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The Case of Bolivia's Renta Dignidad

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Abstract[1]

This document presents a quasi-experimental impact evaluation of Bolivia's *Renta Dignidad*, a universal and non-contributory old age pension. Causal effects on direct, future, and indirect beneficiaries are identified, taking advantage of a reduction in age of eligibility from 65 to 60 years in December 2007. Difference-in-difference and changes-in-changes approaches are used to calculate average and quantile treatment effects. For women, non-contributory pensions have, on average, increased their households' non-labor income. This has decreased their labor supply and labor earnings, in turn decreasing households' labor income and thus reducing, ceteris paribus, the program's effect on total per capita household income. Unexpectedly, the program did not have significant effects on men's welfare, investments and labor market outcomes. The results also suggest that additional resources were neither consumed nor invested in health, education, or the purchase of durables. Households most likely held the additional resources and invested in dwelling improvements.

JEL classifications: I38, J14, J22, J26
Keywords: Non-contributory pensions, Well-being, Investment, Saving, Labor market

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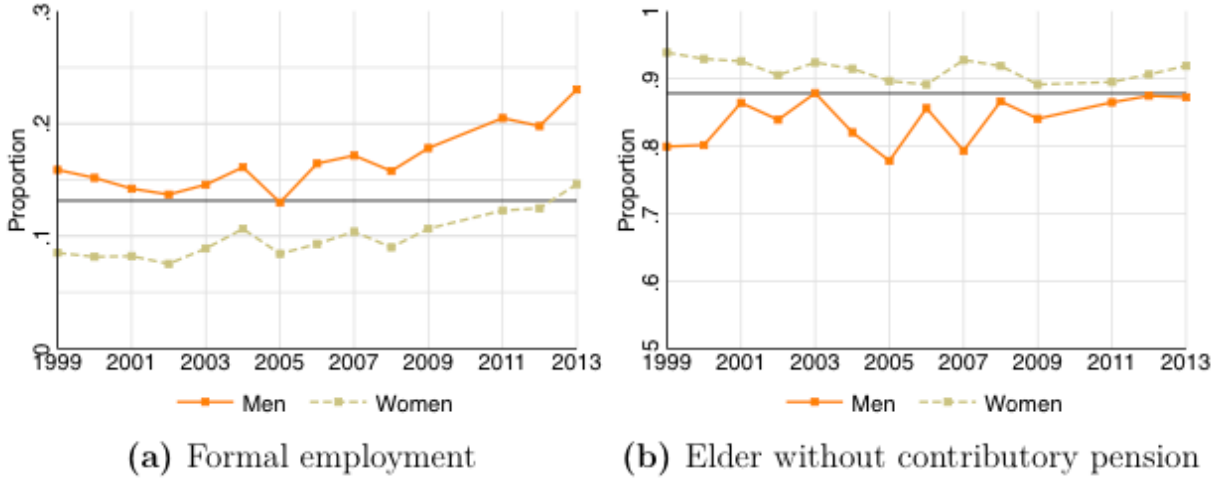
1. Introduction

Non-contributory pensions are usually justified as means to provide social assistance to those who do not have access to a contributory pension scheme. For example, women are more prone than men to experience lower participation rates in the labor market, interrupted careers, and lower-quality jobs, among other difficulties, which negatively affect their level and frequency of contributions to the pension system. In the particular case of Bolivia, in 2012 the labor force participation ratio of women to men was 0.75, and there were seven women working in family businesses (with no earnings) for every man (Hernani-Limarino and Mena, 2014). Moreover, Figure 1 shows that in 2013 almost 23 percent of men and fewer women (15 percent) in the working age population were employed in a formal job, i.e., one that pays for short-term (health) and long-term (pensions) social security. Since some people go back and forth from formal jobs to informal ones or self-employment (Hernani-Limarino, Eid and Villaroel, 2012), fewer will have access to a contributory pension when they are old. In fact, as of 2013 only 13 percent of men and 8 percent of women in the [60,65) age cohort received a contributory pension.[2]

Figure 1. Evolution of Formal Employment and Coverage of Contributory Old-Age Pensions in Bolivia by Sex



Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: A worker is in a formal employment if she contributes to the Bolivian Pension Fund System (AFP). Formal employment calculated for people in the age interval [25,65). Coverage of contributory old-age pensions estimated for the age interval [60,65). The flat lines indicate the period average of the respective indicator.

[2] This situation is not different in many other Latin American and Caribbean countries including Honduras, Dominican Republic, El Salvador, Guatemala, Paraguay and Nicaragua, whose contributory pension coverage is below 20 percent, and even Colombia and Peru, whose levels are only 23 percent and 25 percent, respectively (Rofman and Oliveri, 2011).

This paper presents a quasi-experimental impact evaluation of *Renta Dignidad*, a universal non-contributory pension for the elderly in Bolivia enacted in 2007. The program introduced an exogenous policy change that reduced the age cut-off to become a beneficiary of non-contributory pensions from 65 to 60 years. To estimate the causal effects of becoming a beneficiary, we use both the simple *difference-in-difference* approach and the more complex *changes-in-changes* approach. The latter overcomes some of the problems of the former and helps us to calculate not only average but also quantile treatment effects for the cohort that was affected by the policy change, i.e., the [60,65) population, comparing it to the closest cohort that was excluded from the non-contributory pension scheme, i.e., the [55,60) population.

We use a time-series of cross-section Bolivian household surveys (2005-2011) and analyze a comprehensive set of intended and unintended effects, including the following: i) household's welfare, measured by the non-labor, labor and total household per-capita income; food, non-food and total household per-capita consumption; ii) the household's investments in dwelling, durables, education and health and the household's level and rate of savings; iii) the labor market effects on direct beneficiaries of the program; iv) anticipation effects on labor market outcomes of future beneficiaries; and v) the labor market effects on indirect beneficiaries of the program, i.e., young and adult population residing with an elderly person entitled to *Renta Dignidad*. Whenever possible, we attempt to identify not only the full sample effects, but also differentiate the effects on women's outcomes from those on men's.

The rest of the paper is organized as follows. The next section presents a review of the literature concerned with the effects of non-contributory pensions on labor market and welfare outcomes. Section 3 presents the institutional arrangements of non-contributory pensions in Bolivia and describes the changes that *Renta Dignidad* brought about. Section 4 describes the data and methods that we use to identify the causal effects of *Renta Dignidad*. Section 5 discusses the impacts of the program on household and individual outcomes on direct, future, and indirect beneficiaries, plus falsification tests that validate our results. The final section contains our conclusions and main policy implications.

2. Literature Review

The low coverage of contributory pension systems in Latin America has paved the road for the introduction of non-contributory pension schemes that aim to reduce old-age vulnerability by providing a minimum income floor. As our title suggests, however, the introduction of such programs may not only have the intended effects of increasing the beneficiaries' and their household's disposable income, and therefore, increase consumption and even investments on physical capital (e.g., improving dwelling conditions or buying durables) and on their own or their housemates' human capital (health and education). According to theory, depending on the amount of the transfer, non-contributory pensions may also reduce the supply of labor due to the income effect of an unconditional government transfer, by retiring early from the labor force, switching occupations that may not provide contributory pensions or simply reducing the hours dedicated to the labor market.

The evidence of non-contributory pension's effects in Latin America is based mainly on the experiences of Chile's *Pension Básica Solidaria* (ex PASIS), Brazil's *Beneficio de Prestação Continuada*, Mexico's *70 y más*, and the ones described in this paper for Bolivia.[3] As these programs are being introduced, in our view, we are still learning about the whole range of effects.

In the case of Chile, Behrman et al. (2011) analyze the short-term effects of *Pension Básica Solidaria* (the Basic Solidary Pension) on a broad set of outcomes. They use a difference-in-difference approach comparing treated households entitled to receive PBS (poor and with a household member aged 65 or older) with households that are poor but do not qualify, before (2006) and after (2009) the pension reform of 2008. They find that targeted households with elderly members increased their income by 2.4 percent and little evidence of public benefits crowding out private transfers. In addition, targeted households report higher expenditures on health care, more leisure hours and improved self-reported health, indicative of positive effects of the program on welfare.

Joubert and Todd (2011) use a behavioral dynamic model to estimate short-term and long-term effects of the 2008 pension reform in Chile that introduced PBS. They find that the large expansion in eligibility for a minimum pension (PBS) dramatically reduces old-age poverty and improves pension saving and receipt levels for women, bridging a sizable part of the gender

[3]See Duflo (2003), Ardington, Case and Hosegood (2009), and Ardington et al. (2013) for studies on the effects of South Africa's non-contributory pension on indirect beneficiaries.

gap in pension benefits. However, their simulations indicate some negative behavioral responses to the reform in terms of lower labor force participation rates at older ages and lower rates of participation in the formal sector. As retirement nears, incentives to contribute to the pension system are lower than before the reform due to higher expected income in retirement.

Brazil's *Benefício de Prestação Continuada* (BPC) is targeted to people with a per capita family income no greater than 25 percent of the current minimum wage, whose age is at least 65 or who prove to be incapable of working. Barrientos (2003) finds that BPC's effects are stronger on poverty and indigence gap measures. He reports that poverty headcount would be 4.2 percent higher without the program and that indigence headcount would rise by around 9.6 percent. The impact of non-contributory pensions is stronger on the lower income quintiles, which confirms the important contribution of such programs to the standards of living of the poorest, and suggests these have a key poverty protection role among households with elderly. Moreover, Kassouf, Rodrigues and Aquino (2012) show that BPC has no significant effects on household composition and weekly worked hours for samples of elders and co-residents. Though they do not find effect on school attendance, there is a significant drop in child labor, especially at young ages.

In the case of Mexico's *70 y más* program Galiani, Gertler and Bando (2014) find that the proportion of treated individuals doing paid work is reduced by 20 percent, with most of these people switching from their former activities to work in family businesses. Treated households show higher levels of consumption expenditures (on average, an increase of 23 percent). They rule out significant anticipation effects that might have been associated with program transfers. Amuedo-Dorantes and Juárez (2015) estimate that the program crowds out private transfers by 37 percent, which implies that non-labor income of beneficiaries increases less than government transfers. Juarez and Pfutze (2014) find that the program reduces the labor force participation of elderly men, particularly those who live alone and who are relatively poor, but has a much weaker effect on elderly women. The program has no statistically significant effect on the labor force participation of either prime-age men or women who live with potential beneficiaries, and it has a negative and significant effect on the labor force participation of boys aged 12 to 17, particularly those in the lowest wealth quintiles, but not on girls. These results suggest that the program affects mostly the labor supply of the intended beneficiaries, and that of marginal workers, like adolescent boys.

Martínez (2004) evaluates one of the previous iterations of *Renta Dignidad*, using data from the 1999-2002 household surveys and a regression discontinuity design. He concludes that non-contributory pensions had positive and significant impacts on consumption, particularly on food consumption and productive investments. Yáñez-Pagans (2008) studies the intent-to-treat effects of non-contributory pensions on children's human capital investments and finds that women are more effective at promoting human capital investments.

Escobar, Martínez and Mendizábal (2013) present the government's official impact evaluation of *Renta Dignidad*. Their study is based on a "sharp" discontinuity identification strategy and a sample of 1,258 people in the [55,65] age interval obtained through a special household survey designed for evaluation: the *Encuesta a la Población Adulto Mayor* (EPAM). They find that *Renta Dignidad* has not only increased household per-capita income and consumption, but also reduced the poverty incidence between 11 to 14 percentage points around the cut-off. Unexpectedly, they also find that these effects can be attributed more to urban areas than to rural ones, e.g., the estimated impact on poverty reduction at the cut-off was 16 to 19 percentage points in urban areas (statistically significant at the 5 percent level) while the magnitude is between 2 and 5 percentage points in rural areas.

Claure and Hernani-Limarino (2014) use the EPAM data to replicate the official evaluation of *Renta Dignidad* and conduct some falsification tests. They argue that the proper estimation strategy is not a "sharp" discontinuity design but a "fuzzy" one which gives effects on households' per-capita income and consumption that are negative and statistically significant at the 1 percent level in rural areas. Furthermore, they find that both the direction and significance of the treatment estimates rely heavily on the inclusion of a particular set of controls, and that falsification tests reveal significant jumps in outcomes all over the age distribution, which suggest that there are problems with either the quality of the data or the sample size for a discontinuity strategy.[4] Instead of relying on the comparability and power of the sample around the cut-off, as in regression discontinuity designs,[5] and the comparability of treatment and control groups conditioning on observables, as in all identification under unconfoundedness approaches, we follow a different and, hopefully, more plausible set of assumptions—at least from our point

[4] It is important to note that any discontinuity approach not only relies on the comparability and power of the sample around to cut-off but also on the assumption that the control group either does not expect to cross the cut-off or that at least this expectation does not affect their behavior, i.e., the population who does not receive the non-contributory pension but will soon receive it, does not behave as if they would already receive it because of the expectation.

[5] In the case of discontinuity designs, results are only valid around the age that defines the eligibility criteria.

of view. Taking advantage of the exogenous reduction in the age cut-off from 65 to 60 in 2007, we use the simple difference-in-difference and more complex changes-in-changes approaches to estimate the causal effects of *Renta Dignidad*. To improve the power of our estimates we combine the sample of three years of cross-sectional surveys before and after the policy change, i.e., the 2005, 2006 and 2007 household surveys for the ex ante period and the 2008, 2009 and 2011 household surveys for the ex post period. Our approach is not free of assumptions. In fact, it assumes that the time trend in all outcomes is common for both, the treatment and control cohorts; an assumption that we test comparing the same outcomes in two periods before the policy change, i.e., the 2000-2002 period with the 2005-2007 period. Finally, caution should be taken when analyzing our results since they are not representative for the whole elderly population but for the cohort under analysis, in our case, the [60,65) cohort affected by the policy change.

3. Non-Contributory Old-Age Pensions in Bolivia

There were three iterations of non-contributory pensions in Bolivia since 1996: BONOSOL, BOLIVIDA, and *Renta Dignidad*.[6] *Bono Solidario*, also known as BONOSOL, was established in 1996 after the privatization of public enterprises. BONOSOL was meant to be an annual transfer of Bs. 1,300 (USD 248) to people once they turn 65 years old. Its main objective was to transfer the expected benefits of the capitalization process to Bolivian citizens living in the national territory, though it was not a universal scheme since only those who were 18 or older in December 31 of 1995 were entitled to receive it. BONOSOL was initially supposed to last until 2001, but the results of the capitalization were not as expected and the program became financially unsustainable because the number of beneficiaries was underestimated.

After the elections of 1997, the new government suspended BONOSOL's payments and in 2000 BOLIVIDA replaced BONOSOL. This version of the program entitled only those who were 50 years or older in December 31 of 1995 to receive the transfer. Moreover, BOLIVIDA reduced the non-contributory pension to Bs. 395 (USD 60) a year and the corresponding payments of 1998 and 1999 were made in 2001. BOLIVIDA was increased to Bs. 420 (USD 60) for the payments of 2000 and 2001, which were made in 2002. This means that the elderly received 60.8 percent of the original value of BONOSOL in 2001 and 64.6 percent in 2002.

[6] Besides a cash transfer, each one gave the beneficiaries a burial allowance (*Gastos Funerarios*). The normative and number of beneficiaries of Bolivia's non-contributory pension schemes can be found in the appendices

The original party that created BONOSOL won the elections of 2002 and restored the original name of the transfer. Additionally, the government increased the amount of the non-contributory pension to Bs. 1,800 (USD 257) and the payments were supposed to last until December of 2007. After that, the authority in charge was supposed to redefine the size of the transfer every five years based on the available resources and the rate of mortality of the beneficiaries.

In December of 2007 the current administration replaced BONOSOL with *Renta Dignidad*, a universal[7] non-contributory old-age pension. To secure the funding of *Renta Dignidad* a fixed share (30 percent) of the special direct tax on hydrocarbons (*Impuesto Directo a los Hidrocarburos (IDH)*) was established in addition to the dividends from capitalized public enterprises. The most important change related to our study is the reduction of the age needed to receive the transfer from 65 to 60 years old. This reduction in the age cut-off is the exogenous variation that we use to identify the causal effects of *Renta Dignidad* (see Table 1).

Table 1. Non-Contributory Old-Age Pension Schemes in Bolivia

	1997	1998-2000	2001	2002	2003-2007	2008-2012	2013+
	BONOSOL	BOLIVIDA			BONOSOL	Renta Dignidad	
Beneficiaries	65 or more	65 or more			65 or more	60 or more	
Frequency of payments	Annually	Annualy			Annually	Annually (monthly)*	
Benefit (Bs.)	1,300	Suspended	790[1]	840[2]	1,800	2,400 (200)	3,000 (250)
Benefit ($US)	248	Suspended	60[1]	60[2]	257†	342 (28.5)†	431 (36)†
Criteria for differentiation of payments							
with contributory pensions	100%	100%			100%	100%	
without contributory pensions	100%	100%			100%	75%	

* The elderly can choose to receive Renta Dignidad's payments monthly or accumulate it for a period no longer than a year.
† Estimates based on market exchange rate.
[1] Two payments of Bs. 395 ($US 60) corresponding to years 1998 and 1999.
[2] Two payments of Bs. 420 ($US 60) corresponding to years 2000 and 2001.

Source: Authors' compilation.

Unlike the previous iterations of the program, the beneficiaries can choose to receive monthly, quarterly or annually[8] payments; depending on their needs and preferences. This new scheme also increased the amount of the transfer to Bs. 2,400 (USD 342) for those who are not entitled to a contributory pension, and for those who are entitled to a contributory pension the

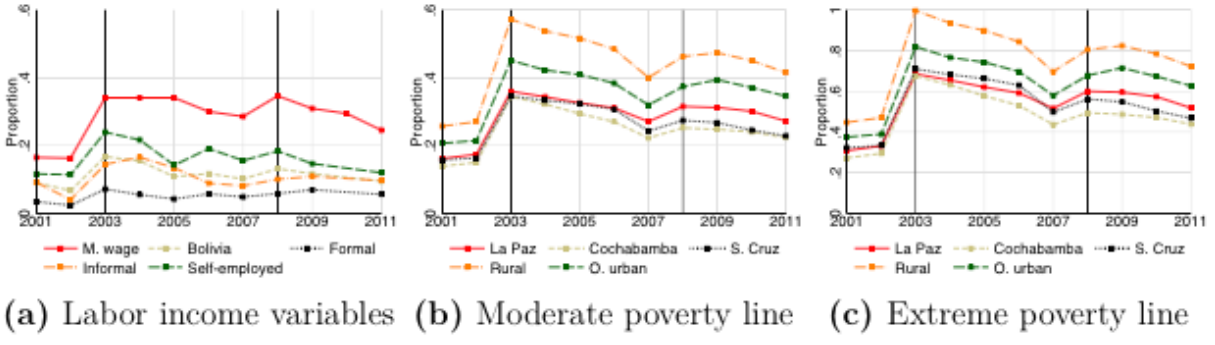
[7] The current Bolivian Constitution (2009) establishes as a right of every Bolivian old-age citizen that

> […] the state will provide an old-age pension, under the framework of an integral social security system.

making non-contributory pensions schemes a constitutional obligation of the state.
[8] Renta Dignidad can be accumulated for a period of one year, otherwise that year's transfer is lost.

benefit is only 75 percent, which is equivalent to the value of BONOSOL. The differentiation of the benefit can help to reduce pension inequality among the elderly, but it is also possible that it may have introduced a disincentive to search better jobs (formal) because one of the costs of being informal, namely zero or low pension benefits, is reduced. To put the non-contributory pension in context, Figure 2 shows that *Renta Dignidad* was worth 25 percent of the national minimum wage in 2011. Moreover, the program is 9.5 percent of the average monthly labor income in Bolivia and 5.6 percent of the average labor income of a worker in the formal sector in the [55,60) age interval.

Figure 2. Evolution of Non-Contributory Pensions in Relation to Labor Income and Poverty Variables



(a) Labor income variables (b) Moderate poverty line (c) Extreme poverty line

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Indicators are ratios of non-contributiory pensions to the indicated variable. Labor income variables are the average of the labor income of population in the [55,60) cohort for Bolivia and the indicated sectors. "M. wage"=official national minimum wage. Moderate and extreme poverty lines extracted from Mena, Hernani-Limarino, and Jiménez (2013). "O. urban"=Other urban areas.

4. Methods and Data

In this section we first lay our identification strategy of the causal effects of *Renta Dignidad* based on the difference-in-difference and changes-in-changes approaches. Then we present the data that we use for the evaluation of the program and all potential data sources that could be used to estimate the effects of *Renta Dignidad*, justifying our choice of standard household surveys data.

4.1 Identification Strategy

To identify the causal effects of *Renta Dignidad* we use a generalization of the difference-in-difference (DID) approach known as changes-in-changes (CIC) proposed by Athey and Imbens (2006a). We only review the basic identification assumptions and see whether they can be applied to our particular problem.

4.1.1 Set-Up

Let us begin with the simple two group-two period DID case.[9] Let individuals, indexed by subindex *i*, belong to one of two groups $G_i \in \{0,1\}$, the control group G_i=0 or the treatment group G_i=1, and who are observed in two periods of time $T_i \in \{0,1\}$, the ex ante period T_i=0, where none of the groups are treated, and the *ex post* period T_i=1, where the treatment group receives treatment. Thus, we can write the treatment indicator as:

$$I_i \begin{cases} 1 & \text{if } G_i = 1,\ T_i = 1 \\ 0 & \textit{otherwise} \end{cases} \qquad (1)$$

Under the assumption of unconfoundedness we would compare the treatment cohort ex ante and ex post, i.e., (*G*=1,*T*=0) and (*G*=1,*T*=1), or the treatment and control cohorts *ex post* (*G*=1,*T*=1) and (*G*=0,*T*=1). The standard DID approach would suggest comparing the treatment and control cohorts ex post but adjusting for the differences we observe in the ex ante situation. With a random error *epsilon* independent of both *G* and *T* the standard treatment on the treated effect can be obtained according to:

$$Y_i = \beta_0 + \beta_1 G_i + \beta_2 T_i + \tau^{DID} I_i + \varepsilon_i \qquad (2)$$

leading to:

$$\begin{aligned} \tau^{DID} = &[E[Y \mid G=1, T=1] - E[Y \mid G=1, T=0]] \\ &-[E[Y \mid G=0, T=1] - E[Y \mid G=0, T=0]] \end{aligned} \qquad (3)$$

where τ^{DID} is the average treatment on the treated measured with the DID approach. This model can be easily extended to include a set of covariates *X*, since it is linear in its arguments.

