006; Oosterbeek *et al*., 2008), children's nutritional status (León and Younger, 2007) or and cognitive achievement (Ponce and Bedi, 2010). These results allow us to conclude that the program has a positive effect on social indicators, but there is a lack of information on entrepreneurship.

Given the importance of entrepreneurship in poverty reduction, Ecuador implemented a variation in the BDH called CDH, which allows beneficiaries to receive accumulated monthly monetary transfers. This may give beneficiaries

initial money to engage in business activities but comes with some conditions and costs. Specifically, CDH recipients must participate in training programs before receiving the transfer and must be available for agency checks. In addition, the transfer costs 5%, which is deducted from the transfer amount. An essential aspect of this program is that it goes beyond the traditional objective of smoothing consumption and accumulating human capital by generating synergies with productive activities. Furthermore, entrepreneurs must be available for agency checks starting in the first month. These randomly conducted visits aim to verify that activities are in progress and to identify potential implementation issues. If difficulties are identified, the Ministry of Agriculture and Livestock may be called upon for technical visits (Martínez *et al*., 2017).

Based on the nature of Ecuadorian social programs and previous literature, we consider analyzing the effect of CDH on entrepreneurial activities and beneficiaries' living conditions.

3. METHODOLOGY AND DATA

3.1. Methodology

One of the main problems in estimating the effect of public policy is the presence of bias in the selection of participants, which is usually conditioned by observable and unobservable variables and determined by public agencies. Therefore, relying on traditional methods such as ordinary least squares (OLS) can produce biased results. To address this issue, the literature on public policy evaluation suggests the use of other methodologies, such as regression discontinuity design, difference-in-differences, or instrumental variables (IV) approaches, which solve the selection problem based on unobservable variables (King and Nielsen, 2019; Hünermund and Czarnitzki, 2019). However, these methods require a specific data structure and the presence of certain variables to instrument the endogenous variable. Specifically, Regression Discontinuity Design (RDD) could be feasible if there was an explicit cutoff in the selection score for CDH eligibility, and a synthetic difference-in-differences approach (combining synthetic control methods with difference-in-differences) could be used if panel data were available. Such approaches have more stringent assumptions but offer greater credibility in estimating causal effects. Unfortunately, our data lacked a sharp eligibility threshold and did not in-

clude extensive pre-program observations, so implementing RDD or synthetic control was impossible in this study.

Given the nature of our data and following previous studies (Serio and Herrera, 2021; Ikira and Ezzrari, 2021; Bouincha *et al*., 2024), we employed Propensity Score Matching as our identification strategy. Under certain conditions, this procedure allows us to compute the effect of the public program or treatment in terms of the difference in outcomes between subsidized (treated) individuals and a control group of non-subsidized individuals by pairing treatment observations with control observations that have similar probabilities of receiving the treatment (the "propensity score") based on a set of observed characteristics. This method attempts to simulate a randomized experiment and remove bias due to observable covariate differences between groups. The difference in the average outcomes between matched CDH recipients and matched BDH-only individuals can be interpreted as the causal effect of the treatment on the treated.

Consider that each individual can have two states, we represent by $T = 1$ if the individual has been subsidized, and by $T = 0$ otherwise. The treatment effect on individual i can be written as:

$$\tau_i = Y_{1i} - Y_{0i} \tag{1}$$

Y_{1i} denotes the treatment outcome if the individual obtained the subsidy and Y_{0i} if the individual was not subsidized. To evaluate the impact of public support on subsidized individuals, most studies are interested in the estimation of the Average Treatment Effect on the Treated (*ATET*):

$$ATET = E\left[Y_1 - Y_0 \mid T = 1\right] = E\left[Y_1 \mid T = 1\right] - E\left[Y_0 \mid T = 1\right] \tag{2}$$

The fundamental evaluation problem arises because we can observe only one of the potential treatment outcomes for each individual i (Holland, 1986). If subsidies were assigned randomly, this issue could be addressed by comparing the outcomes of treated and untreated individuals. However, access to social benefits is not randomly assigned, which could lead to selection bias (Heckman, 1979).