[9] See Angrist and Pischke (2008), Lechner (2011), and Imbens and Wooldridge (2009), among others, for a discussion of the DID approach.

Although this is a valid method of identification, standard problems that may result in inconsistent estimates include functional form dependency, i.e., results might be different depending on whether we use a model in levels or logs; heterogeneity in the effect of treatment; and an impossibility of estimating the effect for the group that was not treated. An alternative and more general approach to the DID is the CIC approach proposed by Athey and Imbens (2006a), which we briefly outline below.

The baseline model for continuous outcomes is based on four basic assumptions:

1. Outcome under control treatment depends on time period T and on unobserved individual component U. Formally, we have that,

$$Y(0)=h(U,T) \tag{4}$$

2. Distribution of U does not vary over time within a group, but is allowed to vary across groups,

$$U \perp T \mid G \tag{5}$$

3. $h(u,t)$ is monotone in u

4. The support of $U|G=1$ is a subset of the support of $U|G=0$

In the CIC approach the treatment group's distribution of unobservables may be different from that of the control group in arbitrary ways and it is assumed not to change over time within groups. Thus, the treatment effect at a given time is the same for individuals with the same $U_i=u$, irrespective of their group. The strict monotonicity assumption is not restrictive in the case of continuous outcomes, but it would be if there were mass points in the distribution of $Y(0)_{gt}$. Under this assumption, Athey and Imbens show that it is possible to identify the *distribution* of $Y(0)|G=1,T=1$. In particular they show that

$$F_{Y(0),11}(y) = F_{Y,10}(F^{-1}_{Y,00}(F_{Y,01}(y))) \tag{6}$$

where $F_{Y,gt}(y)$ denotes the distribution function of Y_i given $G_i=g,T_i=t$, and $F_{Y(0),11}(y)$ represents the counterfactual distribution of the treated in $T=1$ in the absence of treatment. The expected counterfactual outcome for the second period control group under treatment is:

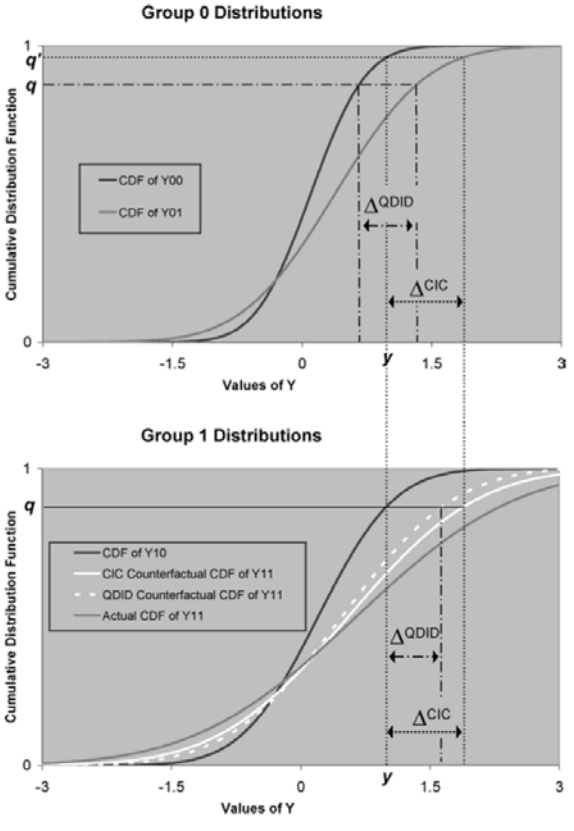
$$E[Y(0)\,|\,G_i=1,T_i=1]=E[F_{Y,01}^{-1}(F_{Y,00}(Y_{10}))] \tag{7}$$

Hence, the average treatment effect can be written as

$$\begin{aligned}\tau^{CIC}&=E[Y(1)_{11}-Y(0)_{11}]=E[Y(1)_{11}]-E[k^{CIC}(Y_{10})]\\&=E[Y(1)_{11}]-E[F_{Y,01}^{-1}(F_{Y,00}(Y_{10}))]\end{aligned} \tag{8}$$

A commonly used example to interpret these results is the following (see Figure 3). Take a person in the baseline ex ante period with outcome *y*. To answer the counterfactual question of what would happen to a treated person in the second period without exposure to the treatment: first, look for someone with the same value of *y* on the control group in the ex ante period. This individual must have had the same unobserved individual component *u*. Notice that someone with that value of *u* in the *ex-post* period would have an outcome *y*' at the same quantile, i.e., $y'=F_{01}^{01}(F_{00}(y))$. Therefore, outcome distribution would be given by $Y_{11}^{N}=F_{01}^{-1}(F_{00}(Y_{10}))$.

Figure 3. Transformations



Source: Extracted from Athey and Imbens (2006a).

If the support assumption is not satisfied, then the counterfactual distribution would be still identified, but not outside the support of Y_{01}. Even if this were the case, Athey and Imbens show that it is possible to calculate the effect of the treatment on quantile *q* of the distribution of $F_{Y,10}$ according to:

$$\tau_q^{CIC} = F^{-1}_{Y(1)11}(q) - F^{-1}_{Y(0)11}(q) = F^{-1}_{Y(1)11}(q) - F^{-1}_{Y,01}(F_{Y,00}(F^{-1}_{Y,10}(q))) \quad (9)$$

This result is very useful if we consider that the program may have had an impact on the lower part of the distribution of income, saving or any other outcome of interest.

The model has many other extensions, and it can also be applied to discrete (binary) outcomes such as labor market participation in order to obtain boundaries of the average treatment effects. In this case, $h(u,t)$ is assumed to be weakly monotone in u and under the assumption of conditional independence $U \perp G|Y,T$ it is possible to restore point identification. The conditional independence assumption in the case of discrete data is necessary to ensure that the level of outcomes can be compared across groups, and that the quantile of outcomes can be compared over time. It is also possible to include covariates in the CIC approach and the details of such extensions are left for the Technical Appendix.

4.1.2 Estimation

The CIC model proposed by Athey and Imbens considers the cases of continuous and discrete outcomes. We consider in this subsection the case of continuous outcomes and leave the treatment of discrete outcomes for the appendices.

Assumptions (1)-(4) are needed to ensure that

$$\tau^{CIC} = E[Y(1)_{11}] - E[Y(0)_{11}] = E[Y(1)_{11}] - E[F^{-1}_{Y,01}(F_{Y,00}(Y_{10})] \quad (10)$$

Additionally, the following assumptions are made regarding the data generating process:

1. Y_i is a random draw from the subpopulation with $G_i=g$ during period *t*, conditional on $T_i=t$ and $G_i=g$.

2. For all $t,g \in [0,1], \alpha_{gt} = P(T_i = t, G_i = g) > 0$.

3. Y_{gt} are continuous with densities $f_{Y,gt}(Y)$ that are continuously differentiable with support $Y_{gt}=[y_{min,gt},y_{max,gt}]$

4. The support of the treatment group in the pre-treatment period is a subset of the support of the control group in the pre-treatment period.

Thus, the empirical distribution is used as an estimator for the distribution function:

$$\hat{F}_{Y,gt}(y) = \frac{\sum_{i=1}^{N_{gt}} I\{Y_{gt,i} \leq y\}}{N_{gt}} \tag{11}$$

and the estimator of the inverse distribution function used is:

$$\hat{F}^{-1}_{Y,gt}(q) = \inf\{y \in Y_{gt} : \hat{F}_{Y,gt}(y) \geq q\} \tag{12}$$

At this point one important issue in the implementation of the estimator is that the support condition might not be satisfied. Therefore, $\hat{F}_{Y(0)_{11}(y)}$ is estimated according to:

$$\hat{F}_{Y(0)_{11}(y)} \begin{cases} 0 & \text{if } y < y_{\min,01} \\ \hat{F}_{Y,10}(\hat{F}^{-1}_{Y,00}(\hat{F}_{Y,01}(Y))) & \text{if } y_{\min,01} \leq y < y_{\max,01} \\ 1 & \textit{otherwise.} \end{cases}$$

Hence, (10) can be (consistently) estimated through:

$$\tau^{CIC} = \frac{\sum_{i=1}^{N_{11}} Y_{11,i}}{N_{11}} - \frac{\sum_{i=1}^{N_{10}} \hat{F}^{-1}_{01}(\hat{F}_{00}(Y_{10,i}))}{N_{10}} \tag{13}$$

The variance of the CIC estimator can be estimated analytically. In practice, we obtain the standard errors of all the estimates through bootstrapping. We use 100 replications and calculate the difference between the 0.975 and 0.025 quantiles of the bootstrap draws and divide it by 2×1.96 so that all of the standard errors are comparable.

4.2 Available Data Sources

To the best of our knowledge, there are three alternative databases that can potentially be used to analyze the impacts of *Renta Dignidad* (Table 2).

The first is the 2-2-2 quarterly employment rotating panel. This survey was conceived to provide statistic information concerning labor market supply and its characteristics, and to fill the void between general household surveys that are collected on a yearly basis. The survey was focused on urban areas only, and it is a rare case of rotating panel data in Bolivia, since all of the

previous household surveys are a series of cross-section. Hence, this survey could be used to study the impact of *Renta Dignidad*, in urban areas, on labor market outcomes but we would not be able to study household investments. The panel was supposed to last from 2009 to 2012 and to collect information from 8,532 households, but, at least to our knowledge, the attrition level was too high and the final results were not showed.

A second database is provided by The Household with Elderly Survey (EPAM). EPAM is a household survey specially conducted in 2011 that provides data for the official impact evaluation based on a regression discontinuity design. The survey has information about demographic characteristics, labor market outcomes, income and consumption. Even though the survey is mainly focused on the elderly and their socioeconomic status, the consumption and labor market sections are not as complete as that of regular household surveys. In particular, the labor market section does not have useful information to differentiate the formality status of workers, and the consumption section is not comprehensive enough to assure the quality of the consumption indicator, at least compared with standard household surveys.

A major drawback of the survey is that it was designed to be comparable with the Income-Expenditure Survey (IES) of 2003-2004 in terms of the sampling frame. If this was the case, then the urban area would be oversampled as in the IES 2003-2004 because IES is mainly focused on collecting information on urban household budgets in order to change the base year of the CPI. Finally, since the survey was collected only for 2011, the available methodologies reduce to applying a regression discontinuity design, an approach used elsewhere.[10]

A third and final database is drawn from the 1999-2013 time series of cross-sectional household surveys. The main source of micro data in Bolivia is the time series of cross-section household surveys formerly known as LSMS. They provide detailed income, consumption, labor market, education attainment, dwelling, and demographic characteristics information. Even though this survey was not conceived to perform impact evaluations per se, Table 2 shows that its sample size in the age intervals of interest are comparable to those of EPAM, a survey conducted specifically to evaluate the impact of *Renta Dignidad* through a regression discontinuity design. Furthermore, standard household surveys are richer in terms of disaggregated information.

[10] Escobar, Martínez y Mendizábal (2013) use this data for the official impact evaluation, and Hernani and Claure (2014) use EPAM to replicate the results of the the official evaluation and show that some of the found impacts are not robust to changes in the specification and there might be problems with the quality of the data.

Hence, we use household surveys to estimate the intended and unintended effects of *Renta Dignidad* on: i) income, ii) consumption, iii) saving, iv) education expenditures, v) health expenditures, vi) expenditure in durables, vii) dwelling investments, viii) labor force participation, ix) sector of employment, x) worked hours, and xi) wages and earnings (see the Appendix for the definitions of the variables of interest).

Table 2. Available Data Sources in Bolivia to Study *Renta Dignidad*

	HS '05-'11	**HS 2011**	**EPAM 2011**	**ETE '09-'10**
Full sample of households	29,157	8,851	2,748	??
hh max-age $\in [55, 60)$	2,483	780	670	??
hh max-age $\in [60, 65)$	2,108	666	620	??
hh max-age $\in [65, 70)$	1,865	572	547	??
Household variables				
Income	X	X	X	X
Consumption	X	X	X	n.a.
Savings	X	X	X	n.a.
Education expenditure	X	X	X	n.a.
Health expenditure	X	X	?	n.a.
Durables *expenditure*	X	X	n.a.	n.a.
Dwelling's investment	X	X	n.a.	n.a.
Full sample of individuals	114,726	33,821	9,158	??
age $\in [55, 60)$	3,889	1,242	1,109	??
age $\in [60, 65)$	3,132	982	925	??
age $\in [65, 70)$	2,581	779	772	??
Labor market supply				
LM participation	X	X	X	X
Hours worked	X	X	n.a.	X
Sector of employment				
Family Worker	X	X	X	X
Self-employed	X	X	X	X
Informal salaried	X	X	?	X
Formal salaried	X	X	n.a.	X

Source: Authors' compilation.
Notes: "X"= available, "?"= incomplete, "n.a." not available, "??"= unknown. HS=Houhsehold Surveys; EPAM=Encuesta a hogares con Personas Adultas Mayores; ETE= Encuesta Trimestral de Empleo.

4.3 Defining Treatment and Control Groups

4.3.1 Direct Beneficiaries

We define years 2008, 2009 and 2011 as the treatment period (T1), and years 2005, 2006 and 2007 as the control period (T0). The treatment group (G1) is composed of those aged [60,65). After all, this population was excluded from the non-contributory pension under the BONOSOL scheme and was included under the *Renta Dignidad* scheme. However, there are two alternative ways to define the control group (G0). On the one hand, we could compare the [60,65)

population to those who are excluded from the *Renta Dignidad* scheme in both periods, say those whose age belongs to the interval [55,60). In this case, we would be getting the impact of treating the treated cohort. On the other hand, we could have compared the [60,65) population with those who are included in the *Renta Dignidad* scheme in both periods, say those whose age belongs to the interval [65,70). In this case, we would be getting the effect of un-treating the treatment cohort. Unfortunately, for the experiment, the cohort [65,70) benefited from an increase in the value of the non-contributory pension, so it cannot be used as control group, and we choose to use the [55,60) cohort as control group (G0).

Having established the groups of interest, we use the self-reported age to assign the individuals to control or treatment groups in the case of individual outcomes. In the case of household outcomes, we use the age of the oldest household member to determine the membership of the household to either the control or treatment group. To study the gender dimension of the effects we separate the sample according to the sex of beneficiaries in the case of individual outcomes. In the case of household outcomes, there are different options to study the gender dimension. For example, we could group households according to the sex of the household head. But it might be the case that the spouse is in the same cohort and so we would not be comparing women with women and men with men. Instead, we choose to group the households according to the age of the oldest household member, to define its treatment status, and then we classify them according to the sex of the household members in the relevant cohort. Finally, we only keep the observations with non-missing values for each one of the characteristics used as control variables and use survey weights in the estimation. In the case of household outcomes we restrict the sample to households that have non-missing values in per-capita income and consumption and households with one person only in the age interval of interest so as to obtain more reliable estimates. Table 3 shows the final sample sizes for households and individuals.

Table 3. Sample Sizes of Direct Beneficiaries

	Bolivia		Men		Women		Both	
	$G_0 = hh \in [55, 60)$	$G_1 = hh \in [60, 65)$	$G_0 = hh \in [55, 60)$	$G_1 = hh \in [60, 65)$	$G_0 = hh \in [55, 60)$	$G_1 = hh \in [60, 65)$	$G_0 = hh \in [55, 60)$	$G_1 = hh \in [60, 65)$
$T_0 = 2005/2007$	952	790	434	370	335	285	183	135
$T_1 = 2008/2009, 2011$	1486	1281	705	599	508	457	273	225

(a) Households

	Bolivia		Men		Women	
	$G_0 = i \in [55, 60)$	$G_1 = i \in [60, 65)$	$G_0 = i \in [55, 60)$	$G_1 = i \in [60, 65)$	$G_0 = i \in [55, 60)$	$G_1 = i \in [60, 65)$
$T_0 = 2005/2007$	1519	1217	716	581	803	636
$T_1 = 2008/2009, 2011$	2364	1912	1157	944	1207	968

(b) Individuals

Source: Authors' compilation based on ARU's harmonized set of Bolivian household surveys.
Notes: Sample of individuals and households constrained to observations with no missing values in all of the following variables: quintiles of the wealth index, dummy indicator of household members in the [0,4), [4,7), [7,16), and [16,19) cohorts, area of residence and region. Individual observations with missing values in any of the following variables: years of education, ethnic condition, and sex were excluded from the sample of individuals. Households with missing values in per capita income, per capita consumption, years of education of the household head, ethnic condition of the household head, and sex of the household head were excluded from the sample of households.

4.3.2 Future Beneficiaries

Future beneficiaries may also be subject to some of the incentives actual beneficiaries face due to anticipation effects. If it is not only actual but future non-labor income that affects actual labor supply of individuals, then the introduction of non-contributory pensions may also affect the present consumption of leisure of soon to become beneficiaries. In order to investigate the impact of *Renta Dignidad* on this people we compare the outcomes for the cohort of people whose age does not make them beneficiaries yet, but who will soon become program's beneficiaries after the 2007 reform, say people within the [55,60) years old interval, with those who were somewhat far from becoming program beneficiaries, i.e., the cohort of people whose ages are in the [50,55) years old interval. To differentiate the impact of the future stream of benefits from that arising from the indirect benefit of living with a direct program's beneficiary, we restrict the sample only to those people who are not living with a program beneficiary.

Table 4. Sample Sizes: Future Beneficiaries

	Bolivia		Men		Women	
	$G_0 = i$ $\in [50, 55)$	$G_1 = i$ $\in [55, 60)$	$G_0 = i$ $\in [50, 55)$	$G_1 = i$ $\in [55, 60)$	$G_0 = i$ $\in [50, 55)$	$G_1 = i$ $\in [55, 60)$
$T_0 = 2005/2007$	1734	1355	848	675	886	680
$T_1 = 2008/2009, 2011$	2343	1782	1187	996	1156	786

Source: Authors' compilation based on ARU's harmonized set of Bolivian household surveys.
Notes: Sample of individuals constrained to observations with no missing values in all of the following variables: quintiles of the wealth index, dummy indicator of household members in the [0,4), [4,7), [7,16), and [16,19) cohorts, area of residence and region, years of education, ethnic condition, and sex.

4.3.3 Indirect Beneficiaries

Indirect program's beneficiaries are people who did not receive the non-contributory pension but were residing in a household with an elderly person who was a program beneficiary. To differentiate the externality of living with an elderly person from those associated with the expectation of soon becoming a beneficiary we restrict our analysis to the sample of people who were somewhat far from becoming beneficiaries, i.e., those within the age interval [25,45) years old and living with a person in the [55,65) age interval. We assign the [25,45) cohort to the treatment group if people live with a household member in the [60,65) age interval and to the control group it people live with a household member in the [55,60) age interval. We focus our analysis on three particular sets of outcomes: the level and sector of participation, the supply of labor, measured as the (log) monthly total hours of work, and the (log) level of wage/earnings per hour.

We are also interested in analyzing the effects of *Renta Dignidad* on human capital accumulation, specifically in the form of education of children. Thus, we define another sample of indirect beneficiaries made of individuals in the [7,19) interval. We assign this cohort to the treatment or control group using the same criteria as above.

Table 5. Sample Sizes: Indirect Beneficiaries

	Bolivia		Men		Women	
	$G_0 = reside$ with $i \in [55, 60)$	$G_1 = reside$ with $i \in [60, 65)$	$G_0 = reside$ with $i \in [55, 60)$	$G_1 = reside$ with $i \in [60, 65)$	$G_0 = reside$ with $i \in [55, 60)$	$G_1 = reside$ with $i \in [60, 65)$
$T_0 = 2005/2007$	577	542	283	258	294	284
$T_1 = 2008/2009, 2011$	893	770	468	371	425	399

(a) Young adults (age $\in [25, 45)$)

	Bolivia		Men		Women	
	$G_0 = reside$ with $i \in [55, 60)$	$G_1 = reside$ with $i \in [60, 65)$	$G_0 = reside$ with $i \in [55, 60)$	$G_1 = reside$ with $i \in [60, 65)$	$G_0 = reside$ with $i \in [55, 60)$	$G_1 = reside$ with $i \in [60, 65)$
$T_0 = 2005/2007$	1044	630	548	320	496	310
$T_1 = 2008/2009, 2011$	1253	807	651	406	602	401

(b) Children (age $\in ([7, 19))$

Source: Authors' compilation based on ARU's harmonized set of Bolivian household surveys.
Notes: Sample of individuals constrained to observations with no missing values in all of the following variables: quintiles of the wealth index, dummy indicator of household members in the [0,4), [4,7), [7,16), and [16,19) cohorts, area of residence and region, years of education, ethnic condition, and sex.

4.3.4 Falsification Tests

Finally, the main assumption behind the DID and the CIC approaches is that treatment and control groups follow a common trend in the absence of the program. To test the validity of this assumption, we re-estimate all the parameters analyzed before using pre-program data. More specifically, we use the set of household surveys for two periods before the policy change, i.e., the 2000-2002 (G0') period with the 2005-2007 (G1') period. Notice that if the parallel time trend assumption is satisfied we should not get statistically significant estimates.

Table 6. Sample Sizes for Falsification Tests

	Bolivia		Men		Women		Both	
	$G_0 = hh$ $\in [55, 60)$	$G_1 = hh$ $\in [60, 65)$	$G_0 = hh$ $\in [55, 60)$	$G_1 = hh$ $\in [60, 65)$	$G_0 = hh$ $\in [55, 60)$	$G_1 = hh$ $\in [60, 65)$	$G_0 = hh$ $\in [55, 60)$	$G_1 = hh$ $\in [60, 65)$
$T_0 = 2000/2002$	1152	942	543	473	371	341	238	128
$T_1 = 2005/2007$	952	790	434	370	335	285	183	135

(a) Households

	Bolivia		Men		Women	
	$G_0 = i$ $\in [55, 60)$	$G_1 = i$ $\in [60, 65)$	$G_0 = i$ $\in [55, 60)$	$G_1 = i$ $\in [60, 65)$	$G_0 = i$ $\in [55, 60)$	$G_1 = i$ $\in [60, 65)$
$T_0 = 2000/2002$	1950	1468	955	738	995	730
$T_1 = 2005/2007$	1519	1217	716	581	803	636

(b) Individuals

Source: Authors' compilation based on ARU's harmonized set of Bolivian household surveys.
Notes: Sample of individuals and households constrained to observations with no missing values in all of the following variables: quintiles of the wealth index, dummy indicator of household members in the [0,4), [4,7), [7,16), and [16,19) cohorts, area of residence and region. Individual observations with missing values in any of the following variables: years of education, ethnic condition, and sex were excluded from the sample of individuals. Households with missing values in per capita income, per capita consumption, years of education of the household head, ethnic condition of the household head, and sex of the household head were excluded from the sample of households.

5. Intended and Unintended Effects of *Renta Dignidad*

In this section we report the results from our estimations using both the difference-in-difference and the changes-in-changes approaches. We begin analyzing household outcomes of direct beneficiaries. Then we analyze the effects on individual outcomes and finally proceed to analyze the results for future beneficiaries, indirect beneficiaries and finally report the results of the falsification tests.

5.1 Household Income, Consumption, Investment and Savings

5.1.1 Household Per Capita Income

Table 7 presents the DID average treatment effect estimates on total, labor and non-labor per capita household income and intra-household transfers. In all panels, the first column presents the average outcome for the control group, i.e., the [55,60) cohort, and the second column presents the average outcome for the treatment group, i.e., the [60,65) cohort. In both columns, the first row presents the average outcome ex ante, while the second row presents the average outcome ex post. Finally, the third column presents the DID average treatment effect, i.e., the ex post/ex ante difference of the treatment/control difference.

In the sample for Bolivia there is an increase of 17 percent in per capita household income, clearly caused by the introduction of non-contributory pensions for the treatment cohort. We do not find statistically significant evidence of effects on neither aggregate per capita labor income nor intra-household transfers. The latter implies that public transfer did not crowd out private transfers.

Disaggregating the results by sex we find that the program significantly increases non-labor income in the three subsamples of households with men (189 percent), women (300 percent), and men and women (271 percent) in the [60,65) cohort. In the case where the household has one male and one female beneficiary there are not significant effects on per capita household income but per capita labor income decreases 96 percent. Thus, households with a female beneficiary are the only ones that on average significantly increase their per capita household income, doing so by 36 percent.

Table 7. Effects on Household Income Outcomes: Diff-in-Diff

	Bolivia			Men			Women			Both		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
pc household income (log 2012 Bs. a month)												
T=0	6.32	6.20		6.39	6.29		6.31	6.10		6.18	6.12	
	[0.05]	[0.05]	0.17**	[0.07]	[0.08]	0.14	[0.07]	[0.09]	0.36***	[0.11]	[0.13]	−0.11
T=1	6.51	6.55	[0.09]	6.57	6.61	[0.13]	6.45	6.60	[0.14]	6.45	6.28	[0.20]
	[0.03]	[0.03]		[0.05]	[0.05]		[0.06]	[0.05]		[0.08]	[0.08]	
pc labor income (log 2012 Bs. a month)												
T=0	5.76	5.29		6.06	5.62		5.44	4.77		5.62	5.51	
	[0.07]	[0.09]	−0.21	[0.09]	[0.11]	0.02	[0.13]	[0.17]	−0.14	[0.16]	[0.17]	−0.96***
T=1	6.17	5.50	[0.14]	6.30	5.88	[0.19]	5.96	5.14	[0.28]	6.26	5.19	[0.31]
	[0.05]	[0.08]		[0.07]	[0.10]		[0.10]	[0.15]		[0.09]	[0.18]	
pc non-labor income (log 2012 Bs. a month)												
T=0	1.83	2.46		1.16	2.16		2.59	2.67		2.00	2.85	
	[0.11]	[0.13]	2.45***	[0.16]	[0.18]	1.89***	[0.19]	[0.21]	3.00***	[0.24]	[0.28]	2.71***
T=1	1.20	4.27	[0.20]	0.98	3.86	[0.30]	1.65	4.72	[0.34]	0.93	4.49	[0.46]
	[0.09]	[0.08]		[0.12]	[0.12]		[0.15]	[0.11]		[0.20]	[0.17]	
pc intra-household transfers (log 2012 Bs. a month)												
T=0	−0.09	0.11		−0.77	−0.41		0.73	0.69		−0.01	0.34	
	[0.11]	[0.12]	0.00	[0.13]	[0.16]	−0.39	[0.21]	[0.22]	0.38	[0.23]	[0.28]	0.16
T=1	−0.38	−0.19	[0.21]	−0.63	−0.66	[0.27]	0.20	0.54	[0.39]	−0.88	−0.38	[0.45]
	[0.09]	[0.10]		[0.12]	[0.12]		[0.17]	[0.19]		[0.18]	[0.21]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Tables 8, 9, 10 and 11 present, respectively, the average and quantile treatment effects of CIC estimates for household total per capita income, labor per capita income, non-labor per capita income, and intra-household transfers. Quantiles are defined based on the ex ante distribution of the outcome variable. We present both unconditional and conditional estimates. As expected, there is a statistically significant effect on per-capita household non-labor income between 244 to 257 percent in the full sample explained by statistically significant effects between 189 and 194 percent on men and between 293 and 303 percent on women. The differential impact on women and men can be explained by the relative more access to contributory pensions of men - which limits the amount of the monthly pension to Bs. 1,800 instead of the Bs. 2,400 that receive those without access to the non-contributory pensions. The results also confirm that the public transfer did not crowd out private transfers. Unexpectedly, we do find some negative statistically significant effects of the introduction of non-contributory pensions on per capita household labor income. The average treatment CIC estimate for the full sample is around -30 and -33 percent and significant at the 10 percent level for conditional and unconditional estimates. These negative effects are more substantial in the case where the household has male and female beneficiaries.

Consequently, the overall effect on per capita household income is offset. Thus, the unconditional effect is only 17 percent significant at the 10 percent level of confidence, but the conditional estimate is not statistically significant. The quintile treatment effects show that the effects of the program are bigger in the poorest segment of the population, especially in the case of women. It is also worth noticing that even in the poorest segment of the subsample of households with men the effects are not significant.

Table 8. Effects on (log) Household Per Capita Income: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.17*	0.58**	0.29	0.04	0.06	0.16
	[0.10]	[0.23]	[0.21]	[0.10]	[0.08]	[0.11]
$\tau^{CIC}_{w/cov}$	0.15	0.53*	0.40	0.02	−0.13	0.05
	[0.16]	[0.27]	[0.30]	[0.20]	[0.20]	[0.16]
Men						
τ^{CIC}	0.13	0.17	0.20	−0.02	0.05	0.27*
	[0.11]	[0.32]	[0.24]	[0.11]	[0.11]	[0.15]
$\tau^{CIC}_{w/cov}$	0.05	0.04	0.12	0.01	−0.05	0.11
	[0.19]	[0.42]	[0.34]	[0.23]	[0.22]	[0.20]
Women						
τ^{CIC}	0.36***	1.04***	0.78**	0.22	0.16	0.04
	[0.13]	[0.32]	[0.38]	[0.17]	[0.11]	[0.18]
$\tau^{CIC}_{w/cov}$	0.45**	1.42***	0.88**	0.30	0.18	0.14
	[0.21]	[0.44]	[0.40]	[0.27]	[0.28]	[0.26]
Both						
τ^{CIC}	−0.13	0.10	0.09	−0.38**	−0.15	−0.05
	[0.16]	[0.58]	[0.36]	[0.17]	[0.16]	[0.26]
$\tau^{CIC}_{w/cov}$	−0.20	−0.40	0.05	−0.58	−0.17	−0.31
	[0.29]	[0.66]	[0.50]	[0.49]	[0.44]	[0.41]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 9. Effects on (log) Household Per-Capita Labor Income: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.30*	−0.43	−0.30	−0.14	−0.06	−0.04
	[0.15]	[0.79]	[0.24]	[0.11]	[0.08]	[0.08]
$\tau^{CIC}_{w/cov}$	−0.33*	−0.38	−0.54*	−0.17	−0.04	−0.12
	[0.18]	[0.82]	[0.32]	[0.16]	[0.13]	[0.16]
Men						
τ^{CIC}	−0.02	0.29	−0.24	−0.05	0.04	0.11
	[0.20]	[1.62]	[0.30]	[0.12]	[0.12]	[0.14]
$\tau^{CIC}_{w/cov}$	−0.09	0.09	−0.43	−0.05	−0.07	0.09
	[0.22]	[1.01]	[0.43]	[0.25]	[0.21]	[0.17]
Women						
τ^{CIC}	−0.26	−4.57***	0.16	−0.12	0.00	−0.04
	[0.30]	[1.74]	[0.52]	[0.14]	[0.13]	[0.23]
$\tau^{CIC}_{w/cov}$	−0.20	−2.90**	0.41	0.00	−0.01	0.08
	[0.33]	[1.34]	[0.94]	[0.25]	[0.20]	[0.25]
Both						
τ^{CIC}	−0.99***	−2.72*	−1.14**	−0.57**	−0.31*	−0.26
	[0.24]	[1.47]	[0.49]	[0.28]	[0.19]	[0.23]
$\tau^{CIC}_{w/cov}$	−1.08***	−3.44***	−1.51**	−0.66**	−0.17	−0.43
	[0.27]	[1.04]	[0.64]	[0.33]	[0.30]	[0.41]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 10. Effects on (log) Household Per-Capita Non-Labor Income: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	2.57***	0.00	4.54***	5.77***	0.59**	0.39**
	[0.19]	[0.00]	[0.09]	[0.03]	[0.26]	[0.16]
$\tau^{CIC}_{w/cov}$	2.44***	0.91***	4.29***	4.12***	0.63*	0.51*
	[0.22]	[0.22]	[0.17]	[0.38]	[0.37]	[0.28]
Men						
τ^{CIC}	1.94***	0.00	2.46**	5.48***	0.11	0.17
	[0.30]	[0.00]	[1.13]	[1.03]	[0.35]	[0.32]
$\tau^{CIC}_{w/cov}$	1.89***	0.50**	2.13***	3.72***	0.18	−0.44
	[0.32]	[0.25]	[0.77]	[0.61]	[0.52]	[0.48]
Women						
τ^{CIC}	3.03***	2.88**	4.86***	5.88***	0.91***	0.78***
	[0.31]	[1.15]	[0.09]	[1.05]	[0.32]	[0.25]
$\tau^{CIC}_{w/cov}$	2.93***	3.35***	4.88***	4.55***	1.10**	0.79*
	[0.35]	[0.91]	[0.30]	[0.65]	[0.51]	[0.42]
Both						
τ^{CIC}	2.93***	0.00	4.86***	6.04***	0.16	0.50
	[0.46]	[1.16]	[0.50]	[1.19]	[0.55]	[0.51]
$\tau^{CIC}_{w/cov}$	2.83***	1.00	4.68***	4.11***	1.91	0.36
	[0.51]	[1.11]	[0.55]	[0.92]	[1.30]	[0.86]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 11. Effects on (log) Per-Capita Intra-Household Transfers: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.08	0.00	0.00	0.00	0.47	−0.22
	[0.24]	[0.00]	[0.00]	[0.00]	[0.91]	[0.34]
$\tau^{CIC}_{w/cov}$	0.02	0.00	−0.12	−0.16	0.18	0.14
	[0.27]	[0.05]	[0.09]	[0.13]	[0.96]	[0.49]
Men						
τ^{CIC}	−0.40	0.00	0.00	0.00	−1.25	−0.79
	[0.30]	[0.00]	[0.00]	[0.00]	[1.76]	[0.60]
$\tau^{CIC}_{w/cov}$	−0.36	0.07	−0.09	−0.13	−1.10	−0.46
	[0.27]	[0.08]	[0.09]	[0.10]	[1.72]	[0.61]
Women						
τ^{CIC}	0.62	0.00	0.00	0.00	0.42	0.26
	[0.46]	[0.00]	[0.00]	[0.00]	[1.17]	[0.51]
$\tau^{CIC}_{w/cov}$	0.28	0.05	−0.06	−0.16	0.23	−0.12
	[0.48]	[0.24]	[0.25]	[0.19]	[0.95]	[0.56]
Both						
τ^{CIC}	0.46	0.00	0.00	0.00	5.00***	0.17
	[0.52]	[0.00]	[0.00]	[0.00]	[1.83]	[2.00]
$\tau^{CIC}_{w/cov}$	0.46	−0.06	0.03	0.08	4.19**	−0.33
	[0.52]	[0.09]	[0.11]	[0.23]	[1.70]	[1.47]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.1.2 Poverty Measures

Renta Dignidad was meant to provide a minimum standard of living to the Bolivian elderly. Our previous results confirm that the program has indeed increased significantly the income of some of the poorest segment of the population. However, Table 12 reveals that *Renta Dignidad* did not cause reduction in moderate poverty among households with a beneficiary. Even though the increment in per capita household income of females was larger, the program did not reduce their moderate poverty levels. Furthermore, the program did not even reduce poverty when the household has two beneficiaries (male and female).

It is still possible that the non-contributory transfer helped to reduce extreme poverty among households with beneficiaries. The DID estimates show that the program reduced extreme poverty in the full sample by 5 percentage points (significant at 10 percent). The decrease of 10 percentage points among households with female beneficiaries is significant, and bigger than the

non-significant decrease of extreme poverty among households with male beneficiaries. An important result is that there are not significant effects on the extreme poverty levels of households with two beneficiaries, a man and a woman. These are probably the most vulnerable households, and yet the program does not help them to overcome extreme poverty.

As expected, there are significant reductions in both moderate and extreme poverty gap in the full sample. Moreover, the program also helped to reduce moderate and extreme severity of poverty. However, the reduction in poverty gap and severity are significant only in the case of households with female beneficiaries.

Table 12. Effects on Poverty Measures: Diff-in-Diff

	Bolivia			Men			Women			Both		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
(a) **Moderate poverty**												
Incidence												
T=0	0.50	0.52		0.48	0.50		0.50	0.54		0.53	0.51	
	[0.02]	[0.02]	0.00	[0.03]	[0.03]	0.02	[0.03]	[0.03]	−0.08	[0.04]	[0.04]	0.08
T=1	0.43	0.45	[0.03]	0.39	0.44	[0.05]	0.47	0.43	[0.06]	0.46	0.52	[0.08]
	[0.01]	[0.02]		[0.02]	[0.02]		[0.02]	[0.03]		[0.03]	[0.04]	
Gap												
T=0	0.26	0.29		0.25	0.28		0.25	0.30		0.29	0.29	
	[0.01]	[0.01]	−0.05**	[0.02]	[0.02]	−0.04	[0.02]	[0.02]	−0.09**	[0.03]	[0.03]	0.01
T=1	0.22	0.20	[0.02]	0.20	0.19	[0.03]	0.23	0.19	[0.04]	0.23	0.24	[0.05]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.02]	[0.01]		[0.02]	[0.02]	
Severity												
T=0	0.17	0.20		0.17	0.19		0.16	0.21		0.19	0.20	
	[0.01]	[0.01]	−0.05***	[0.01]	[0.02]	−0.04	[0.01]	[0.02]	−0.09***	[0.02]	[0.03]	−0.01
T=1	0.14	0.12	[0.02]	0.14	0.12	[0.03]	0.15	0.11	[0.03]	0.15	0.15	[0.04]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]		[0.02]	[0.02]	
(b) **Extreme poverty**												
Incidence												
T=0	0.29	0.32		0.29	0.32		0.30	0.33		0.30	0.30	
	[0.02]	[0.02]	−0.05*	[0.02]	[0.03]	−0.05	[0.03]	[0.03]	−0.10**	[0.04]	[0.04]	0.05
T=1	0.24	0.21	[0.03]	0.23	0.21	[0.04]	0.25	0.19	[0.05]	0.24	0.29	[0.07]
	[0.01]	[0.01]		[0.02]	[0.02]		[0.02]	[0.02]		[0.03]	[0.03]	
Gap												
T=0	0.15	0.17		0.15	0.16		0.14	0.18		0.16	0.18	
	[0.01]	[0.01]	−0.05***	[0.01]	[0.02]	−0.03	[0.01]	[0.02]	−0.08***	[0.02]	[0.03]	−0.02
T=1	0.12	0.09	[0.02]	0.12	0.09	[0.03]	0.12	0.08	[0.03]	0.12	0.12	[0.04]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]		[0.02]	[0.02]	
Severity												
T=0	0.10	0.12		0.10	0.11		0.08	0.13		0.11	0.12	
	[0.01]	[0.01]	−0.04***	[0.01]	[0.01]	−0.03	[0.01]	[0.02]	−0.08***	[0.02]	[0.02]	−0.02
T=1	0.08	0.06	[0.01]	0.08	0.06	[0.02]	0.08	0.05	[0.02]	0.08	0.07	[0.04]
	[0.01]	[0.00]		[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

According to Table 13, the CIC estimates show that there is no evidence of significant reductions of moderate and extreme poverty in the full sample due to *Renta Dignidad*. These estimates also show that there are no effects on poverty incidence in the sample of households with male beneficiaries and households with both male and female beneficiaries. The only case where there is evidence of significant reductions in the levels of extreme poverty is in the sample of households with female beneficiaries. The results suggest that the program reduced the extreme poverty of households with female beneficiaries by 10 to 14 percentage points, significant at the 5 percent confidence level.

Although the conditional estimates of moderate and extreme poverty gap are not significant for the full sample, the unconditional CIC estimates tell us that the program reduced on average these indicators by 5 percentage points. The unconditional and conditional CIC estimates confirm our previous finding that the program only reduced moderate and extreme poverty gap of households with female beneficiaries.

The CIC estimates of moderate and extreme poverty severity show that the program is more effective to reduce such measures, especially among households with female beneficiaries, in comparison to poverty gap and incidence. To be more specific, the program reduced the severity of moderate poverty 5 percentage points and the severity of extreme poverty 4 percentage points. The effects are significant in the sample of women but not in the other two samples.

Table 13. Effects on Poverty Measures: Changes-in-Changes

	Bolivia	Men	Women	Both
Moderate poverty				
τ^{CIC}	0.00	0.03	−0.07	0.08
	[0.04]	[0.04]	[0.06]	[0.07]
$\tau^{CIC}_{w/cov}$	0.00	0.05	−0.09	0.07
	[0.05]	[0.06]	[0.07]	[0.09]
Extreme poverty				
τ^{CIC}	−0.05	−0.05	−0.10**	0.05
	[0.04]	[0.04]	[0.05]	[0.07]
$\tau^{CIC}_{w/cov}$	−0.05	−0.02	−0.14**	0.06
	[0.06]	[0.06]	[0.06]	[0.11]

(a) Incidence

	Bolivia	Men	Women	Both
Moderate poverty				
τ^{CIC}	−0.05*	−0.03	−0.09***	0.00
	[0.03]	[0.03]	[0.03]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.04	−0.01	−0.11**	0.02
	[0.04]	[0.04]	[0.05]	[0.08]
Extreme poverty				
τ^{CIC}	−0.05**	−0.03	−0.09***	−0.02
	[0.02]	[0.02]	[0.03]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.04	−0.02	−0.10***	0.00
	[0.03]	[0.03]	[0.04]	[0.06]

(b) Gap

	Bolivia	Men	Women	Both
Moderate poverty				
τ^{CIC}	−0.05**	−0.03	−0.09***	−0.01
	[0.02]	[0.02]	[0.03]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.05	−0.02	−0.11***	0.01
	[0.03]	[0.03]	[0.04]	[0.06]
Extreme poverty				
τ^{CIC}	−0.04***	−0.03	−0.08***	−0.02
	[0.02]	[0.02]	[0.02]	[0.04]
$\tau^{CIC}_{w/cov}$	−0.04*	−0.02	−0.09***	0.00
	[0.02]	[0.02]	[0.03]	[0.05]

(c) Severity

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.1.3 Household Per Capita Consumption

Table 14 presents the DID average treatment estimates on total, food and non-food household consumption. In this case, our main result is that the increase in per capita household income did not increase per capita household consumption.[11] The disaggregation by sex also shows no significant effects on any of the outcomes related to household consumption.

[11] We estimated the effects using different definitions of per capita household consumption, which showed no significant results and are available upon request.