This bias can emerge from two different sources. First, public support is conditioned to show the specific social and economic characteristics as eligibility. Second, another source of bias may arise because BDH beneficiaries can decide whether to claim a CDH.

Therefore, we need to estimate the counterfactual, that is, to construct a control sample of individuals with characteristics similar to those of the treated group. Given the difficulty of identifying individuals with the same characteristics, one alternative is using the PSM. Through this non-parametric approach, we condense the information of all characteristics (X) into only one, the estimated likelihood of program participation conditioned on X (Rosenbaum and Rubin, 1983).

This methodology is based on the Conditional Independence Assumption (CIA), which indicates that, given a set of observable covariates (X) that are not affected by the treatment, potential outcomes are independent of the treatment assignment (Rubin, 1977):

$$(Y_{1i}, Y_{0i}) \perp T \mid X \tag{3}$$

Under this assumption, we can compute the *ATET* as the mean of the estimated individual treatment effects:

$$\hat{ATET} = \frac{1}{N} \sum_{i=1}^{N} \hat{\tau}_i \tag{4}$$

Where is the difference between a treated unit and its non-treated counterfactual? This is an effect of each individual receiving public support.

As mentioned, PSM only controls for observable differences, which is an important limitation to consider when determining whether the effect is causal. Recent critiques by King and Nielsen (2019) and Guo *et al.* (2020) have raised concerns that PSM does not always eliminate bias and can even worsen covariate imbalances in finite samples. Achieving balance on the observed covariates in the matched sample does not guarantee unbiased estimation if important confounders are omitted or if the propensity score model is misspecified. The estimated treatment effect might reflect a spurious correlation rather than a causal impact. In addition, the presence of unobservable differences between CDH beneficiaries and non-beneficiaries could still bias results. We are mindful of these critiques and thus interpret the PSM results with appropriate caution. We discuss this limitation in the conclusions.

We perform several robustness checks on the PSM results to strengthen our analysis by trying different specifications and ensuring that the matching procedure is thorough. We justify the set of covariates included in the propensity score model based on economic theory and prior empirical findings to bolster the plausibility of CIA.

Data and variables

To analyze the effect of CDH, this study uses data coming from a survey carried out by the Universidad Nacional de Loja,[1] which covers the period 2018-2021 and is focused on the beneficiaries of BDH residents in Loja, Ecuador. We consider this region in the analysis because of its high participation in social protection programs and its representativeness in the Ecuadorian context. According to data from the National Institute of Statistics and Census, Loja had an income poverty rate of 23.6% in 2021, one of the highest among intermediate-sized cities in the country. Furthermore, according to figures from the Ministry of Economic and Social Inclusion (MIES), a considerable percentage of urban households in Loja have benefited from BDH and CDH, which allows for a rigorous evaluation of the impact of these policies. The city also has diverse socioeconomic dynamics, an active academic community, and a cultural tradition that favors the collection and analysis of reliable information. These characteristics make Loja a relevant case study for understanding the effects of public policies on living conditions. The questionnaire contained information on 614 households about social and economic household characteristics (such as educational level and housing quality). Our analyses included all individuals in the sample, although we excluded those who did not report information on the main variables considered in the study. This leaves us with 510 observations.

From the total number of households, 137 (27%) indicated participation in a CDH program from 2018 to 2021. We used this information to construct our treatment indicator, a binary variable that takes the value of one if the individual participated in the above mentioned public program. As expected, the statistics in table 1 show that the sample averages of supported households are different from those of non-supported households, especially regarding gender and the number of dependents. Regarding the latter, the supported group had a lower percentage of having one or no dependents but a higher rate when considering the category of more than five dependents. The correlation analysis in table A.1 of the Appendix indicates no serious multicollinearity problem among independent variables since correlation coefficients are small, in absolute value.

As we have indicated, we aim to evaluate the impact of program participation on both individuals' entrepreneurship and quality of life. Therefore, we employed different outcome variables to test the program's effectiveness.

[1] The information was collected by members of the Project 43-DI-FJSA-2021.