Table 14. Effects on Household Consumption Outcomes: Diff-in-Diff

	Bolivia			Men			Women			Both		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
pc household consumption (log 2012 Bs. a month)												
T=0	6.53	6.54		6.50	6.60		6.59	6.53		6.49	6.42	
	[0.03]	[0.03]	−0.01	[0.05]	[0.05]	−0.10	[0.04]	[0.06]	0.11	[0.06]	[0.07]	0.00
T=1	6.74	6.75	[0.05]	6.78	6.78	[0.08]	6.74	6.79	[0.09]	6.65	6.57	[0.11]
	[0.02]	[0.02]		[0.03]	[0.03]		[0.03]	[0.04]		[0.05]	[0.05]	
pc food consumption (log 2012 Bs. a month)												
T=0	5.97	5.96		5.94	6.01		6.03	5.93		5.95	5.86	
	[0.03]	[0.03]	0.04	[0.04]	[0.04]	−0.06	[0.04]	[0.05]	0.13	[0.05]	[0.06]	0.09
T=1	6.18	6.20	[0.05]	6.21	6.23	[0.07]	6.18	6.21	[0.08]	6.10	6.11	[0.10]
	[0.02]	[0.02]		[0.03]	[0.03]		[0.03]	[0.04]		[0.04]	[0.05]	
pc non-food consumption (log 2012 Bs. a month)												
T=0	4.10	4.07		4.11	4.20		4.13	3.99		4.03	3.89	
	[0.04]	[0.05]	0.01	[0.07]	[0.08]	−0.07	[0.07]	[0.09]	0.13	[0.09]	[0.12]	−0.02
T=1	4.35	4.34	[0.09]	4.40	4.42	[0.13]	4.37	4.36	[0.14]	4.18	4.03	[0.19]
	[0.03]	[0.04]		[0.05]	[0.06]		[0.06]	[0.07]		[0.08]	[0.09]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Tables 15, 16, and 17 show the CIC estimates for per-capita household consumption, food consumption and non-food consumption, respectively. Once again there are not significant results on food and non-food consumption and not only on average, but also on quintiles of their distributions. Although the results for total per capita household consumption show no significant average treatment effects, there is evidence of an increase of 33 percent to 39 percent in the 20th percentile for the subsample of women.

Possibly households do not increase their consumption because they may have other needs that would like to cover first. For example, it is still possible that households use the extra resources for investments on dwelling improvements, acquisition of durables or human capital accumulation.

Table 15. Effects on (log) Per-Capita Household Consumption: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.01	−0.06	0.08	−0.01	0.06	0.02
	[0.06]	[0.09]	[0.08]	[0.05]	[0.06]	[0.09]
$\tau^{CIC}_{w/cov}$	−0.03	0.10	0.05	−0.05	−0.08	0.00
	[0.09]	[0.16]	[0.13]	[0.11]	[0.13]	[0.13]
Men						
τ^{CIC}	−0.09	−0.17*	−0.05	−0.03	0.04	0.10
	[0.07]	[0.10]	[0.11]	[0.07]	[0.10]	[0.15]
$\tau^{CIC}_{w/cov}$	−0.13	−0.25	−0.16	−0.20	−0.19	0.11
	[0.12]	[0.21]	[0.16]	[0.14]	[0.18]	[0.15]
Women						
τ^{CIC}	0.09	0.19	0.33***	0.04	0.14	−0.05
	[0.08]	[0.18]	[0.12]	[0.09]	[0.13]	[0.20]
$\tau^{CIC}_{w/cov}$	0.14	0.60***	0.39**	0.08	−0.07	−0.03
	[0.13]	[0.22]	[0.18]	[0.18]	[0.21]	[0.21]
Both						
τ^{CIC}	0.00	−0.04	−0.05	0.01	−0.03	0.23
	[0.09]	[0.28]	[0.17]	[0.11]	[0.13]	[0.18]
$\tau^{CIC}_{w/cov}$	−0.05	−0.15	−0.12	0.03	−0.09	0.19
	[0.18]	[0.32]	[0.29]	[0.22]	[0.27]	[0.36]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 16. Effects on (log) Per-Capita Household Food Consumption: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.04	0.06	0.03	0.05	0.08	0.07
	[0.04]	[0.10]	[0.07]	[0.05]	[0.06]	[0.07]
$\tau^{CIC}_{w/cov}$	0.03	0.00	0.10	0.00	0.07	0.14
	[0.07]	[0.16]	[0.11]	[0.09]	[0.07]	[0.12]
Men						
τ^{CIC}	−0.04	−0.06	−0.12	−0.05	−0.06	−0.02
	[0.06]	[0.13]	[0.09]	[0.08]	[0.11]	[0.12]
$\tau^{CIC}_{w/cov}$	−0.07	−0.23	−0.19	−0.11	0.04	0.04
	[0.09]	[0.20]	[0.14]	[0.12]	[0.11]	[0.19]
Women						
τ^{CIC}	0.12*	0.07	0.07	0.19**	0.17	0.16
	[0.06]	[0.17]	[0.09]	[0.08]	[0.11]	[0.16]
$\tau^{CIC}_{w/cov}$	0.15	0.25	0.32**	0.13	0.20*	0.00
	[0.09]	[0.18]	[0.13]	[0.14]	[0.12]	[0.22]
Both						
τ^{CIC}	0.08	0.10	0.12	0.07	0.14	0.24
	[0.09]	[0.17]	[0.17]	[0.10]	[0.14]	[0.15]
$\tau^{CIC}_{w/cov}$	0.07	0.18	−0.02	0.04	0.22	0.20
	[0.12]	[0.24]	[0.30]	[0.16]	[0.21]	[0.20]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 17. Effects on (log) Per-Capita Household Non-Food Consumption: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.01	−0.06	0.05	0.02	0.04	−0.06
	[0.08]	[0.20]	[0.10]	[0.09]	[0.08]	[0.12]
$\tau^{CIC}_{w/cov}$	0.00	−0.05	0.09	0.04	−0.02	−0.07
	[0.12]	[0.21]	[0.20]	[0.18]	[0.20]	[0.19]
Men						
τ^{CIC}	−0.06	−0.01	0.07	0.08	−0.01	−0.14
	[0.12]	[0.20]	[0.13]	[0.15]	[0.13]	[0.17]
$\tau^{CIC}_{w/cov}$	−0.11	−0.31	−0.01	−0.10	−0.14	−0.20
	[0.17]	[0.30]	[0.22]	[0.28]	[0.27]	[0.22]
Women						
τ^{CIC}	0.16	−0.13	0.14	0.03	0.17	0.06
	[0.13]	[0.32]	[0.16]	[0.13]	[0.12]	[0.23]
$\tau^{CIC}_{w/cov}$	0.21	0.29	0.45	0.15	0.15	0.23
	[0.19]	[0.39]	[0.28]	[0.26]	[0.32]	[0.36]
Both						
τ^{CIC}	−0.02	0.21	0.03	−0.09	−0.07	0.02
	[0.20]	[0.43]	[0.30]	[0.25]	[0.19]	[0.21]
$\tau^{CIC}_{w/cov}$	−0.10	0.13	−0.15	0.01	−0.25	−0.06
	[0.28]	[0.52]	[0.37]	[0.44]	[0.45]	[0.52]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.1.4 Household Investments

Table 18 presents the DID estimates of the effects on education, health, durables and dwelling investments. The estimates show that *Renta Dignidad* did not increase on average the investments on education, health or the expenditure on durables. Moreover, these results do not depend on the sex of the beneficiary. Nevertheless, the DID effects do show a 25 percent increase in dwelling investments, significant at the 10 percent level. This implies that households with beneficiaries prioritize the enhancement of living conditions in the form of dwelling improvements instead of investing in the form of human capital.

Table 18. Effects on Household Investments: Diff-in-Diff

	Bolivia			Men			Women			Both		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
Education expenditure (log 2012 Bs. a month)												
T=0	1.16	0.32		1.51	0.71		0.74	0.11		1.14	−0.29	
	[0.12]	[0.13]	−0.02	[0.17]	[0.20]	0.01	[0.21]	[0.22]	0.00	[0.26]	[0.31]	−0.07
T=1	0.98	0.13	[0.24]	1.27	0.47	[0.34]	0.64	0.01	[0.40]	0.94	−0.56	[0.53]
	[0.10]	[0.12]		[0.15]	[0.17]		[0.18]	[0.20]		[0.25]	[0.25]	
Health expenditure (log 2012 Bs. a month)												
T=0	−0.27	−0.21		−0.40	−0.36		−0.07	0.02		−0.32	−0.29	
	[0.10]	[0.12]	0.04	[0.15]	[0.17]	0.00	[0.18]	[0.19]	−0.07	[0.23]	[0.28]	0.37
T=1	−0.19	−0.09	[0.21]	−0.20	−0.17	[0.30]	−0.07	−0.05	[0.36]	−0.38	0.03	[0.48]
	[0.09]	[0.10]		[0.13]	[0.15]		[0.16]	[0.18]		[0.22]	[0.24]	
Expenditure on durables (last year) (log 2012 Bs. a month)												
T=0	1.78	1.37		1.84	1.44		1.67	1.25		1.84	1.42	
	[0.09]	[0.10]	0.10	[0.14]	[0.15]	−0.03	[0.15]	[0.16]	0.31	[0.22]	[0.23]	−0.01
T=1	1.65	1.34	[0.18]	1.79	1.36	[0.27]	1.49	1.38	[0.30]	1.63	1.20	[0.42]
	[0.08]	[0.08]		[0.12]	[0.12]		[0.14]	[0.15]		[0.19]	[0.18]	
Dwelling investments (log 2012 Bs. of 2012 a month)												
T=0	−0.31	−0.57		−0.45	−0.64		−0.30	−0.47		−0.01	−0.59	
	[0.08]	[0.08]	0.25*	[0.12]	[0.11]	0.09	[0.14]	[0.14]	0.36	[0.20]	[0.17]	0.40
T=1	−0.40	−0.41	[0.15]	−0.37	−0.46	[0.21]	−0.57	−0.38	[0.25]	−0.15	−0.34	[0.36]
	[0.07]	[0.07]		[0.09]	[0.10]		[0.10]	[0.13]		[0.19]	[0.17]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Tables 19, 20, 21 and 22 present, respectively, the CIC estimates for household investment in education, health, durables and dwelling. Under the two methodological approaches we find no evidence of effects of non-contributory pensions on household investments, with the exception of investments in dwelling. According to the CIC estimates the average investment on dwelling increases 23 to 24 percent due to *Renta Dignidad*. Unlike other kinds of investment, which benefit only one portion of household members, the improvement of dwelling conditions can benefit all of the members of the household, which is probably why it is the preferred type of investment.

Table 19. Effects on (log) Education Expenditure: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.00	0.00	0.00	0.00	−0.04	0.04
	[0.18]	[0.00]	[0.00]	[2.38]	[0.18]	[0.14]
$\tau^{CIC}_{w/cov}$	0.07	0.05	−0.08	0.07	0.02	0.26
	[0.33]	[0.10]	[0.20]	[1.59]	[0.34]	[0.38]
Men						
τ^{CIC}	−0.12	0.00	0.00	−0.77	0.07	−0.01
	[0.28]	[0.00]	[0.00]	[2.90]	[0.28]	[0.31]
$\tau^{CIC}_{w/cov}$	−0.05	−0.13	0.05	−0.15	−0.16	0.40
	[0.53]	[0.26]	[0.47]	[2.33]	[0.51]	[0.49]
Women						
τ^{CIC}	0.11	0.00	0.00	0.00	−0.09	0.19
	[0.38]	[0.00]	[0.00]	[1.33]	[0.31]	[0.24]
$\tau^{CIC}_{w/cov}$	0.37	0.18	0.08	0.36	1.00	−0.10
	[0.61]	[0.14]	[0.40]	[1.68]	[0.66]	[0.93]
Both						
τ^{CIC}	0.06	0.00	0.00	0.00	−0.62*	−0.15
	[0.42]	[0.00]	[0.00]	[1.17]	[0.37]	[0.31]
$\tau^{CIC}_{w/cov}$	−0.24	−0.11	−0.04	−0.04	−0.80	−0.47
	[0.72]	[0.27]	[0.42]	[0.99]	[0.96]	[0.77]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 20. Effects on (log) Health Expenditure: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.04	0.00	0.00	0.18	−0.31	−0.02
	[0.22]	[0.00]	[0.00]	[0.84]	[0.21]	[0.23]
$\tau^{CIC}_{w/cov}$	0.03	−0.01	0.06	0.20	0.17	−0.18
	[0.24]	[0.16]	[0.18]	[0.79]	[0.31]	[0.28]
Men						
τ^{CIC}	−0.01	0.00	0.00	0.18	−0.32	0.02
	[0.28]	[0.00]	[0.00]	[1.26]	[0.23]	[0.32]
$\tau^{CIC}_{w/cov}$	−0.08	−0.06	−0.05	0.31	−0.15	0.08
	[0.32]	[0.18]	[0.23]	[0.87]	[0.40]	[0.40]
Women						
τ^{CIC}	−0.08	0.00	0.00	0.27	−0.30	0.29
	[0.41]	[0.00]	[0.00]	[1.98]	[0.41]	[0.32]
$\tau^{CIC}_{w/cov}$	−0.02	0.50	−0.05	−0.10	−0.10	0.25
	[0.50]	[0.33]	[0.38]	[1.11]	[0.62]	[0.37]
Both						
τ^{CIC}	0.36	0.00	0.00	4.45***	−0.55	−0.61
	[0.43]	[0.00]	[0.00]	[1.27]	[0.55]	[0.62]
$\tau^{CIC}_{w/cov}$	0.40	−0.19	−0.02	2.39**	0.79	−0.57
	[0.48]	[0.28]	[0.33]	[1.20]	[0.75]	[0.80]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 21. Effects on (log) Last Year's Expenditure on Durables: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.03	0.00	0.00	0.00	0.03	0.02
	[0.20]	[0.00]	[0.00]	[0.00]	[0.30]	[0.26]
$\tau^{CIC}_{w/cov}$	0.12	0.07	0.05	0.05	0.07	0.01
	[0.21]	[0.11]	[0.11]	[0.19]	[0.38]	[0.38]
Men						
τ^{CIC}	−0.04	0.00	0.00	0.00	−0.43	−0.32
	[0.27]	[0.00]	[0.00]	[0.00]	[0.37]	[0.51]
$\tau^{CIC}_{w/cov}$	−0.07	−0.13	0.09	−0.11	−0.18	−0.54
	[0.33]	[0.19]	[0.17]	[0.31]	[0.63]	[0.58]
Women						
τ^{CIC}	0.19	0.00	0.00	0.00	0.29	0.40
	[0.23]	[0.00]	[0.00]	[0.00]	[0.40]	[0.44]
$\tau^{CIC}_{w/cov}$	0.39	0.17	0.09	0.27	0.36	0.58
	[0.31]	[0.18]	[0.24]	[0.25]	[0.58]	[0.55]
Both						
τ^{CIC}	−0.05	0.00	0.00	0.00	−0.08	−0.51
	[0.44]	[0.00]	[0.00]	[0.00]	[1.02]	[0.71]
$\tau^{CIC}_{w/cov}$	0.06	0.45***	0.26	−0.23	−0.18	−0.44
	[0.43]	[0.17]	[0.21]	[0.38]	[1.45]	[0.92]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 22. Effects on (log) Dwelling Investments: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.23**	0.00	0.00	0.00	0.00	1.61
	[0.12]	[0.00]	[0.00]	[0.00]	[0.00]	[1.32]
$\tau^{CIC}_{w/cov}$	0.24**	0.01	0.00	0.03	0.13	1.19
	[0.12]	[0.02]	[0.03]	[0.07]	[0.12]	[1.11]
Men						
τ^{CIC}	0.11	0.00	0.00	0.00	0.00	1.05
	[0.23]	[0.00]	[0.00]	[0.00]	[0.76]	[1.19]
$\tau^{CIC}_{w/cov}$	0.05	0.00	−0.01	0.02	0.06	0.62
	[0.25]	[0.03]	[0.04]	[0.12]	[0.83]	[1.05]
Women						
τ^{CIC}	0.34	0.00	0.00	0.00	0.00	2.59
	[0.23]	[0.00]	[0.00]	[0.00]	[0.63]	[1.80]
$\tau^{CIC}_{w/cov}$	0.39	0.00	0.05	0.13	0.27	2.75*
	[0.24]	[0.04]	[0.05]	[0.15]	[0.56]	[1.52]
Both						
τ^{CIC}	0.39	0.00	0.00	0.00	0.00	2.30
	[0.33]	[0.00]	[0.00]	[0.00]	[1.94]	[1.71]
$\tau^{CIC}_{w/cov}$	0.42	0.01	−0.08	−0.05	0.08	2.46*
	[0.38]	[0.07]	[0.07]	[0.14]	[1.39]	[1.48]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.1.5 Household Savings

Now we focus our attention on household saving measures to see if there is any remainder after investing in dwelling improvements that households could use to offset the effects of negative shocks. Table 23 reports the DID estimates for household saving and three different definitions of saving rates. The first one is the common saving as proportion of income, the second one is the less common saving as proportion of consumption, which helps to mitigate the effect of extreme values in the distribution of income, and the third measure is an approximation of saving rates using the difference of the log of income and consumption.

Focusing on household saving the estimates indicate an increase of Bs. 460, significant at a 10 percent level of confidence. The increase in the subsample of households with men as beneficiaries is of Bs. 890, which is bigger than the effect on household saving where women are

beneficiaries. In fact, the effects on household saving are not significant in households with female beneficiaries and households with both men and women beneficiaries.

Regarding saving rates, the DID estimates show that the program increased by 1.15 the saving rate as proportion of income in the full sample. Though there are not effects on the subsample of men, in the case of women the saving rate increased by 1.78. As we stated previously, this results may be influenced by the presence of outliers, but saving rates as a proportion of consumption confirm that the program increased saving rates in the full sample.

Table 23. Effects on Saving Rates: Diff-in-Diff

	Bolivia			Men			Women			Both		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
Household saving (thousands of real 2012 Bs.)												
T=0	0.80	0.29		1.29	0.41		0.16	0.02		0.83	0.57	
	[0.18]	[0.13]	0.46*	[0.34]	[0.19]	0.89**	[0.17]	[0.23]	0.17	[0.35]	[0.21]	−0.06
T=1	0.31	0.26	[0.26]	0.38	0.39	[0.44]	0.15	0.18	[0.36]	0.41	0.08	[0.49]
	[0.09]	[0.09]		[0.14]	[0.15]		[0.15]	[0.15]		[0.21]	[0.16]	
Saving rate as proportion of income: (y-c)/y												
T=0	−1.19	−1.95		−1.22	−1.70		−1.08	−2.40		−1.35	−1.68	
	[0.23]	[0.32]	1.15***	[0.46]	[0.48]	1.02	[0.19]	[0.55]	1.78***	[0.35]	[0.64]	0.21
T=1	−1.22	−0.82	[0.43]	−1.23	−0.68	[0.70]	−1.18	−0.72	[0.63]	−1.30	−1.42	[0.98]
	[0.15]	[0.09]		[0.19]	[0.09]		[0.21]	[0.11]		[0.52]	[0.39]	
Saving rate as proportion of consumption: (y-c)/c												
T=0	0.16	0.01		0.29	0.03		0.01	−0.03		0.13	0.04	
	[0.04]	[0.03]	0.11*	[0.06]	[0.04]	0.20*	[0.04]	[0.05]	0.10	[0.10]	[0.07]	−0.07
T=1	0.10	0.07	[0.06]	0.16	0.09	[0.11]	0.01	0.07	[0.09]	0.14	−0.02	[0.15]
	[0.03]	[0.02]		[0.06]	[0.04]		[0.04]	[0.04]		[0.07]	[0.05]	
Difference of log(income) and log(consumption) (ln(y)- ln(c))												
T=0	−0.21	−0.35		−0.11	−0.31		−0.27	−0.42		−0.30	−0.30	
	[0.03]	[0.04]	0.18***	[0.05]	[0.05]	0.23***	[0.05]	[0.06]	0.25**	[0.08]	[0.09]	−0.11
T=1	−0.23	−0.20	[0.06]	−0.21	−0.17	[0.09]	−0.29	−0.19	[0.10]	−0.19	−0.29	[0.15]
	[0.03]	[0.02]		[0.04]	[0.04]		[0.04]	[0.04]		[0.06]	[0.06]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Tables 24, 25, 26, and 27 show the CIC estimates of the effects of *Renta Dignidad* on saving measures. The CIC estimates for household saving does not confirm significant effects on this variable for the full sample, but it indicates that household saving of households where there are male beneficiaries increased on average by Bs. 728.56 (unconditional) and Bs. 656.77 (conditional).

The CIC estimates for saving rates show significant effects on unconditional saving rates as proportion of income for the full sample (1.36), for households with men (1.27), and households with women (2.27) in the [60,65) cohort at 5 and 10 percent significance levels.

There are not significant average effects on households with both a man and a woman beneficiary, and even a decrease in the 80th percentile. The effect on saving rates as proportion of consumption does not provide evidence of average effects for the full sample and the sample of women, but there is a significant effect on the subsample of men of 0.16 (unconditional) and 0.15 (conditional). However, there is evidence of effects on the lower percentiles of the distribution of saving as proportion of consumption in the full sample and subsamples of men and women.

Finally, the CIC estimates for the saving rates as the difference of log income and consumption indicate that *Renta Dignidad* increased the saving rate of households with an old-age household member independently of its sex. These estimates also confirm that households that have both a man and a woman as beneficiaries do not increase their household saving rate.