First, regarding entrepreneurship, we consider a binary variable that represents individuals' decisions to engage in entrepreneurship activities, which takes the value 1 for individuals who have self-employment activities and zero otherwise. Second, we consider the perception of quality of life as an indicator of an individual's ability to satisfy their basic needs. This indicator is based on a Likert scale ranging from 1 to 4, where 1 indicates an unsatisfactory condition, and 4 indicates an entirely satisfactory condition.

Table 1. Descriptive statistics

	Beneficiaries CDH		*Non-beneficiaries CDH*		*Mean difference*	*p-value*
	Mean	*S.D.*	*Mean*	*S.D.*		
Probability of entrepreneurship	0.942	0.234	0.369	0.483	0.573	0.000
Perceived living conditions	2.619	0.928	2.556	0.911	0.063	0.493
Housing quality index	1.993	0.838	3.701	1.317	-1.708	0.000
Age	39.482	9.711	38.911	12.211	0.571	0.620
Male	0.058	0.234	0.092	0.289	-0.034	0.213
Secondary and tertiary educational level dummy	0.324	0.470	0.329	0.470	-0.005	0.913
Marital status						
Single	0.259	0.440	0.356	0.479	-0.097	0.038
Married	0.424	0.496	0.402	0.491	0.023	0.641
Other marital status	0.317	0.467	0.243	0.429	0.074	0.091
Dependents						
0-1	0.079	0.271	0.197	0.398	-0.118	0.001
2-3	0.468	0.501	0.456	0.499	0.012	0.808
4-5	0.281	0.451	0.278	0.448	0.003	0.947
More than 5	0.173	0.379	0.070	0.256	0.103	0.000
Residence in the central area	0.496	0.502	0.445	0.498	0.052	0.298
Observations	139		371			

Notes: S.D.= Standard Deviation. The mean difference test is a t-test for continuous variables, and a two-sample z-test of proportions for dummy variables.

Source: our elaboration.

As the individual's perception may bias this indicator, we consider another dependent variable, which refers to housing quality. We follow Peragine *et al*. (2021) to create this variable by summing binary values, where the value of 1 indicates that they have a basic service for five housing services (such as public supply of water, electricity, sewerage system, refuse collection, and Internet). This variable has a maximum score of 5 and a Cronbach's alpha of 0.801,[2] indicating good internal consistency (Gliem and Gliem, 2003).

Following the related literature and considering our theoretical framework, we select various control variables that could influence an individual's participation status. First, we consider the age of the head of household (measured as the number of years of the individual), since younger people are expected to be more risk-averse; thus, they would show a higher probability of being a CDH beneficiary. In addition, we consider that older people are less motivated to engage in this kind of activity and would prefer the security of monthly payments, and adults of intermediate ages may show a different pattern of participation depending on their motivation and needs. Therefore, we include the individual's number of years and its square to allow for non-linearities in the relationship.

In addition, we include gender in the analysis since more public policies are usually oriented to specific groups of individuals. However, this effect can be ambiguous. First, we expect that men tend to participate more frequently because, commonly, they are the heads of the household. Second, women tend to be less likely to be in stable employment; therefore, they seek new income opportunities. Microcredit has generally been promoted as a tool for women's empowerment; however, its effectiveness is debatable. Garikipati (2013) suggests that the impact of microcredit on women's empowerment depends on the indicators used to measure it, finding that, although it can improve certain economic aspects, it does not necessarily lead to comprehensive empowerment. While Li *et al.* (2011) and Aguilar-Pinto *et al.* (2017) found that microcredit significantly impacted women's empowerment. In this regard, we include a binary variable that takes the value of one when the head of the household is a man and zero otherwise.

In this sense, we include educational level and marital status as determinants of CDH participation. The first is considered an essential predictor, because the higher the academic level, the greater the probability of accessing a formal job. The latter effect would be related to the need to obtain a higher income level, especially when the presence of dependents complements marital status.

[2] For a detailed description, see table A.2 in Appendix.