Table 24. Effects on Saving (hundreds of Bs.): Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	3.40	0.89	1.44	1.04	−0.38	−1.89
	[2.16]	[2.27]	[1.90]	[1.04]	[2.89]	[5.55]
$\tau^{CIC}_{w/cov}$	3.22	2.03	2.43	1.80	−1.75	−2.19
	[2.14]	[2.46]	[1.58]	[1.54]	[3.74]	[6.92]
Men						
τ^{CIC}	7.29**	−1.08	1.87	2.65**	1.75	−1.76
	[3.11]	[4.76]	[2.43]	[1.23]	[3.74]	[8.39]
$\tau^{CIC}_{w/cov}$	6.57**	3.90	3.87	1.58	2.34	−2.94
	[3.26]	[5.84]	[2.94]	[1.78]	[5.28]	[8.53]
Women						
τ^{CIC}	1.03	1.73	0.95	1.39	0.66	2.77
	[3.69]	[5.36]	[3.36]	[1.43]	[3.66]	[9.80]
$\tau^{CIC}_{w/cov}$	2.02	0.03	−0.29	1.95	5.08	6.75
	[3.85]	[5.30]	[2.24]	[2.06]	[5.02]	[10.82]
Both						
τ^{CIC}	−5.54	−3.72	0.84	−4.02	−13.47*	−11.42
	[4.38]	[4.71]	[3.77]	[3.38]	[7.71]	[12.37]
$\tau^{CIC}_{w/cov}$	−4.89	−0.63	2.79	−4.23	−16.46*	−16.79
	[5.26]	[6.20]	[3.47]	[4.02]	[9.34]	[14.78]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 25. Effects on Saving Rate as Proportion of Income: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	1.36**	1.70	0.48	0.12	0.04	0.04
	[0.61]	[1.10]	[0.39]	[0.08]	[0.04]	[0.04]
$\tau^{CIC}_{w/cov}$	1.26	1.65	0.51	−0.08	−0.08	−0.09
	[0.78]	[1.12]	[0.45]	[0.20]	[0.09]	[0.09]
Men						
τ^{CIC}	1.27*	3.04	0.54	0.17*	0.08	0.08
	[0.65]	[2.22]	[0.67]	[0.10]	[0.07]	[0.05]
$\tau^{CIC}_{w/cov}$	1.06	0.81	0.52	−0.12	−0.12	−0.11
	[0.73]	[2.31]	[0.57]	[0.20]	[0.16]	[0.13]
Women						
τ^{CIC}	2.27*	2.75	0.66	0.27*	0.07	−0.01
	[1.18]	[2.90]	[0.51]	[0.15]	[0.09]	[0.05]
$\tau^{CIC}_{w/cov}$	2.37*	3.38	0.60	0.29	0.01	0.17
	[1.35]	[2.55]	[0.87]	[0.34]	[0.12]	[0.13]
Both						
τ^{CIC}	0.34	−0.29	0.28	−0.17	−0.17**	−0.05
	[1.68]	[1.62]	[0.68]	[0.14]	[0.08]	[0.09]
$\tau^{CIC}_{w/cov}$	0.09	−1.44	0.48	−0.68	−0.41*	−0.34*
	[1.61]	[2.85]	[1.07]	[0.70]	[0.25]	[0.18]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 26. Effects on Saving Rate as Proportion of Consumption: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.10	0.10**	0.08*	0.09*	0.08	0.16
	[0.06]	[0.04]	[0.05]	[0.05]	[0.08]	[0.15]
$\tau^{CIC}_{w/cov}$	0.10	0.08	0.12*	0.06	0.08	0.15
	[0.07]	[0.08]	[0.06]	[0.07]	[0.08]	[0.18]
Men						
τ^{CIC}	0.16**	0.15**	0.09	0.13*	0.16	0.28
	[0.07]	[0.07]	[0.09]	[0.07]	[0.13]	[0.18]
$\tau^{CIC}_{w/cov}$	0.15**	0.09	0.09	0.11	0.15	0.21
	[0.07]	[0.12]	[0.09]	[0.07]	[0.12]	[0.19]
Women						
τ^{CIC}	0.11	0.14**	0.11*	0.17**	0.18	−0.06
	[0.09]	[0.06]	[0.06]	[0.08]	[0.20]	[0.19]
$\tau^{CIC}_{w/cov}$	0.14	0.23*	0.13	0.19**	0.08	0.03
	[0.09]	[0.14]	[0.12]	[0.10]	[0.20]	[0.26]
Both						
τ^{CIC}	−0.14	−0.02	0.05	−0.16	−0.37**	−0.16
	[0.14]	[0.11]	[0.13]	[0.14]	[0.18]	[0.33]
$\tau^{CIC}_{w/cov}$	−0.15	0.02	0.10	−0.24	−0.34	−0.15
	[0.15]	[0.14]	[0.18]	[0.18]	[0.21]	[0.32]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 27. Effects on Saving Rate (log y - log c): Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.18***	0.41**	0.20	0.11	0.05	0.09
	[0.07]	[0.19]	[0.14]	[0.07]	[0.06]	[0.08]
$\tau^{CIC}_{w/cov}$	0.17**	0.40	0.34***	0.11	0.01	−0.03
	[0.09]	[0.28]	[0.13]	[0.08]	[0.07]	[0.07]
Men						
τ^{CIC}	0.24***	0.66*	0.22	0.15*	0.11	0.15
	[0.08]	[0.35]	[0.23]	[0.08]	[0.09]	[0.09]
$\tau^{CIC}_{w/cov}$	0.20*	0.32	0.31	0.09	0.06	0.11
	[0.11]	[0.43]	[0.25]	[0.10]	[0.09]	[0.11]
Women						
τ^{CIC}	0.26**	0.60	0.26	0.21**	0.11	−0.03
	[0.11]	[0.37]	[0.17]	[0.11]	[0.13]	[0.10]
$\tau^{CIC}_{w/cov}$	0.31**	0.52	0.32*	0.19*	0.08	0.13
	[0.12]	[0.38]	[0.20]	[0.11]	[0.12]	[0.14]
Both						
τ^{CIC}	−0.10	−0.08	0.12	−0.17	−0.25**	−0.09
	[0.13]	[0.39]	[0.28]	[0.13]	[0.12]	[0.17]
$\tau^{CIC}_{w/cov}$	−0.15	0.04	0.26	−0.20	−0.27*	−0.18
	[0.17]	[0.49]	[0.40]	[0.21]	[0.15]	[0.17]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.2 Labor Market Outcomes of Direct Beneficiaries

5.2.1 Level and Sector of Participation

Table 28 presents the DID average treatment effect estimates on the level and sector of participation. Notice that there are important differences in the level and sector of participation in the labor market between the older and the younger cohort. The older cohort (our treatment group), not only has smaller levels of participation than the younger cohort; but also smaller levels of participation in the salaried sector, both informal and formal. Notice also that there are important time increases in participation in both groups, explained mainly by an expansion of employment in the informal non-salaried and the formal salaried sector. Since we observe important ex post/ex ante differences between the older and younger cohort, we do find some significant DID average treatment effects. In particular, non-contributory transfers have reduced labor market participation by 4 percentage points (significant at the 10 percent level). The

disaggregation of the results by sex reveals that all of the decline in participation can be attributed to women. The labor market participation of this segment decreased 10 percentage points (significant at the 1 percent level). Disaggregating the results by sector, we find that the reduction may be explained by reductions of 2 points in the familiar sector, 3 points in the non-salaried sector, 3 points in the informal salaried sector (significant at the 5 percent level) and 2 points in the formal sector. We do not find statistically significant effects of non-contributory pension on men's labor market participation.

Table 28. Effects on Level and Sector of Participation: Diff-in-Diff

	Bolivia			Men			Women		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
Participation									
T=0	0.80	0.74		0.92	0.82		0.69	0.66	
	[0.01]	[0.01]	−0.04*	[0.01]	[0.02]	0.02	[0.02]	[0.02]	−0.10***
T=1	0.85	0.75	[0.02]	0.96	0.88	[0.02]	0.74	0.62	[0.03]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.02]	
Family worker									
T=0	0.13	0.16		0.02	0.03		0.23	0.27	
	[0.01]	[0.01]	−0.01	[0.01]	[0.01]	−0.01	[0.02]	[0.02]	−0.02
T=1	0.13	0.14	[0.02]	0.02	0.02	[0.01]	0.23	0.25	[0.03]
	[0.01]	[0.01]		[0.00]	[0.00]		[0.01]	[0.02]	
Informal n/salaried									
T=0	0.45	0.45		0.57	0.62		0.34	0.31	
	[0.01]	[0.01]	−0.02	[0.02]	[0.02]	−0.02	[0.02]	[0.02]	−0.03
T=1	0.49	0.47	[0.03]	0.61	0.64	[0.04]	0.37	0.30	[0.03]
	[0.01]	[0.01]		[0.02]	[0.02]		[0.02]	[0.02]	
Informal salaried									
T=0	0.10	0.07		0.17	0.10		0.04	0.05	
	[0.01]	[0.01]	−0.01	[0.01]	[0.01]	0.02	[0.01]	[0.01]	−0.03**
T=1	0.10	0.07	[0.01]	0.16	0.11	[0.03]	0.05	0.03	[0.01]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]	
Formal salaried									
T=0	0.10	0.04		0.15	0.07		0.06	0.02	
	[0.01]	[0.01]	0.00	[0.01]	[0.01]	0.02	[0.01]	[0.01]	−0.02
T=1	0.12	0.07	[0.01]	0.16	0.11	[0.02]	0.09	0.03	[0.02]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 29 presents the CIC average treatment effect estimates on the overall participation level, and the sectoral participation in the familiar, non-salaried, informal salaried and formal salaried sector. We find that non-contributory pensions cause, on average, a reduction of 6 to 7 percentage points in labor market participation for the full sample, an effect that is statistically significant at the 5 percent level. This reduction in labor market participation can be explained mostly by the reduction of 10 to 12 percentage points in female labor market participation

(statistically significant at the 1 percent level). Although we do find a negative causal effect of non-contributory pension on male labor market participation of 1 to 2 percentage points, the estimates are not statistically significant. The reduction in female participation can be attributed to a decrease of 2 to 3 points in the familiar sector, 3 to 6 points in the self-employment sector, 3 points in the informal salaried sector (significant at the 5 percent level), and up to 2 points in the formal salaried sector. The key implication of these results is that the non-contributory pension allows women to retire from the labor market and from informal salaried jobs in particular.

Table 29. Effects on Level and Sector of Participation: Changes-in-Changes

	Bolivia	Men	Women
Participation			
τ^{CIC}	-0.06^{**}	-0.02	-0.10^{***}
	[0.02]	[0.02]	[0.03]
$\tau^{CIC}_{w/cov}$	-0.07^{***}	-0.02	-0.12^{***}
	[0.03]	[0.04]	[0.04]
Family worker			
τ^{CIC}	-0.01	0.00	-0.02
	[0.02]	[0.01]	[0.03]
$\tau^{CIC}_{w/cov}$	-0.02	0.01	-0.03
	[0.02]	[0.01]	[0.04]
Informal n/salaried			
τ^{CIC}	-0.02	-0.02	-0.03
	[0.03]	[0.03]	[0.04]
$\tau^{CIC}_{w/cov}$	-0.02	-0.01	-0.06
	[0.03]	[0.04]	[0.05]
Informal salaried			
τ^{CIC}	-0.01	0.02	-0.03^{**}
	[0.01]	[0.02]	[0.01]
$\tau^{CIC}_{w/cov}$	-0.01	0.01	-0.03^{*}
	[0.02]	[0.03]	[0.02]
Formal salaried			
τ^{CIC}	0.00	0.02	-0.02
	[0.01]	[0.02]	[0.01]
$\tau^{CIC}_{w/cov}$	0.01	0.02	0.00
	[0.02]	[0.03]	[0.02]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.2.2 Labor Supply Intensity and Earnings

Although the dichotomous indicator of labor force participation is interesting on its own, it is also informative to take a look at the average and quantile effects on monthly worked hours and on wage/labor earnings. Table 30 presents the DID average treatment effect estimates on (the log of)

monthly hours worked, (the log of) wage/earnings per hour and (the log of) monthly labor earnings in the primary job and summing up primary and secondary jobs.

On average, the treatment cohort worked less hours than the control cohort in both periods and the DID estimate for the full sample shows a reduction of 18 percent in total hours dedicated to work, significant at the 10 level. Once again, the significant drop in female labor supply (40 percent) is the main factor behind the overall drop because the DID estimate for men is positive and statistically non-significant.

We do not find effects in the full sample in the cases of wages and labor income. However, there is evidence that the program has a negative effect of 67 percent in the sample of women. Moreover, female labor income decreases, on average, by 75 percent (significant at the 5 percent) as a consequence of the program.[12]

Table 30. Effects on Worked Hours, Hourly Wage, and Monthly Earnings: Diff-in-Diff

	Bolivia			Men			Women		
	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID	[55, 60)	[60, 65)	DID
Labor supply intensity-total (log of hours p/month)									
T=0	2.78	2.50		3.38	2.93		2.25	2.11	
	[0.05]	[0.06]	−0.18*	[0.06]	[0.08]	0.06	[0.08]	[0.09]	−0.40**
T=1	3.01	2.56	[0.10]	3.58	3.19	[0.12]	2.47	1.93	[0.16]
	[0.04]	[0.05]		[0.04]	[0.06]		[0.07]	[0.08]	
Labor supply-PA (log of hours p/month)									
T=0	2.74	2.46		3.33	2.89		2.22	2.07	
	[0.05]	[0.06]	−0.17*	[0.06]	[0.08]	0.06	[0.08]	[0.09]	−0.39**
T=1	2.97	2.52	[0.10]	3.52	3.15	[0.12]	2.44	1.90	[0.16]
	[0.04]	[0.05]		[0.04]	[0.06]		[0.07]	[0.08]	
Wage (log of 2012 Bs. p/hour)									
T=0	−1.23	−1.97		0.56	−0.40		−2.79	−3.40	
	[0.10]	[0.11]	−0.32	[0.12]	[0.15]	0.03	[0.14]	[0.14]	−0.67**
T=1	−0.48	−1.54	[0.20]	1.26	0.34	[0.23]	−2.12	−3.39	[0.27]
	[0.09]	[0.10]		[0.08]	[0.11]		[0.13]	[0.13]	
Labor income (log of 2012 Bs. p/month)									
T=0	3.67	2.73		5.76	4.60		1.83	1.05	
	[0.12]	[0.13]	−0.32	[0.13]	[0.17]	0.12	[0.16]	[0.17]	−0.75**
T=1	4.44	3.19	[0.23]	6.49	5.45	[0.26]	2.51	0.97	[0.31]
	[0.10]	[0.11]		[0.09]	[0.13]		[0.15]	[0.15]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

[12] The results apply to women as a whole. Thus, bear in mind that this result does not imply that labor income of women who are still working decreased.

Tables 31, and 32, show, respectively, the CIC unconditional and conditional average and quantile treatment effects for total labor supply, and labor supply in the principal activity. Results show that total labor supply in the full sample decreased 23 to 24 percent (significant at 5 percent), with a decrease in labor supply of women of 42 to 49 percent (significant at 1 percent) and without significant effects on labor supply of men.

Table 31. Effects on (log) Labor Supply Intensity: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.23**	0.00	0.00	0.00	0.00	0.00
	[0.09]	[0.00]	[0.81]	[0.05]	[0.04]	[0.02]
$\tau^{CIC}_{w/cov}$	−0.24**	−0.27	−1.38**	−0.11	0.12	−0.10
	[0.12]	[0.16]	[0.66]	[0.09]	[0.09]	[0.07]
Men						
τ^{CIC}	−0.09	0.00	0.00	0.00	0.00	−0.03
	[0.12]	[0.87]	[0.22]	[0.04]	[0.06]	[0.03]
$\tau^{CIC}_{w/cov}$	0.00	−0.07	0.05	0.14	−0.10	−0.01
	[0.16]	[0.95]	[0.32]	[0.09]	[0.06]	[0.05]
Women						
τ^{CIC}	−0.42***	0.00	0.00	−0.36***	−0.04	0.11
	[0.14]	[0.00]	[0.00]	[0.13]	[0.06]	[0.07]
$\tau^{CIC}_{w/cov}$	−0.49***	−0.10	−0.29**	−0.32	−0.18**	0.00
	[0.16]	[0.08]	[0.14]	[0.20]	[0.09]	[0.07]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 32. Effects on (log) Labor Supply Intensity Principal Activity: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.22**	0.00	0.00	−0.05	0.00	0.00
	[0.09]	[0.00]	[0.81]	[0.06]	[0.02]	[0.06]
$\tau^{CIC}_{w/cov}$	−0.24**	−0.26	−1.52**	−0.09	0.10	−0.06
	[0.11]	[0.18]	[0.65]	[0.11]	[0.08]	[0.07]
Men						
τ^{CIC}	−0.07	0.00	0.00	−0.06	−0.07*	0.00
	[0.11]	[0.85]	[0.26]	[0.07]	[0.04]	[0.04]
$\tau^{CIC}_{w/cov}$	0.01	−0.12	0.12	0.13	−0.03	−0.06
	[0.15]	[0.92]	[0.40]	[0.10]	[0.06]	[0.07]
Women						
τ^{CIC}	−0.42***	0.00	0.00	−0.41**	−0.13*	0.00
	[0.13]	[0.00]	[0.00]	[0.16]	[0.07]	[0.08]
$\tau^{CIC}_{w/cov}$	−0.49***	−0.08	−0.26**	−0.27	−0.21**	−0.03
	[0.16]	[0.08]	[0.13]	[0.19]	[0.09]	[0.08]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

The drop in female labor participation and supply intensity implies that fewer women earn wages and labor income. Thus, Tables 33 and 34 show that in the full sample wages fell 42 to 43 percent and in the sample of women the fall is 66 to 71 percent (significant at 1 percent). On the other hand, in the full sample the unconditional CIC estimate of labor income fell 45 percent, but the conditional estimate is not significant. However, there is evidence of negative effects (71 to 81 percent) on the labor income of women.

Table 33. Effects on (log) Hourly Wage: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.43**	0.00	0.00	−0.59**	−0.09	−0.15*
	[0.18]	[0.00]	[0.00]	[0.25]	[0.12]	[0.09]
$\tau^{CIC}_{w/cov}$	−0.42*	0.14	0.04	−0.73**	0.08	0.18
	[0.24]	[0.10]	[0.16]	[0.35]	[0.18]	[0.18]
Men						
τ^{CIC}	−0.22	0.00	−0.58	0.02	0.02	0.05
	[0.21]	[1.12]	[0.75]	[0.14]	[0.13]	[0.14]
$\tau^{CIC}_{w/cov}$	−0.36*	−2.74***	−0.91	−0.22	0.20	0.02
	[0.21]	[1.04]	[0.76]	[0.20]	[0.16]	[0.19]
Women						
τ^{CIC}	−0.71***	0.00	0.00	0.00	−0.55**	−0.31
	[0.25]	[0.00]	[0.00]	[1.12]	[0.22]	[0.19]
$\tau^{CIC}_{w/cov}$	−0.66***	0.04	0.16	−0.13	−0.86***	−0.43
	[0.25]	[0.08]	[0.10]	[1.09]	[0.33]	[0.31]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 34. Effects on (log) Labor Income: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.45**	0.00	0.00	−0.47**	0.03	−0.07
	[0.20]	[0.00]	[0.00]	[0.23]	[0.10]	[0.08]
$\tau^{CIC}_{w/cov}$	−0.44	0.22***	0.05	−0.64	0.00	0.16
	[0.27]	[0.07]	[0.14]	[0.42]	[0.23]	[0.17]
Men						
τ^{CIC}	−0.22	0.00	−0.47	−0.03	−0.08	0.09
	[0.23]	[1.43]	[0.51]	[0.15]	[0.09]	[0.12]
$\tau^{CIC}_{w/cov}$	−0.40	−3.72***	−0.87	−0.15	0.19	0.19
	[0.26]	[1.38]	[0.62]	[0.19]	[0.17]	[0.15]
Women						
τ^{CIC}	−0.81***	0.00	0.00	0.00	−0.61**	−0.26*
	[0.29]	[0.00]	[0.00]	[1.48]	[0.27]	[0.14]
$\tau^{CIC}_{w/cov}$	−0.71**	0.06	0.22**	−0.21	−1.02***	−0.41*
	[0.30]	[0.12]	[0.11]	[1.25]	[0.31]	[0.23]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.3 Labor Market Outcomes of Future Beneficiaries

In this subsection we analyze the results on future beneficiaries of *Renta Dignidad* to see if there is evidence of anticipation effects.

5.3.1 Level and Sector of Participation

Table 35 presents the DID estimates for labor participation and for labor market structure of future beneficiaries. The estimates show that labor force participation in the full sample increased 3 percentage points (significant at 10 percent) but there are not gender-specific significant effects. There is a decrease in family work in the full sample of 4 percentage points and an increase of 6 percentage points in informal non-salaried employment. In the case of men there are not significant effects in the cases of family work or salaried informal and formal jobs, but there is an increase of 6 percentage points in informal non-salaried employment (significant at 10 percent). In the case of women the DID estimates show a decrease of 6 percentage points in family employment, and there is some evidence of a 4 percentage point increase in formal employment (significant at 10 percent).

In the case of women these results indicate that they look for better jobs before they are 60 or older. In the case of men the informal non-salaried sector keeps growing before 60. Both results indicate that people anticipate future decreases in labor income and attempt to engage in what they consider more productive jobs.