4. Results

Determinants of CDH participation

The main results of the PSM approach are analyzed in two steps. First, the results in table 2 show the effect of social and economic characteristics on the probability of accessing CDH. We report the estimated coefficients (columns 1 and 3) and marginal effects (columns 2 and 4) for a better interpretation. The results in columns (1) and (2) show the determinants of participation in the CDH program before the matching procedure to estimate the propensity score.

Table 2. Probability of being a CDH beneficiary. Probit model

Variables	*Before matching*		*After matching*	
	(1) *Coef.*	*(2)* dy/dx	*(3)* *Coef.*	*(4)* dy/dx
Age	0.1278***	0.0432***	0.0014	0.0006
	(0.0447)	(0.0150)	(0.0589)	(0.0236)
Age2	-0.0015***	-0.0005***	0.0000	0.0000
	(0.0005)	(0.0002)	(0.0007)	(0.0003)
Gender	-0.1567	-0.0448	-0.0379	-0.0150
	(0.2357)	(0.0784)	(0.3228)	(0.1275)
Educational level	0.0422	0.0142	0.0652	0.0262
	(0.1390)	(0.0453)	(0.1730)	(0.0694)
Marital status				
Single	-0.1595	-0.0496	-0.0084	-0.0035
	(0.1659)	(0.0536)	(0.2215)	(0.0889)
Married	-0.1074	-0.0336	-0.0196	-0.0080
	(0.1507)	(0.0478)	(0.1919)	(0.0768)
Dependents				
0-1	-0.3527*	-0.1214*	-0.2156	-0.0860
	(0.2001)	(0.0682)	(0.2969)	(0.1183)

Continue

Table 2. Probability of being a CDH beneficiary. Probit model (*continuation*)

Variables	*Before matching*		*After matching*	
	(1) *Coef.*	*(2)* dy/dx	*(3)* *Coef.*	*(4)* dy/dx
Dependents				
4-5	-0.0772	-0.0248	-0.2003	-0.0800
	(0.1459)	(0.0468)	(0.1910)	(0.0764)
More than 5	0.4201**	0.1309**	-0.2243	-0.0897
	(0.2016)	(0.0616)	(0.2493)	(0.0999)
Place of residence	0.0974	0.0343	0.0260	0.0104
	(0.1224)	(0.0392)	(0.1600)	(0.0640)
Observations	510		262	
Log. Likelihood	-282.716		-180.542	
χ^2 global (p-value)	0.002		0.995	
Under ROC curve area	0.652		0.553	

Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.1. Robust standard errors in parentheses. Marginal effects (dy/dx) are computed at sample means. The marginal effect corresponds to a change from 0 to 1 for dummy variables. All models include a constant. Excluded variables: Other marital status; have 2-3 dependents.

Source: our elaboration.

The results show two main participation status determinants, age and the number of dependents. The first is an essential predictor with a non-linear relationship with an inverted "U" shape (see figure A.1. in the Appendix), namely, there is a saturation point beyond which a further increase in several years does not yield an increase in the CDH's participation probability. While the latter reflects the importance of necessities, the higher the number of dependents, the higher the probability of participating in the CDH program. Notably, there is no significant effect of gender or educational level. However, this may be related to the similarities in the samples regarding these indicators, since the two groups are beneficiaries of the BDH program, aimed at people who do not exceed a certain income threshold.

Impact of CDH on entrepreneurial and living conditions

To estimate the effect of CDH using the PSM approach, it is necessary to match each treated unit with a non-treated one that shows similar characteristics. In this study, we consider a matching algorithm that allows individuals to be matched more than once and imposes a common support to obtain reliable matches. However, this methodology only reduces bias if the differences between the groups disappear after the matching procedure. To test the reliability of our matching, we carry out a difference mean test (see table 3) and estimate the probit model only on the matched individuals (see table 2, columns 3 and 4). Results in table 2 show that after the matching procedure, there are no significant variables as predictors of CDH participation status, namely, the averages of explanatory variables in the probit model converge after the matching process. In addition, the area under the ROC curve falls to 0.5, which means the model is not significant in predicting the values.