Table 35. Effects on Level and Sector of Participation of Future Beneficiaries: Diff-in-Diff

	Bolivia			Men			Women		
	[50, 55)	[55, 60)	DID	[50, 55)	[55, 60)	DID	[50, 55)	[55, 60)	DID
Participation									
T=0	0.85	0.81		0.97	0.92		0.75	0.70	
	[0.01]	[0.01]	0.03*	[0.01]	[0.01]	0.02	[0.02]	[0.02]	0.03
T=1	0.88	0.87	[0.02]	0.98	0.96	[0.02]	0.78	0.76	[0.03]
	[0.01]	[0.01]		[0.00]	[0.01]		[0.01]	[0.02]	
Family worker									
T=0	0.11	0.13		0.01	0.02		0.21	0.23	
	[0.01]	[0.01]	−0.04**	[0.00]	[0.01]	0.00	[0.01]	[0.02]	−0.06**
T=1	0.11	0.08	[0.02]	0.01	0.01	[0.01]	0.20	0.17	[0.03]
	[0.01]	[0.01]		[0.00]	[0.00]		[0.01]	[0.01]	
Informal n/salaried									
T=0	0.46	0.46		0.59	0.57		0.34	0.35	
	[0.01]	[0.01]	0.06**	[0.02]	[0.02]	0.06*	[0.02]	[0.02]	0.05
T=1	0.47	0.53	[0.03]	0.57	0.62	[0.04]	0.37	0.43	[0.04]
	[0.01]	[0.01]		[0.02]	[0.02]		[0.02]	[0.02]	
Informal salaried									
T=0	0.11	0.11		0.16	0.18		0.07	0.05	
	[0.01]	[0.01]	−0.01	[0.01]	[0.02]	−0.04	[0.01]	[0.01]	0.00
T=1	0.13	0.12	[0.02]	0.18	0.16	[0.03]	0.08	0.06	[0.02]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]	
Formal salaried									
T=0	0.15	0.10		0.19	0.14		0.11	0.06	
	[0.01]	[0.01]	0.02	[0.01]	[0.01]	0.00	[0.01]	[0.01]	0.04*
T=1	0.15	0.13	[0.02]	0.21	0.16	[0.03]	0.10	0.09	[0.02]
	[0.01]	[0.01]		[0.01]	[0.01]		[0.01]	[0.01]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

The unconditional and conditional CIC estimates reported in Table 36 will confirm whether the DID estimates are reliable. There is no evidence of an increase in labor force participation in the full sample or in the subsample of future female and male beneficiaries. There is not enough evidence to claim that future women beneficiaries significantly increase their participation in the formal sector. However, there is evidence that in the full sample participation in the family sector decreases 3 to 4 percentage points. The conditional and unconditional CIC estimates show as well that it is a decrease of 6 percentage points in the sample of women that is behind the decrease in the full sample. Finally, the conditional and unconditional CIC estimates in the case of informal non-salaried jobs show an increment of 6 percentage points (significant at 10 and 5 percent).

Table 36. Effects on Level and Sector of Participation. Changes-in-Changes

	Bolivia	Men	Women
Participation			
τ^{CIC}	0.03	0.00	0.03
	[0.02]	[0.02]	[0.04]
$\tau^{CIC}_{w/cov}$	0.02	0.01	0.01
	[0.02]	[0.02]	[0.04]
Family worker			
τ^{CIC}	−0.03*	0.00	−0.06**
	[0.02]	[0.01]	[0.02]
$\tau^{CIC}_{w/cov}$	−0.04*	0.00	−0.06*
	[0.02]	[0.01]	[0.03]
Informal n/salaried			
τ^{CIC}	0.06**	0.06*	0.05
	[0.03]	[0.03]	[0.03]
$\tau^{CIC}_{w/cov}$	0.06*	0.06	0.03
	[0.03]	[0.04]	[0.05]
Informal salaried			
τ^{CIC}	−0.01	−0.03	0.00
	[0.02]	[0.03]	[0.02]
$\tau^{CIC}_{w/cov}$	−0.01	−0.05	0.01
	[0.02]	[0.03]	[0.02]
Formal salaried			
τ^{CIC}	0.02	0.00	0.03*
	[0.02]	[0.03]	[0.02]
$\tau^{CIC}_{w/cov}$	0.02	0.00	0.03
	[0.02]	[0.03]	[0.02]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.3.2 Labor Supply Intensity and Income

Although the previous results show that there are not changes in the participation rates of future women and men beneficiaries, the changes in the labor structure may have affected the worked hours and earnings from the labor market. This would be the case if they effectively found better jobs.

Table 37 shows that there is no evidence of changes in the total labor supply of future beneficiaries in the full sample. However, as a consequence of the changes in the structure of the labor market the wage increased 64 percent and labor income increased 61 percent, both significant at the 1 percent level. The DID estimates for the sample of women confirm the idea

that they changed less productive activities for better jobs that provide them with higher earnings without significantly changing their work schedule. The DID estimates for men, on the other hand, indicate that they effectively dedicate more hours to the labor market, which significantly increases their wages (37 percent) but not their average labor income.

Table 37. Effects on Worked Hours, Hourly Wage, and Monthly Earnings of Future Beneficiaries: Diff-in-Diff

	Bolivia			Men			Women		
	[50, 55)	[55, 60)	DID	[50, 55)	[55, 60)	DID	[50, 55)	[55, 60)	DID
Labor supply intensity-total (log of hours p/month)									
T=0	3.00	2.82		3.62	3.38		2.41	2.27	
	[0.04]	[0.05]	0.15	[0.04]	[0.06]	0.18**	[0.07]	[0.08]	0.05
T=1	3.15	3.12	[0.09]	3.68	3.61	[0.09]	2.62	2.53	[0.15]
	[0.04]	[0.04]		[0.03]	[0.04]		[0.07]	[0.08]	
Labor supply-PA (log of hours p/month)									
T=0	2.96	2.77		3.58	3.32		2.37	2.23	
	[0.04]	[0.05]	0.16*	[0.04]	[0.06]	0.19**	[0.07]	[0.08]	0.05
T=1	3.10	3.07	[0.09]	3.62	3.56	[0.09]	2.57	2.49	[0.15]
	[0.04]	[0.04]		[0.03]	[0.04]		[0.07]	[0.08]	
Wage (log of 2012 Bs. p/hour)									
T=0	−0.47	−1.06		1.23	0.63		−2.08	−2.73	
	[0.09]	[0.11]	0.64***	[0.09]	[0.12]	0.37**	[0.14]	[0.15]	0.71**
T=1	−0.03	0.01	[0.19]	1.58	1.35	[0.19]	−1.67	−1.60	[0.29]
	[0.08]	[0.09]		[0.07]	[0.08]		[0.13]	[0.16]	
Labor income (log of 2012 Bs. p/month)									
T=0	4.47	3.86		6.49	5.85		2.56	1.90	
	[0.11]	[0.12]	0.61***	[0.10]	[0.13]	0.21	[0.16]	[0.17]	0.78**
T=1	5.02	5.02	[0.22]	7.01	6.58	[0.20]	3.01	3.12	[0.33]
	[0.10]	[0.10]		[0.07]	[0.09]		[0.15]	[0.18]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 38 shows the CIC estimates for total labor supply intensity of future beneficiaries. These estimates indicate that there is no evidence of effects on total hours dedicated to the labor market of future beneficiaries. However, there is some evidence of a 16 to 17 percent increase in men's labor supply in the principal activity.

In spite of an increase in men's labor supply, Table 40 shows that only the wages of future women beneficiaries increased significantly (64 to 66 percent). Likewise, Table 41 shows that labor income in the full sample increased 52 to 63 percent and 73 to 74 percent in the case of women, both significant at 5 percent, but without significant effects in the sample of men.

Table 38. Effects on (log) Labor Supply Intensity of Future Beneficiaries: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.13	0.00	0.41	0.00	−0.05	−0.03
	[0.09]	[0.00]	[0.99]	[0.07]	[0.04]	[0.03]
$\tau^{CIC}_{w/cov}$	0.11	0.11	0.46	0.05	0.09	0.09
	[0.11]	[0.28]	[0.58]	[0.06]	[0.07]	[0.06]
Men						
τ^{CIC}	0.15	0.36	0.00	0.00	−0.08	0.00
	[0.09]	[0.99]	[0.13]	[0.00]	[0.05]	[0.02]
$\tau^{CIC}_{w/cov}$	0.14	0.58	−0.01	0.01	0.07	0.01
	[0.10]	[0.96]	[0.10]	[0.05]	[0.05]	[0.06]
Women						
τ^{CIC}	0.04	0.00	0.00	0.00	−0.07*	0.00
	[0.16]	[0.00]	[0.00]	[0.13]	[0.04]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.03	−0.01	−0.06	−0.08	−0.10	−0.06
	[0.19]	[0.05]	[0.26]	[0.10]	[0.07]	[0.06]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 39. Effects on (log) Labor Supply Intensity-pa of Future Beneficiaries: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.14	0.00	0.47	0.00	0.00	0.00
	[0.09]	[0.00]	[0.95]	[0.05]	[0.04]	[0.01]
$\tau^{CIC}_{w/cov}$	0.13	0.11	0.41	0.03	0.09	0.12**
	[0.11]	[0.29]	[0.54]	[0.08]	[0.06]	[0.06]
Men						
τ^{CIC}	0.16*	0.41	0.18	0.00	0.00	−0.03
	[0.09]	[0.94]	[0.13]	[0.03]	[0.04]	[0.02]
$\tau^{CIC}_{w/cov}$	0.17*	0.66	0.04	−0.03	0.11**	0.03
	[0.10]	[0.93]	[0.13]	[0.04]	[0.05]	[0.05]
Women						
τ^{CIC}	0.06	0.00	0.00	0.00	0.00	0.00
	[0.16]	[0.00]	[0.00]	[0.11]	[0.04]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.02	−0.01	−0.03	−0.08	−0.04	−0.01
	[0.19]	[0.04]	[0.26]	[0.09]	[0.08]	[0.06]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 40. Effects on (log) Hourly Wage of Future Beneficiaries: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.55***	0.00	0.00	0.40**	0.16	0.11
	[0.18]	[0.00]	[0.00]	[0.16]	[0.11]	[0.10]
$\tau^{CIC}_{w/cov}$	0.65***	0.34	1.97***	0.78**	0.19	0.33
	[0.25]	[0.23]	[0.65]	[0.30]	[0.22]	[0.22]
Men						
τ^{CIC}	0.26	0.64	0.60	0.11	0.09	0.00
	[0.21]	[1.55]	[0.39]	[0.13]	[0.11]	[0.13]
$\tau^{CIC}_{w/cov}$	0.27	2.43**	0.45	0.05	0.22	0.16
	[0.24]	[1.01]	[0.50]	[0.22]	[0.21]	[0.19]
Women						
τ^{CIC}	0.64**	0.00	0.00	5.75***	0.29**	0.44*
	[0.28]	[0.00]	[0.00]	[1.68]	[0.14]	[0.23]
$\tau^{CIC}_{w/cov}$	0.66**	0.03	0.25	3.35**	0.45	0.73**
	[0.27]	[0.15]	[0.18]	[1.41]	[0.28]	[0.33]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 41. Effects on (log) Labor Income of Future Beneficiaries: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	0.52**	0.00	0.00	0.27*	0.05	0.06
	[0.21]	[0.00]	[0.00]	[0.16]	[0.06]	[0.08]
$\tau^{CIC}_{w/cov}$	0.63**	0.43	3.20***	0.74***	0.12	−0.16
	[0.30]	[0.26]	[0.85]	[0.28]	[0.23]	[0.16]
Men						
τ^{CIC}	0.02	0.06	0.39	−0.06	−0.02	−0.05
	[0.24]	[1.95]	[0.35]	[0.10]	[0.08]	[0.11]
$\tau^{CIC}_{w/cov}$	0.03	0.44	0.22	−0.03	−0.21	0.03
	[0.28]	[1.37]	[0.54]	[0.21]	[0.18]	[0.18]
Women						
τ^{CIC}	0.73**	0.00	0.00	1.24	0.22	0.14
	[0.34]	[0.00]	[0.00]	[2.01]	[0.17]	[0.18]
$\tau^{CIC}_{w/cov}$	0.74**	0.06	0.34	1.61	0.22	0.35
	[0.33]	[0.14]	[0.22]	[1.72]	[0.24]	[0.27]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.4 Labor Market Outcomes of Young Adults

In this subsection we report the DID and CIC estimates of the effects of *Renta Dignidad* on indirect beneficiaries' outcomes.

5.4.1 Level and Sector of Participation

Table 42 shows that there is not a significant difference in the labor force participation of people in the [25,45) who live with a beneficiary compared with those in the same interval but do not live with a beneficiary. Similarly, the program does not have effects on the labor market structure of indirect beneficiaries. These results imply that the transfer does not help indirect beneficiaries to search for better jobs, even though the elderly spend, on average, more time on non-labor activities. These results are confirmed with the CIC estimates (Table 43).

Table 42. Effects on Level and Sector of Participation of Young Adults: Diff-in-Diff

	Bolivia			Men			Women		
	IC	*IT*	DID	*IC*	*IT*	DID	*IC*	*IT*	DID
Participation									
T=0	0.77	0.83		0.86	0.90		0.68	0.76	
	[0.02]	[0.02]	−0.04	[0.02]	[0.02]	−0.02	[0.03]	[0.03]	−0.04
T=1	0.81	0.83	[0.03]	0.88	0.90	[0.04]	0.74	0.77	[0.05]
	[0.02]	[0.01]		[0.02]	[0.02]		[0.02]	[0.02]	
Family worker									
T=0	0.15	0.18		0.13	0.15		0.16	0.21	
	[0.02]	[0.02]	0.01	[0.02]	[0.02]	0.01	[0.02]	[0.02]	−0.01
T=1	0.13	0.17	[0.03]	0.10	0.13	[0.04]	0.17	0.21	[0.04]
	[0.01]	[0.02]		[0.02]	[0.02]		[0.02]	[0.02]	
Informal n/salaried									
T=0	0.19	0.22		0.23	0.26		0.15	0.18	
	[0.02]	[0.02]	0.00	[0.03]	[0.03]	0.00	[0.02]	[0.02]	0.01
T=1	0.18	0.21	[0.03]	0.21	0.24	[0.05]	0.15	0.19	[0.04]
	[0.01]	[0.02]		[0.02]	[0.02]		[0.02]	[0.02]	
Informal salaried									
T=0	0.25	0.21		0.33	0.26		0.16	0.17	
	[0.02]	[0.02]	−0.02	[0.03]	[0.03]	0.00	[0.02]	[0.02]	−0.02
T=1	0.26	0.21	[0.04]	0.34	0.25	[0.05]	0.19	0.18	[0.04]
	[0.02]	[0.02]		[0.03]	[0.03]		[0.02]	[0.02]	
Formal salaried									
T=0	0.13	0.16		0.12	0.16		0.13	0.15	
	[0.01]	[0.02]	0.00	[0.02]	[0.02]	0.02	[0.02]	[0.02]	−0.02
T=1	0.18	0.20	[0.03]	0.18	0.24	[0.04]	0.18	0.17	[0.04]
	[0.01]	[0.02]		[0.02]	[0.02]		[0.02]	[0.02]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance. IC=indirect control, who are individuals in the [25,45) age interval who live in a household with a member in the [55,60) cohort. IT=indirect treatment, who are individuals in the [25,45) age interval who live in a household with a member in the [60,65) cohort.

Table 43. Effects on Level and Sector of Participation of Young Adults: Changes-in-Changes

	Bolivia	Men	Women
Participation			
τ^{CIC}	−0.03	−0.01	−0.03
	[0.03]	[0.03]	[0.04]
$\tau^{CIC}_{w/cov}$	−0.03	−0.01	−0.03
	[0.03]	[0.04]	[0.04]
Family worker			
τ^{CIC}	0.01	0.01	0.00
	[0.03]	[0.03]	[0.04]
$\tau^{CIC}_{w/cov}$	0.01	0.04	−0.02
	[0.05]	[0.06]	[0.08]
Informal n/salaried			
τ^{CIC}	0.00	0.00	0.01
	[0.03]	[0.05]	[0.05]
$\tau^{CIC}_{w/cov}$	0.01	0.00	0.03
	[0.05]	[0.06]	[0.05]
Informal salaried			
τ^{CIC}	−0.02	0.00	−0.01
	[0.03]	[0.04]	[0.04]
$\tau^{CIC}_{w/cov}$	−0.02	−0.01	−0.02
	[0.04]	[0.05]	[0.05]
Formal salaried			
τ^{CIC}	0.00	0.02	−0.02
	[0.03]	[0.04]	[0.04]
$\tau^{CIC}_{w/cov}$	−0.01	0.01	−0.03
	[0.03]	[0.05]	[0.05]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.4.2 Labor Supply Intensity and Income

As expected, the DID estimates in Table 44 indicate that there are not significant effects on total labor supply, wages and labor income of indirect beneficiaries. The conditional and unconditional CIC estimates for these variables support the idea of non-significant effects on the labor supply and earnings of indirect beneficiaries.

Table 44. Effects on Worked Hours, Hourly Wage, and Monthly Earnings of Young Adults: Diff-in-Diff

	Bolivia			Men			Women		
	IC	*IT*	**DID**	*IC*	*IT*	**DID**	*IC*	*IT*	**DID**
Labor supply intensity-total (log of hours p/month)									
T=0	2.39	2.72		2.89	3.03		1.90	2.44	
	[0.09]	[0.09]	−0.19	[0.11]	[0.11]	0.02	[0.13]	[0.12]	−0.31
T=1	2.65	2.80	[0.16]	2.99	3.16	[0.21]	2.27	2.50	[0.24]
	[0.08]	[0.07]		[0.09]	[0.10]		[0.12]	[0.11]	
Labor supply-PA (log of hours p/month)									
T=0	2.37	2.70		2.88	3.00		1.88	2.41	
	[0.09]	[0.08]	−0.18	[0.11]	[0.11]	0.02	[0.13]	[0.12]	−0.30
T=1	2.63	2.78	[0.16]	2.97	3.11	[0.21]	2.25	2.49	[0.24]
	[0.08]	[0.07]		[0.09]	[0.10]		[0.12]	[0.11]	
Wage (log of 2012 Bs. p/hour)									
T=0	−1.57	−1.25		−0.66	−0.42		−2.44	−2.01	
	[0.18]	[0.18]	−0.37	[0.24]	[0.25]	−0.27	[0.24]	[0.25]	−0.31
T=1	−0.87	−0.92	[0.33]	−0.10	−0.13	[0.45]	−1.73	−1.60	[0.47]
	[0.15]	[0.16]		[0.19]	[0.22]		[0.23]	[0.23]	
Labor income (log of 2012 Bs. p/month)									
T=0	3.08	3.47		4.14	4.45		2.07	2.57	
	[0.20]	[0.21]	−0.49	[0.27]	[0.29]	−0.42	[0.28]	[0.28]	−0.36
T=1	3.91	3.81	[0.38]	4.90	4.79	[0.52]	2.83	2.97	[0.54]
	[0.17]	[0.19]		[0.22]	[0.26]		[0.26]	[0.26]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance. IC=indirect control, who are individuals in the [25,45) age interval who live in a household with a member in the [55,60) cohort. IT=indirect treatment, who are individuals in the [25,45) age interval who live in a household with a member in the [60,65) cohort.

Table 45. Effects on (log) Labor Supply Intensity of Young Adults: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.14	0.00	−2.08	−0.10**	−0.07	−0.13**
	[0.13]	[0.00]	[1.75]	[0.05]	[0.04]	[0.06]
$\tau^{CIC}_{w/cov}$	−0.20	−0.03	−0.32	−0.23	−0.10	−0.18
	[0.16]	[0.18]	[1.25]	[0.15]	[0.08]	[0.12]
Men						
τ^{CIC}	0.05	0.00	−0.18	0.00	−0.07	−0.03
	[0.17]	[0.74]	[1.27]	[0.04]	[0.05]	[0.07]
$\tau^{CIC}_{w/cov}$	0.03	0.27	0.00	−0.06	−0.14	−0.17
	[0.20]	[0.36]	[1.25]	[0.11]	[0.14]	[0.17]
Women						
τ^{CIC}	−0.24	0.00	0.00	−0.22*	−0.18**	−0.15
	[0.20]	[0.00]	[0.94]	[0.13]	[0.08]	[0.10]
$\tau^{CIC}_{w/cov}$	−0.29	−0.03	0.04	−0.38**	−0.05	−0.03
	[0.21]	[0.16]	[1.06]	[0.16]	[0.16]	[0.18]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 46. Effects on (log) Labor Supply Intensity-pa of Young Adults: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.13	0.00	−1.39	−0.10**	−0.04	−0.15***
	[0.13]	[0.00]	[1.75]	[0.05]	[0.06]	[0.06]
$\tau^{CIC}_{w/cov}$	−0.20	−0.03	−0.36	−0.23	−0.16*	−0.20*
	[0.16]	[0.18]	[1.23]	[0.15]	[0.08]	[0.11]
Men						
τ^{CIC}	0.03	0.00	−0.41	0.00	0.00	−0.03
	[0.18]	[0.53]	[1.22]	[0.07]	[0.06]	[0.09]
$\tau^{CIC}_{w/cov}$	0.03	0.24	−0.02	−0.10	−0.10	−0.07
	[0.21]	[0.34]	[1.23]	[0.12]	[0.15]	[0.15]
Women						
τ^{CIC}	−0.23	0.00	0.00	−0.29**	−0.13	−0.15
	[0.20]	[0.00]	[0.94]	[0.12]	[0.11]	[0.10]
$\tau^{CIC}_{w/cov}$	−0.29	−0.07	0.03	−0.38**	−0.11	0.01
	[0.21]	[0.16]	[1.05]	[0.16]	[0.16]	[0.18]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 47. Effects on (log) Hourly Wage of Young Adults: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.33	0.00	0.00	−0.29	−0.09	−0.03
	[0.26]	[0.00]	[0.00]	[0.18]	[0.12]	[0.13]
$\tau^{CIC}_{w/cov}$	−0.42	0.01	−0.33	−0.27	−0.30	−0.24
	[0.34]	[0.66]	[0.40]	[0.50]	[0.26]	[0.26]
Men						
τ^{CIC}	−0.22	0.00	0.00	−0.10	−0.16	−0.03
	[0.39]	[0.00]	[1.52]	[0.17]	[0.12]	[0.13]
$\tau^{CIC}_{w/cov}$	−0.42	−1.30*	−0.35	0.23	−0.09	−0.24
	[0.45]	[0.75]	[1.34]	[0.44]	[0.26]	[0.22]
Women						
τ^{CIC}	−0.29	0.00	0.00	−0.56	−0.08	0.15
	[0.38]	[0.00]	[0.00]	[3.61]	[0.21]	[0.18]
$\tau^{CIC}_{w/cov}$	−0.05	0.08	−0.13	−0.60	−0.47	−0.31
	[0.45]	[0.48]	[0.68]	[2.63]	[0.32]	[0.27]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 48. Effects on (log) Labor Income of Young Adults: Changes-in-Changes

	$CIC_{average}$	$CIC_{q0.1}$	$CIC_{q0.2}$	$CIC_{q0.5}$	$CIC_{q0.8}$	$CIC_{q0.9}$
Bolivia						
τ^{CIC}	−0.42	0.00	0.00	−0.35**	−0.16	−0.17
	[0.31]	[0.00]	[0.00]	[0.15]	[0.10]	[0.12]
$\tau^{CIC}_{w/cov}$	−0.55	−0.03	−0.59	−0.44	−0.38	−0.18
	[0.42]	[0.76]	[0.47]	[0.50]	[0.29]	[0.26]
Men						
τ^{CIC}	−0.33	0.00	0.00	−0.20	−0.25*	−0.12
	[0.43]	[0.00]	[1.94]	[0.16]	[0.14]	[0.15]
$\tau^{CIC}_{w/cov}$	−0.54	−1.45**	0.33	−0.08	−0.17	−0.47*
	[0.53]	[0.68]	[1.55]	[0.45]	[0.24]	[0.27]
Women						
τ^{CIC}	−0.31	0.00	0.00	−0.88	−0.10	0.09
	[0.42]	[0.00]	[0.00]	[4.27]	[0.16]	[0.20]
$\tau^{CIC}_{w/cov}$	−0.10	−0.08	−0.06	−0.36	−0.58*	−0.24
	[0.49]	[0.58]	[0.68]	[2.83]	[0.32]	[0.37]

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.5 Labor Market and Education Outcomes of Children

Table 49 presents the DID estimates of the effects on labor market outcomes of indirect beneficiaries in the [7,19) cohort. We do not report estimates for formal salaried jobs because their rate is close to zero because of the cohort under analysis. The results show that in the full sample there are not significant effects on labor force participation and labor structure. In the subsample of indirect male beneficiaries there is an increase in their participation in the labor market of 9 percentage points, statistically significant at 10 percent. Though there are not significant changes in the labor force structure, the main increases occurred in the family worker sector and informal salaried jobs. In the case of female indirect beneficiaries there are not significant effects on labor participation based on DID estimates.