Table 3. Mean-test after the matching procedure

	Treated	*Control*	*Mean difference*	*p-value*
Age	39.214	39.237	-0.023	0.985
Gender	0.053	0.046	0.007	0.777
Educational level	0.328	0.305	0.023	0.692
Marital status				
Other status	39.214	39.237	-0.023	0.985
Single	0.053	0.046	0.007	0.777
Married	0.328	0.305	0.023	0.692
Dependents				
0-1	0.084	0.099	-0.015	0.670
2-3	0.496	0.427	0.069	0.266
4-5	0.298	0.328	-0.03	0.596
More than 5	0.122	0.145	-0.023	0.588
Place of residence	0.496	0.504	-0.008	0.902

Notes: The mean difference test is a t-test for continuous variables, and a two-sample z-test of proportions for dummy variables.
Source: our elaboration.

Regarding the mean test, the results in table 3 show no significant differences between the treated and control groups after the matching procedure. We also considered visual analysis by comparing the distribution of propensity scores before and after the matching procedure (see figure A.2. in the Appendix), and the results show that the distribution between treated and control units is the same after matching. Therefore, the quality of the matching procedure can be considered satisfying, and the estimation of ATET can be regarded as unbiased.

About the impact of the CDH using the PSM approach, it is necessary to point out that the population analyzed is all beneficiaries of the BDH; that is, the treated and the controls are recipients of this CCT program. Therefore, the treated group comprises people who receive an accumulated cash transfer rather than a monthly payment. The effect of grants on household conditions is estimated using nearest neighbor (NNM) and kernel-based matching (KBM) algorithms. The main results (see table 4) show that the estimated effects are significant and statistically equal regardless of the matching algorithm considered. The results in table 4 also show the impact estimated using the OLS method. Notably, the effects vary depending on the dependent variable, being greater for the probability of entrepreneurship and smaller and not significant for the perceived living conditions. Finally, although the effect is similar when considering the housing quality index, we consider OLS estimates biased, making it necessary to assess the impact using the PSM approach.

Table 4. Average Treatment Effect on the Treated (ATET)

	(1) *Probability of entrepreneurship*		*(2)* *Perceived living conditions*		*(3)* *Housing quality index*	
	ATET	*S.E.*	*ATET*	*S.E.*	*ATET*	*S.E.*
NNM(1) comm cal(0.01)	0.5649***	0.0540	0.2366**	0.1174	-1.7099***	0.1339
Kernel comm	0.5427***	0.0579	0.2054*	0.1212	-1.7202***	0.1363
ols	0.7443***	0.0732	0.1139	0.0940	-1.7357***	0.1010

Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value 0.1; S.E. Standard Errors bootstrapped 200 times. NNM (1) = Nearest Neighbor Matching with one neighbor. Comm = Common support. Cal(0.01) = The maximum distance between the treated and control units is 0.01. Kernel = Matching using the kernel algorithm.

Source: our elaboration.

First, we find a positive effect on the probability of investing in cash transfers for business creation. This result coincides with Covarrubias *et al.* (2012), although other authors (Flores-Romero, 2010) suggest that this type of program does not significantly affect investments. In this sense, the results support the idea that CDH beneficiaries tend to be more entrepreneurs, which may favor local economies through the stimulus of economic activity. In addition, the living conditions of CDH beneficiaries can also be improved, since new entrepreneurs would have more money to meet their needs.

Second, although the living conditions were not an explicit objective of the CDH, we evaluate their impact because the program could affect them through different mechanisms. To assess the program's impact on living conditions, we used a question about their satisfaction with the ability to cover their basic needs. Our findings (table 4, column (2)) prove that government-administered cash transfers reduce poverty by affecting individuals' capacity to satisfy their basic needs. This variable is measured through a Likert-type measure of four items; therefore, individuals' perceptions may affect the results. With this concern, we also analyze their housing quality with a proxy variable (table 4 column (3)) based on observable characteristics rather than their perception. The results contradict those found to perceive living conditions, since an adverse effect is seen. This apparent discrepancy is common in microfinance programs targeting low-income women, where participants often report greater empowerment and optimism, but no immediate improvements in material well-being are observed. In our context, a possible explanation is that people involved in entrepreneurial activities perceive their conditions as better, perhaps because they have higher income expectations or a sense of autonomy in running a business. However, their housing conditions may deteriorate during the initial stages of entrepreneurship. This pattern is consistent with the idea that the initial impact of the CDH is to boost beneficiaries' feelings of empowerment and prospects. Simultaneously, tangible improvements in housing may take longer to materialize.

5. Conclusions and final remarks

Social protection programs have been implemented in many low—and middle-income countries due to their effectiveness in reducing poverty, vulnerability, and inequality. In Loja's case of CCTs, the BDH offers an alternative to receiving accumulated cash transfers to carry out business activities through the CDH program.

Evaluating the CDH using a propensity score matching setting, we found a positive effect of this program on the propensity to entrepreneurship for 2018-2021. The average treatment effect shows that people who choose to anticipate conditional cash transfers tend to be more self-employed. These results indicate that anti-poverty policies should be geared towards improving access to physical capital and income-generating activities to enable social mobility. In addition, we find that participation in this program directly affects perceived living conditions. Beneficiaries consider that they can cover their basic needs more than non-beneficiaries. These results allow us to conclude that the CDH program has a positive effect, even when comparing beneficiaries with those who receive another CCT (specifically, BDH). The results for the housing quality index show that non-beneficiaries have better housing conditions, which may be related to the CDH beneficiaries' necessity to engage in entrepreneurship. This indicates that it would be necessary to implement various instruments that complement each other and prevent unexpected adverse effects when implementing the transfer policy, such as housing, food, or education policies.

However, it is remarkable that the study's results are affected by the fact that participation in the CDH is optional; beneficiaries self-select into the program based on characteristics that may not be observable. This limitation implies that our estimated effects should be interpreted cautiously, as PSM may not fully account for all unobservable differences between CDH participants and non-participants. We have attempted to mitigate this concern through robustness checks and careful matching, but the possibility of residual selection bias remains.

Regarding the determinants of participation in the CDH program, the results show that participation status is characterized by the individual's age and number of dependents. In the first case, the analysis reveals a non-linear relationship exhibiting an inverted U-shape. In the latter, a linear pattern is estimated where the probability of participation in this program is greater for households with more dependents. Therefore, we conclude that the needs of the individual determine involvement in this program; that is, the probability of participating is higher for those with more family demands.

Based on the results of this study, three future research questions can be mentioned. First, it would be interesting to analyze the underlying reasons for the greater impact on the living conditions of CDH beneficiaries than on those who receive BDH cash transfers. Secondly, the results of the study are affected because participation in the CDH is optional, so the beneficiaries self-selected based on characteristics that may not be observable. We found some differences in some observable characteristics, implying that it would be necessary

to apply other techniques that control for non-observable factors. Thirdly, while these results are promising, more research is needed, primarily referring to different periods and regions, to generalize the effects and promote these policies in other areas.

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INFORMED CONSENT

Participation was voluntary and informed consent was obtained from all participants. Anonymity was preserved throughout the analysis.

APPENDIX

Table A.1. Pairwise correlations

		[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*	*[7]*	*[8]*	*[9]*	*[10]*	*[11]*
[1]	Age	1.00										
[2]	Gender	0.08	1.00									
[3]	Educational level	-0.29	-0.12	1.00								
	Marital status											
[4]	Other	0.02	-0.03	-0.06	1.00							
[5]	Single	-0.33	0.05	0.08	-0.42	1.00						
[6]	Married	0.3	-0.02	-0.03	-0.5	-0.58	1.00					
	Dependents											
[7]	0-1	0.05	0.12	-0.04	-0.11	0.22	-0.11	1.00				
[8]	2-3	-0.13	-0.03	0.08	0.08	0.01	-0.08	-0.41	1.00			
[9]	4-5	0.03	-0.03	-0.01	-0.06	-0.09	0.14	-0.28	-0.57	1.00		
[10]	More than 5	0.13	-0.05	-0.06	0.1	-0.15	0.05	-0.15	-0.3	-0.2	1.00	
[11]	Place of residence	0.03	-0.05	-0.03	0.06	-0.01	-0.04	-0.03	0.01	-0.02	0.04	1.00