Table 49. Effects on Level and Sector of Participation of Children: Diff-in-Diff

	Bolivia			Boys			Girls		
	IC	*IT*	DID	*IC*	*IT*	DID	*IC*	*IT*	DID
Participation									
T=0	0.38	0.32		0.42	0.34		0.33	0.29	
	[0.02]	[0.02]	0.04	[0.02]	[0.03]	0.09*	[0.02]	[0.03]	0.00
T=1	0.36	0.35	[0.03]	0.38	0.38	[0.05]	0.35	0.31	[0.05]
	[0.02]	[0.02]		[0.02]	[0.03]		[0.02]	[0.03]	
Family worker									
T=0	0.30	0.27		0.32	0.28		0.27	0.26	
	[0.01]	[0.02]	0.03	[0.02]	[0.03]	0.06	[0.02]	[0.03]	−0.01
T=1	0.28	0.28	[0.03]	0.27	0.28	[0.05]	0.29	0.27	[0.05]
	[0.01]	[0.02]		[0.02]	[0.02]		[0.02]	[0.02]	
Informal n/salaried									
T=0	0.01	0.01		0.01	0.01		0.01	0.01	
	[0.00]	[0.00]	−0.01	[0.00]	[0.00]	0.00	[0.00]	[0.01]	−0.01
T=1	0.01	0.01	[0.01]	0.01	0.01	[0.01]	0.01	0.00	[0.01]
	[0.00]	[0.00]		[0.00]	[0.00]		[0.00]	[0.00]	
Informal salaried									
T=0	0.05	0.03		0.07	0.05		0.03	0.01	
	[0.01]	[0.01]	0.02	[0.01]	[0.01]	0.02	[0.01]	[0.01]	0.01
T=1	0.06	0.05	[0.02]	0.08	0.08	[0.03]	0.03	0.03	[0.02]
	[0.01]	[0.01]		[0.01]	[0.02]		[0.01]	[0.01]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance. IC=indirect control, who are individuals in the [7,19) age interval who live in a household with a member in the [55,60) cohort. IT=indirect treatment, who are individuals in the [7,19) age interval who live in a household with a member in the [60,65) cohort.

The DID estimates in Table 50 reveal that there are not indirect effects in the full sample on human capital outcomes such as enrollment, attendance, primary, and secondary levels of education. However, the estimates indicate that the enrollment rate of men fell 6 percentage points, while the enrollment rate of women increased 6 percentage points. The attendance rate of men fell, but not significantly. On the other side, the program indirectly increased the attendance of women in 8 percentage points.

These results are important because they imply that the non-contributory pension helps girls who live with a beneficiary to increase their enrollment and attendance. At the same time, there are negative effects on the enrollment rate of boys who live with a beneficiary. Panel (b) of Table 50 shows that the proportion of boys who only participate in the labor market and are not enrolled in school increases 5 percentage points. Conversely, living with a beneficiary reduces the proportion of girls who only participate in the labor market by 5 percentage points according to the DID estimates.

Table 50. Effects on Education Outcomes and Condition of Children: Diff-in-Diff

	Bolivia			Boys			Girls		
	IC	*IT*	**DID**	*IC*	*IT*	**DID**	*IC*	*IT*	**DID**
(a) **Human capital outcomes**									
Enrollment									
T=0	0.89	0.92		0.88	0.94		0.90	0.91	
	[0.01]	[0.01]	0.00	[0.01]	[0.01]	−0.06*	[0.01]	[0.02]	0.06**
T=1	0.87	0.90	[0.02]	0.88	0.88	[0.03]	0.85	0.92	[0.03]
	[0.01]	[0.01]		[0.01]	[0.02]		[0.02]	[0.01]	
Attendance									
T=0	0.88	0.92		0.87	0.93		0.89	0.91	
	[0.01]	[0.01]	0.01	[0.02]	[0.01]	−0.05	[0.01]	[0.02]	0.08**
T=1	0.85	0.90	[0.02]	0.87	0.88	[0.03]	0.83	0.92	[0.03]
	[0.01]	[0.01]		[0.02]	[0.02]		[0.02]	[0.01]	
Primary									
T=0	0.71	0.75		0.71	0.78		0.71	0.73	
	[0.01]	[0.02]	−0.02	[0.02]	[0.02]	−0.06	[0.02]	[0.03]	0.02
T=1	0.70	0.72	[0.03]	0.71	0.71	[0.05]	0.69	0.74	[0.05]
	[0.01]	[0.02]		[0.02]	[0.03]		[0.02]	[0.03]	
Secondary									
T=0	0.29	0.25		0.28	0.22		0.29	0.27	
	[0.01]	[0.02]	0.02	[0.02]	[0.02]	0.06	[0.02]	[0.03]	−0.02
T=1	0.29	0.27	[0.03]	0.29	0.29	[0.05]	0.29	0.26	[0.05]
	[0.01]	[0.02]		[0.02]	[0.03]		[0.02]	[0.03]	
(b) **Condition**									
Enrolled in school and participates in the labor market									
T=0	0.29	0.26		0.32	0.29		0.26	0.23	
	[0.01]	[0.02]	0.04	[0.02]	[0.03]	0.04	[0.02]	[0.03]	0.04
T=1	0.26	0.27	[0.03]	0.28	0.28	[0.05]	0.23	0.25	[0.05]
	[0.01]	[0.02]		[0.02]	[0.02]		[0.02]	[0.02]	
Only participates									
T=0	0.08	0.06		0.10	0.05		0.06	0.06	
	[0.01]	[0.01]	0.00	[0.01]	[0.01]	0.05*	[0.01]	[0.02]	−0.05*
T=1	0.11	0.08	[0.02]	0.09	0.10	[0.03]	0.12	0.07	[0.03]
	[0.01]	[0.01]		[0.01]	[0.02]		[0.01]	[0.01]	
Only enrolled									
T=0	0.60	0.66		0.56	0.65		0.64	0.67	
	[0.02]	[0.02]	−0.04	[0.02]	[0.03]	−0.09*	[0.02]	[0.03]	0.02
T=1	0.61	0.63	[0.04]	0.60	0.59	[0.05]	0.62	0.68	[0.05]
	[0.02]	[0.02]		[0.02]	[0.03]		[0.02]	[0.03]	
Neither enrolled nor participates									
T=0	0.03	0.02		0.02	0.01		0.04	0.03	
	[0.01]	[0.01]	0.00	[0.01]	[0.01]	0.01	[0.01]	[0.01]	−0.02
T=1	0.03	0.02	[0.01]	0.02	0.02	[0.01]	0.03	0.01	[0.02]
	[0.01]	[0.00]		[0.01]	[0.01]		[0.01]	[0.01]	

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance. IC=indirect control, who are individuals in the [7,19) age interval who live in a household with a member in the [55,60) cohort. IT=indirect treatment, who are individuals in the [7,19) age interval who live in a household with a member in the [60,65) cohort. We consider primary level of education if people have at most 8 years of education, and secondary level of education if people have more than 8 years and less than 13 years of education.

To reassure our previous findings, table 51 reports the CIC conditional and unconditional estimates for labor market and education outcomes of children. There are not significant changes in the labor force participation and labor structure in the full sample. The unconditional CIC estimate of participation of boys shows an increase of 8 percentage points (significant at 10 percent), but the conditional estimate is not significant. The estimates of participation and labor market structure for girls are not significant.

The results of panel (b) show that there are not significant effects in the full sample on enrollment, attendance and proportions of boys and girls who reach primary or secondary education. The enrollment of boys decreases 6 to 8 percentage points as a consequence of living with a beneficiary of the non-contributory pension. On the other hand, the enrollment of girls increases 6 to 7 percentage points (significant at 5 percent). The attendance rate of boys falls 5 to 7 percentage points, and the same indicator in the sample of girls increases 8 percentage points.

Finally, panel (c) indicates that the proportion of boys who only participate in the labor market and are not enrolled increases 5 to 7 percentage points, while the participation of girls falls 5 percentage points. When we consider our previous results, where the labor force participations of direct beneficiaries falls as a consequence of *Renta Dignidad*, it may be the case that households substitute the labor force of the retired elderly with the labor force of boys in the [7,19) cohort.

Table 51. Effects on Labor Market and Education Outcomes of Children: Changes-in-Changes

	Bolivia	Boys	Girls
Participation			
τ^{CIC}	0.04	0.08*	0.00
	[0.03]	[0.04]	[0.05]
$\tau^{CIC}_{w/cov}$	0.04	0.10	−0.02
	[0.05]	[0.07]	[0.06]
Family worker			
τ^{CIC}	0.02	0.05	−0.01
	[0.03]	[0.04]	[0.05]
$\tau^{CIC}_{w/cov}$	0.02	0.06	−0.03
	[0.05]	[0.06]	[0.07]
Informal n/salaried			
τ^{CIC}	−0.01	0.00	−0.01
	[0.00]	[0.01]	[0.01]
$\tau^{CIC}_{w/cov}$	−0.01	−0.01	0.00
	[0.01]	[0.01]	[0.01]
Informal salaried			
τ^{CIC}	0.02	0.02	0.01
	[0.02]	[0.02]	[0.02]
$\tau^{CIC}_{w/cov}$	0.02	0.03	0.02
	[0.02]	[0.02]	[0.02]

(a) Labor Market

	Bolivia	Boys	Girls
Enrollment			
τ^{CIC}	0.00	−0.06*	0.06**
	[0.02]	[0.03]	[0.03]
$\tau^{CIC}_{w/cov}$	0.00	−0.08**	0.07**
	[0.02]	[0.04]	[0.03]
Attendance			
τ^{CIC}	0.01	−0.05*	0.08***
	[0.02]	[0.03]	[0.03]
$\tau^{CIC}_{w/cov}$	0.01	−0.07**	0.08**
	[0.03]	[0.04]	[0.03]
Primary			
τ^{CIC}	−0.02	−0.06	0.02
	[0.03]	[0.05]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.04	−0.12	0.05
	[0.05]	[0.07]	[0.09]
Secondary			
τ^{CIC}	0.02	0.06	−0.02
	[0.03]	[0.05]	[0.05]
$\tau^{CIC}_{w/cov}$	0.04	0.11	−0.04
	[0.05]	[0.07]	[0.08]

(b) Human capital

	Bolivia	Boys	Girls
Enrolled and participates			
τ^{CIC}	0.04	0.03	0.04
	[0.03]	[0.05]	[0.04]
$\tau^{CIC}_{w/cov}$	0.02	0.03	0.01
	[0.04]	[0.06]	[0.05]
Only participates			
τ^{CIC}	0.00	0.05*	−0.05*
	[0.02]	[0.03]	[0.03]
$\tau^{CIC}_{w/cov}$	0.01	0.07**	−0.05
	[0.02]	[0.03]	[0.03]
Only enrolled			
τ^{CIC}	−0.04	−0.09**	0.02
	[0.03]	[0.04]	[0.05]
$\tau^{CIC}_{w/cov}$	−0.04	−0.12*	0.05
	[0.05]	[0.07]	[0.06]
Neither enrolled nor participates			
τ^{CIC}	0.00	0.01	−0.02
	[0.01]	[0.01]	[0.01]
$\tau^{CIC}_{w/cov}$	0.00	0.01	−0.02
	[0.01]	[0.02]	[0.01]

(c) Condition

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

5.6 Falsification Tests

Finally, in this section we test whether the common trend assumption, essential to obtain valid CIC and DID estimates, holds true. We estimate the DID and CIC models using pre-treatment data from 2000-2002 and compare it with our original control group (2005-2007). Significant average DID and CIC estimates will be a flag against the validity of the original estimates.

We sum up the results of the falsification test for household outcomes in Table 52. In general the common trend assumption holds in the case of income variables and in subsample. There is some evidence that the trend in the case of per capita non-labor income of men may have differed before the treatment because the DID and CIC conditional estimates are significant at 10 percent. Overall, there is no evidence against our results in the case of income variables.

The second set of results tests the common trend assumption for consumption variables. There is no evidence against the reliability of the DID and CIC estimates for the full sample, sample of women and sample of households that have both male and female beneficiaries. However, the falsification tests do not support the common trend assumption in the case of consumption variables of men.

In the case of household investment variables there is no evidence against the common trend assumption in the full sample in the cases of education expenditure, health expenditure and dwelling investments. However, we do find some negative and significant effects using the CIC unconditional estimates in the case of last year's expenditure on durables. Regarding the results by sex of the beneficiary, the only case where there is some evidence against the common trend assumption is in the sample of men for education variable. Though there is some evidence against the validity of the estimates of health and last year's expenditure on durables in the subsample of households with male and female beneficiaries, in general our results for household investments are valid.

The set of household saving variables is the one where the common trend assumption may be seriously questioned. Although that assumption may not hold in the full sample and sample of men, there is little evidence against the validity of the estimates for women and households with male and female beneficiaries. Finally, the set of falsification tests for moderate and extreme poverty estimates indicate that there is no evidence against their validity.

Table 52. Falsification Test of Common Trend Assumption for Household Outcomes

	Bolivia	Men	Women	Both
pc household income	∘	∘	∘	∘
pc labor income	∘	∘	∘	∘
pc non-labor income	∘	$(+)D_{10}$, C_{10}	∘	∘
pc intra-household transfers	∘	∘	∘	∘
pc household consumption	∘	$(+)D_5, U_5, C_5$	∘	∘
pc food consumption	∘	$(+)C_{10}$	∘	∘
pc non-food consumption	∘	$(+)D_5, U_5, C_5$	∘	∘
Education expenditure	∘	$(+)C_{10}$	∘	∘
Health expenditure	∘	∘	∘	$(-)D_5, U_{10}, C_{10}$
Expenditure on durables (last year)	$(-)U_{10}$	∘	∘	$(-)D_{10}, U_{10}, C_{10}$
Dwelling investments	∘	∘	∘	∘
Household saving	$(-)U_{10}, C_{10}$	$(-)D_{10}$	∘	∘
Saving rate as proportion of income	$(-)D_5, U_{10}, C_{10}$	$(-)U_{10}$	$(-)U_{10}$	∘
Saving rate as proportion of consumption	$(-)D_5, U_5, C_5$	$(-)D_{10}, U_5, C_{10}$	∘	∘
Difference of log(income) and log(consumption)	$(-)D_5, U_5, C_5$	$(-)D_5, U_5$	∘	∘
moderate poverty: incidence	∘	∘	∘	∘
moderate poverty: gap	∘	∘	∘	∘
moderate poverty: severity	∘	∘	∘	∘
extreme poverty: incidence	∘	∘	∘	∘
extreme poverty: gap	∘	∘	∘	$(+)C_{10}$
extreme poverty: severity	∘	∘	∘	$(+)C_{10}$

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: D=DID, C=CIC conditional, U=CIC unconditional. The subscripts indicate the significance level.

To finish this section, in Table 53 we sum up the falsification tests for individual outcomes. The tests support the common trend assumption and do not provide evidence against the validity of our estimates in the full sample. The only variable whose estimates may be unreliable is the indicator of family worker. The falsification tests by sex indicate that the results for labor participation may not be valid. Furthermore, in the case of women there is evidence of unreliable estimates for family worker and formal employment indicators. There may also be reasons to doubt the validity of the estimates of total labor supply intensity in the sample of men

and women. Nevertheless, bear in mind that the falsification tests are only flags that warn us against the plausibility of the common trend assumption and not a conclusive piece of evidence against DID and CIC estimates.

Table 53. Falsification Test of Common Trend Assumption for Individual Outcomes

	Bolivia	Men	Women
Participation	∘	$(-)D_5$, U_1, C_1	$(+)D_5$, U_5, C_5
Family worker	$(+)D_1$, U_1, C_5	∘	$(+)D_5$, U_1, C_5
Informal n/salaried	∘	∘	∘
Informal salaried	∘	∘	∘
Formal salaried	∘	∘	$(-)D_5$, U_5
Labor supply intensity-total	∘	$(-)C_{10}$	$(+)D_5$, U_5, C_5
Labor supply-PA	∘	$(-)C_{10}$	$(+)D_5$, U_5, C_5
Wage	∘	∘	∘
Labor income	∘	$(-)C_{10}$, U_{10}	∘

Source: Authors' estimation based on ARU's harmonized set of Bolivian household surveys.
Notes: D=DID, C=CIC conditional, U=CIC unconditional. The subscripts indicate the significance level.

6. Conclusions and Policy Implications

This document presents the results of a quasi-experimental impact evaluation of *Renta Dignidad*, a universal non-contributory pension to old-age population implemented in Bolivia. The program introduced an exogenous policy change that reduced the age cut-off to become a beneficiary of non-contributory pensions from 65 to 60 years in December 2007. Applying the *difference-in-difference* and the *changes-in-changes* approaches to a combined sample of three years of cross-sectional surveys before and after the policy change we estimate not only average but also quantile treatment effects. In addition, we test the common time trend assumption comparing outcomes in two periods before the policy change.

Our main findings are summarized well by the title of our paper. At least for the Bolivian case, we find that non-contributory household transfers have complex intended and unintended effects on different individual and household outcomes for different types of individuals and households.

- In the case of women non-contributory pensions have, on average, increased their households' non-labor income 303 percent, which has decreased their labor participation (10 percentage points) and labor earnings (81 percent), which in turn has decreased their households' per-capita labor income (26 percent), which reduced, *ceteris paribus*, the effect of the program on total per-capita household income (36 percent).
- In the case of men, the non-contributory pension only affected their households' per-capita non-labor income (194 percent), but there have not been effects on their labor market outcomes or their households' per capita labor income.
- The program does not have significant effects on the incidence of both moderate and extreme poverty in the full sample, households with male beneficiaries, and households that have both male and female beneficiaries. The transfer, however, helped to reduce 10 percentage points the incidence of extreme poverty in the sample of households with female beneficiaries. Moreover, the transfer helps to reduce significantly the gap and severity of moderate and extreme poverty of households with female beneficiaries, but not of households with male beneficiaries and households with both male and female beneficiaries.
- Our results also suggest that the additional resources were neither consumed nor invested in health, education, or the purchase of durables. Additional resources were most likely held and invested in dwelling improvements.
- Although there are not significant effects on the labor force participation of future beneficiaries, there are changes in their labor market structure. The results suggest that future beneficiaries try to engage in jobs with better conditions for their age before retirement.
- The non-contributory transfer does not have any significant effect on people in the [25,45) age interval who reside with a beneficiary in comparison to people who do not live with a beneficiary.
- There is evidence that the labor force participation of boys in the [7,19) cohort who live with a beneficiary increased 8 percentage points, their enrollment rate

decreased 6 percentage points and their attendance rate decreased 5 percentage points.

- The enrollment of girls in the [7,19) cohort who live with a beneficiary of *Renta Dignidad* increased 6 percentage points and their attendance rate increased 8 percentage points.

The main policy message we should extract from these results is that non-contributory transfers have not only intended but also unintended effects on current, future and indirect beneficiaries. Therefore, it is very important to calibrate the transfer's size and eligibility to maximize the intended consequences and minimize or manage the unintended ones. Increasing the transfer amount might not translate into a one-to-one increase in household income, particularly if there are income effects that reduce the labor supply of current or future beneficiaries and, in the case of the elderly, if they have incentives to retire early from the labor market with a secure income. Non-contributory pensions may help the elderly to retire at a proper age. However, if non-contributory pensions become the main source of income after retirement due to workers not contributing to the pension system, then the elderly are less likely to be self-sufficient if the transfer is reduced or removed.

It is certainly important to evaluate the potential welfare gains associated with the increase in leisure, life satisfaction and health versus the monetary cost associated not only with the losses in production and direct cost of the program. In the particular case of Bolivia, given the demographic transition to a more adult population, means-test targeting—based on more specific demographics or vulnerability criteria, for example—needs to be considered in the near future. Finally, it is important to address the problem of having a high percentage of unregistered workers as beneficiaries of the pension system, the effects of which non-contributory pensions in Bolivia have attempted to mitigate, by introducing much-needed incentives to promote formal jobs.