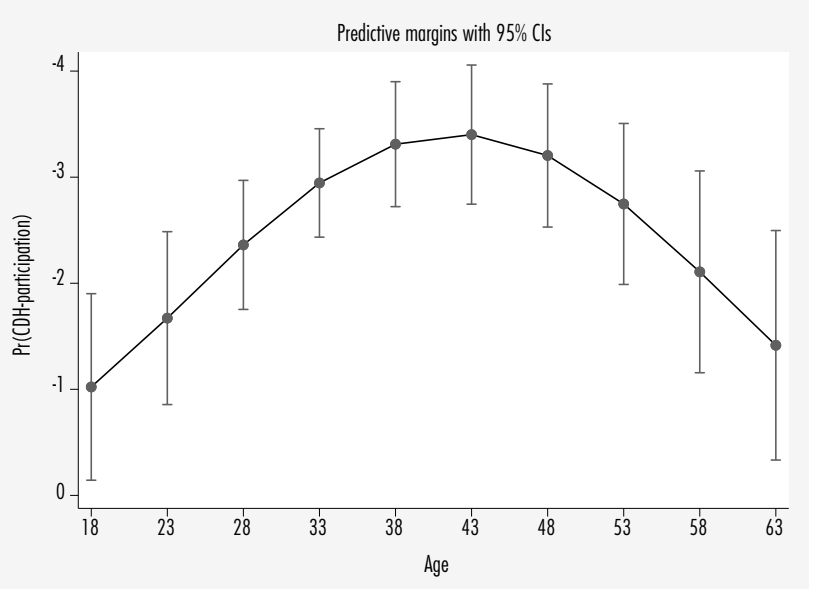
Source: own elaboration.

Table A.2. Internal consistency analysis (Cronbach's alpha)

Statistics for scale	*N*	*Mean*	*S.D.*		
	5	2.690	1.778		
	Mean	*Min.*	*Max.*	*Range*	*Variance*
Item means	0.537	0.396	0.787	0.391	0.026
Item variances	0.228	0.168	0.249	0.081	0.001
Inter-item correlations	0.445	0.280	0.683	0.402	0.015
Items	*Scale mean if item deleted*	*Scale variance if item deleted*	*Corrected item total correlation*	*Squared multiple correlation*	*Alpha if item deleted*
Water	2.08	2.031	0.640	0.456	0.741
Electricity	1.90	2.272	0.583	0.390	0.762
Internet	2.25	2.291	0.416	0.206	0.812
Sewerage system	2.29	2.034	0.636	0.516	0.742
Refuse collection	2.22	1.997	0.648	0.511	0.738
		Alpha		Standardized Item Alpha	
Reliability coefficients		0.799		0.801	

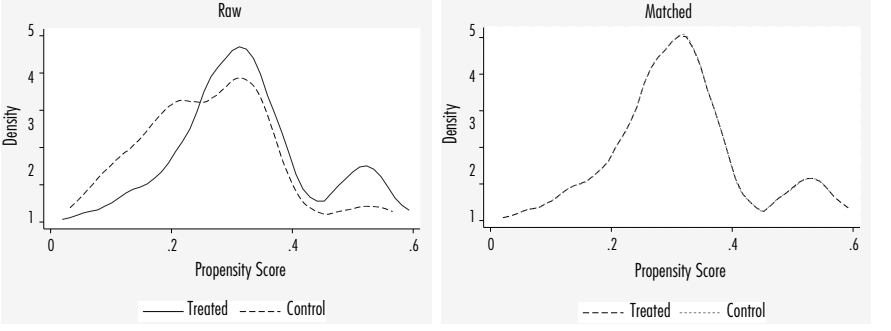
Source: own elaboration.

Figure A.1. Marginal effect of age on the probability of being supported



Source: own elaboration.

Figure A.2. Kernel density of propensity score before and after matching



Source: own elaboration.

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