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Appendices

A. Data Appendix

All of the nominal variables are deflated using the Consumer Price Index base December of 2012. To take the logarithm of censored variables we replace zero with half the minimum non-zero value of the variable, and then we take the logarithm.

A.1 Household Welfare Indicators

Per capita household income. It includes i) labor income (from main and secondary activities) which includes regular, in-kind, extraordinary income for salaried workers and residual income (gross income minus expenses minus depreciation) for self-employed workers; ii) property income from financial and non-financial assets; iii) income from social security; iv) transfers from other households (within the country and abroad); v) government transfers (Renta Dignidad and Juancito Pinto); and vi) other sources of income.

Poverty measures. Poverty lines extracted from Mena, Hernani-Limarino and Jiménez (2013).

Percapita household consumption. It includes total food consumption inside (bought, self-consumption and other sources) and outside the household, imputed rent, utilities, non-food consumption, durables, education and health consumption.

A.2 Household Investments and Savings

Education expenditures. Measured as the total spent on tuition, pension, school uniforms, desktop materials, transport, and others (e.g., contributions, lunch money).

Health expenditures. Measured as money spent on: medical consultations, medicines, hospitalization, and others (e.g., glasses, medical equipment) during the last year.

Expenditure on durables. Measured as the amount spent on 22 goods in the last year.

Dwelling investments. Measured as money spent on either repairs or household improvements (construction) during the last 12 months.

Household savings. Measured as household income minus consumption.

Saving rates. We use three different saving rate definitions: saving as proportion of income, as proportion of consumption and as the difference of log household income and log household consumption.

A.3 Individual Labor Outcomes

Labor force participation. A dichotomous outcome of whether the individual is participating or not, independent of their employment status.

Labor supply intensity. A censored outcome of the number of hours usually worked in the previous week of the date of the survey in all jobs or the primary activity.

Sector of employment. Four sectors: informal non-salaried workers (i.e., self-employed with salaried employees and self-employed without employees), informal salaried or formal salaried where formality is defined in terms of their contribution to short-term and long-term social security.

Labor income. Includes regular, in-kind, extraordinary income for salaried workers and residual income (gross income minus expenses minus depreciation) for self-employed workers (from main and secondary activities).

Wages. Ratio of labor income to labor supply intensity.

Enrollment. Dichotomous outcome where 1 indicates if the person is enrolled during the current year.

Attendance. Dichotomous outcome where 1 indicates if the person attends to the course in which it was enrolled.

Primary education. Dichotomous outcome where 1 indicates if the person has at least 8 years of education.

Secondary education. Dichotomous outcome where 1 indicates if the person has more than 8 years of education and less than 13.

B. Technical Appendix

B.1 Inference

Based on Athey and Imbens (2006b), to estimate the variance of the CIC estimator define:

$$P(y,z) = \frac{1}{f_{Y,01}(F_{Y,01}^{-1}(F_{Y,00}(z)))} \times (I\{y \le z\} - F_{Y,00}(z)) \quad (14)$$

$$p(y)=E[P(y,Y_{10})]$$

$$Q(y,z) = \frac{-1}{f_{Y,01}(F_{Y,01}^{-1}(F_{Y,00}(z)))} \times (I\{F_{Y,01}(y) \le F_{Y,00}(z)\} - F_{Y,00}(z)) \quad (15)$$

$$q(y)=E[Q(y,Y_{10})]$$

$$r(y) = F_{Y,01}^{-1}(F_{Y,00}(y)) - E[F_{Y,01}^{-1}(F_{Y,00}(Y_{10}))] \quad (16)$$

$$s(y) = y - \mathrm{Y}_{11} \quad (17)$$

with variances $V^p=E[p(Y_{00})^2]$, $V^q=E[q(Y_{01})^2]$, $V^r=E[r(Y_{10})^2]$, and $V^s=E[s(Y_{11})^2]$.

Then the asymptotic distribution has the form

$$\sqrt{N}(\hat{\tau}^{CIC} - \tau^{CIC}) \to \mathrm{N}(0, \frac{V^P}{\alpha_{00}} + \frac{V^q}{\alpha_{01}} + \frac{V^r}{\alpha_{10}} + \frac{V^s}{\alpha_{11}}) \quad (18)$$

The asymptotic variance is estimated by replacing expectations with sample averages, and using the empirical cumulative distribution function (and its inverse) showed in 11 (and 12). The density functions are estimated using an Epanechnikov kernel[13] so that

$$\hat{f}_{Y,01}(y) = \frac{1}{hN_{01}} \sum_{i=1}^{N_{01}} K\left(\frac{Y_{01,i} - y}{h}\right) \quad (19)$$

where the bandwidth h is specified according to: $h = \frac{1.06 \times sd_{Y,01}}{\sqrt[5]{N_{01}}}$ and sd is the sample standard deviation of Y_{01}

Thus, the asymptotic variance of $\sqrt{N}(\hat{\tau}^{CIC} - \tau^{CIC})$ is estimated as:

$$\frac{\frac{1}{N_{00}} \sum_{i=1}^{N_{00}} \hat{p}(Y_{00,i})^2}{\hat{\alpha}_{00}} + \frac{\frac{1}{N_{01}} \sum_{i=1}^{N_{01}} \hat{q}(Y_{01,i})^2}{\hat{\alpha}_{01}} + \frac{\frac{1}{N_{10}} \sum_{i=1}^{N_{10}} \hat{r}(Y_{10,i})^2}{\hat{\alpha}_{10}} + \frac{\frac{1}{N_{11}} \sum_{i=1}^{N_{11}} \hat{s}(Y_{11,i})^2}{\hat{\alpha}_{11}} \quad (20)$$

where $\hat{\alpha}_{gt} = \frac{N_{gt}}{N}$.

B.2 Changes-in-Changes Estimation with Covariates

• It is possible to include covariates, which in the case of discrete outcomes will help to improve point estimates.

1. Let $\tilde{Y}_{gt,i} = Y_{gt,i} - X'_{gt,i}\beta$ and define D=((1-T)(1-G),T(1-G),(1-T)G,TG)'

2. Regress (OLS, with no constant) $Y_i = D'\delta + X'_i\beta + \varepsilon_i$

3. Obtain the augmented residuals $\hat{Y} = Y_i - X'_i\beta = D'\delta + \varepsilon_i$, and apply the CIC estimator.

• Included X

1. Individual controls

• Education attainment (years of education)

• Sex

13

$$K[z] = \begin{cases} \frac{3(1-\frac{1}{5}z^2)}{4\sqrt{5}} & if\ |z| < \sqrt{5} \\ 0 & otherwise \end{cases}$$

• Ethnicity, multidimensional index based on three indicators: i) speaks an indigenous language, ii) self-reported ethnicity, and iii) native language

• Dummies if there are individuals in age cohorts: [0,4), [4,7), [7,16), and [16,19)

• Wealth index (5) quantiles.

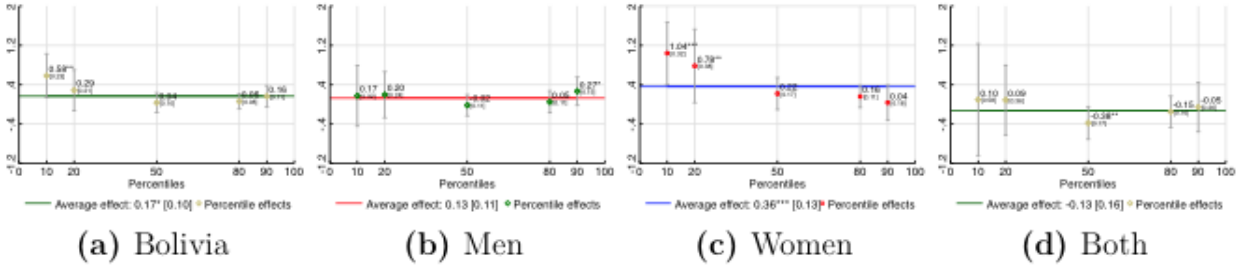
2 other controls

• Rural

• Regional fixed effects

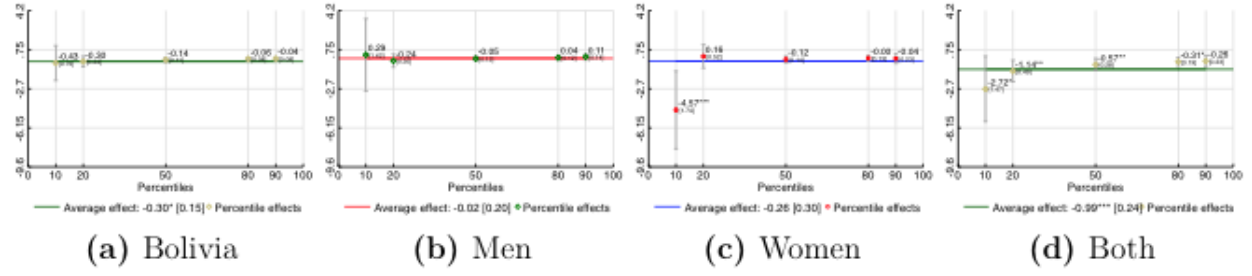
C. Online Appendix

Figure 4. Effects on (log) Household Per-Capita Income: Changes-in-Changes



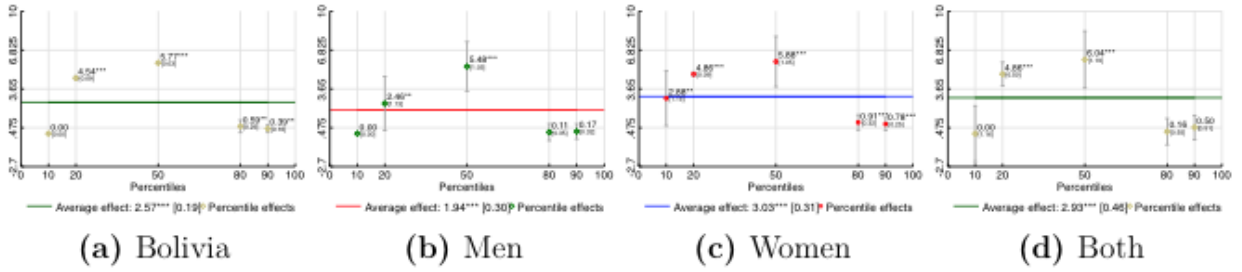
Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Figure 5. Effects on (log) Household Per-Capita Labor Income: Changes-in-Changes



Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

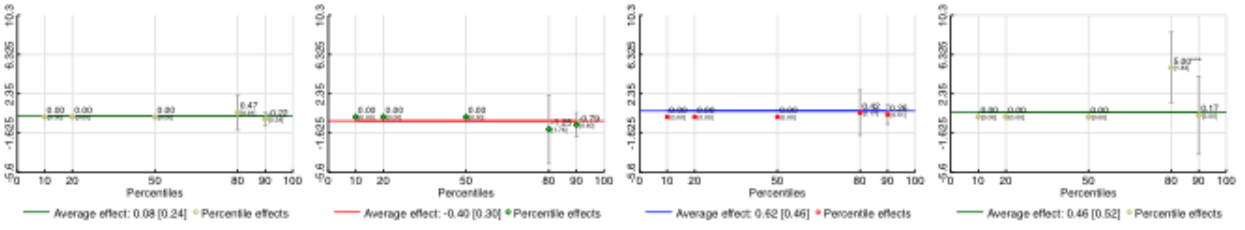
Figure 6. Effects on (log) Household Per-Capita Non-Labor Income: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

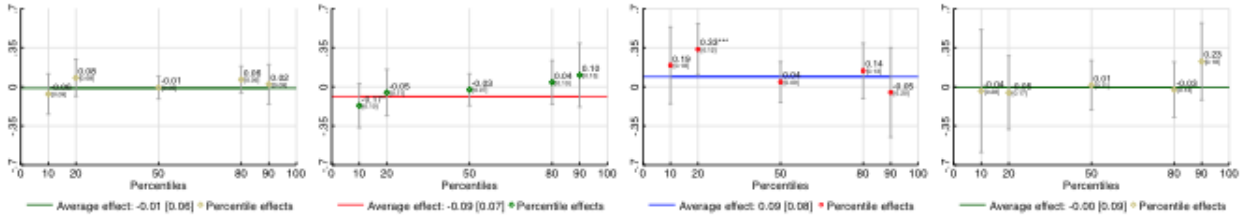
Figure 7. Effects on (log) Per-Capita Intra-Household Transfers: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

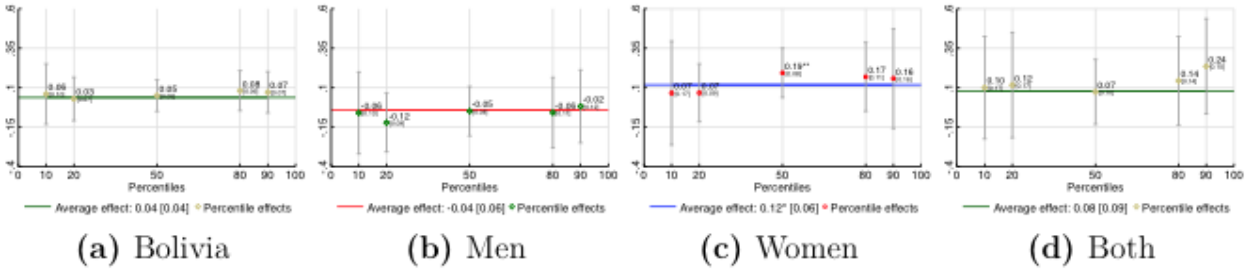
Figure 8. Effects on (log) Per-Capita Household Consumption: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

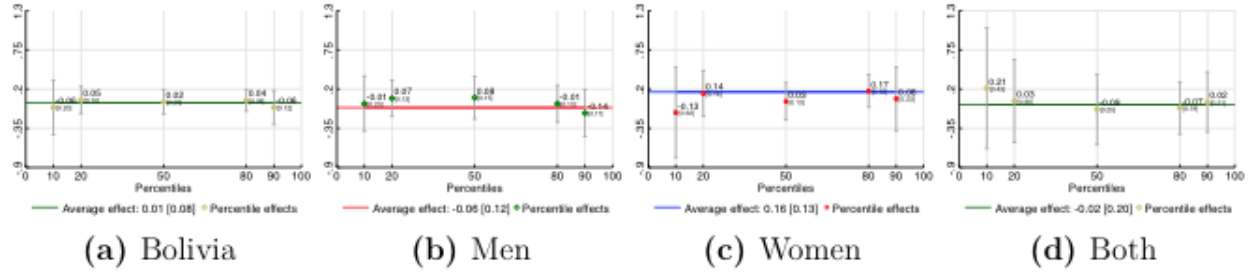
Figure 9. Effects on (log) Per-Capita Household Food Consumption: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

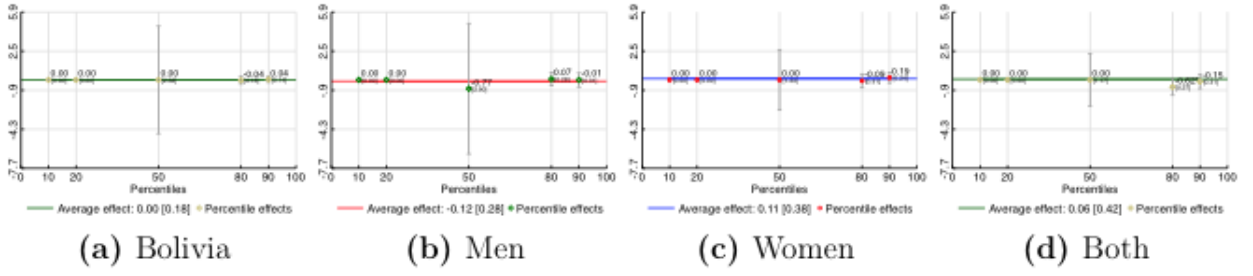
Figure 10. Effects on (log) Per-Capita Household Non-Food Consumption: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

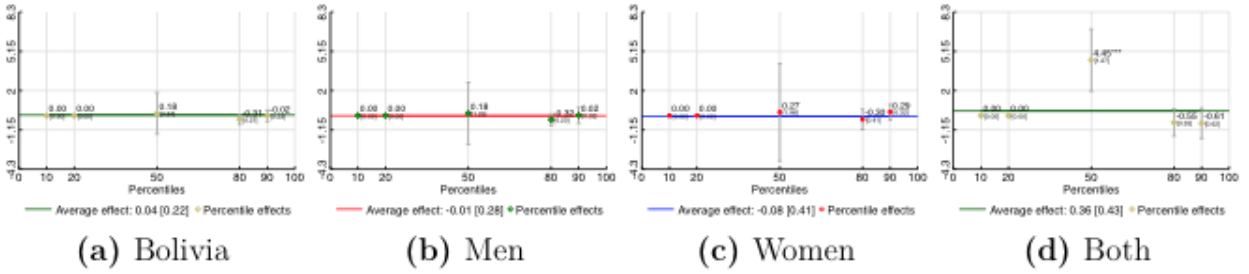
Figure 11. Effects on (log) Education Expenditure: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

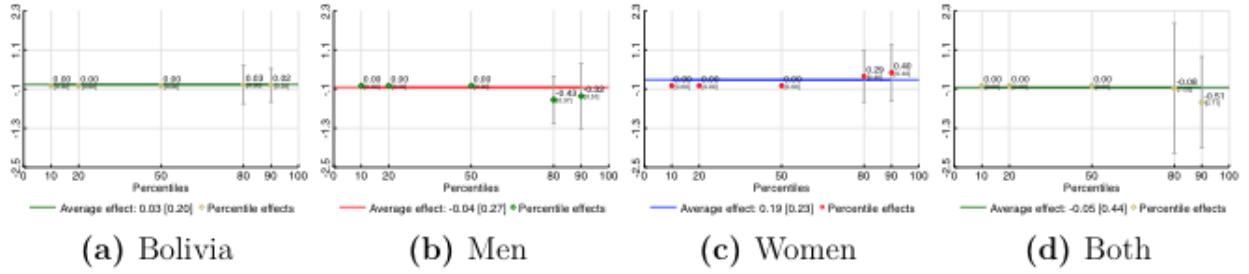
Figure 12. Effects on (log) Health Expenditure: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

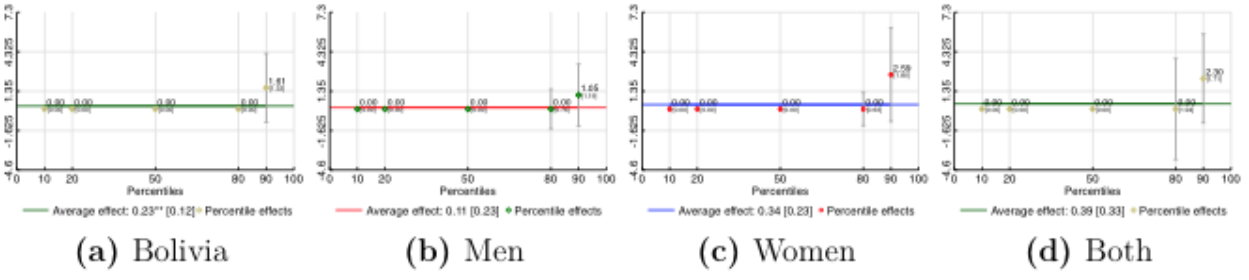
Figure 13. Effects on (log) Last Year's Expenditure on Durables: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

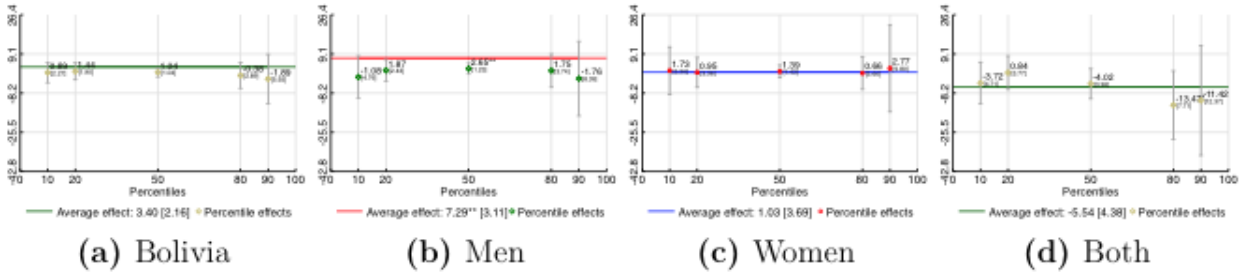
Figure 14. Effects on (log) Dwelling Investments: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

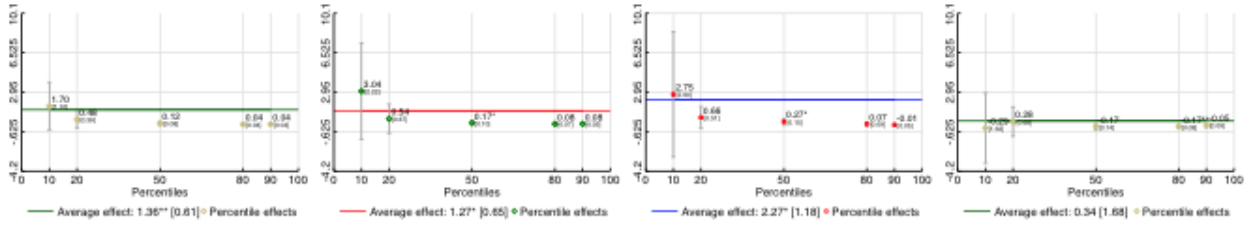
Figure 15. Effects on Saving (hundreds of Bs.): Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

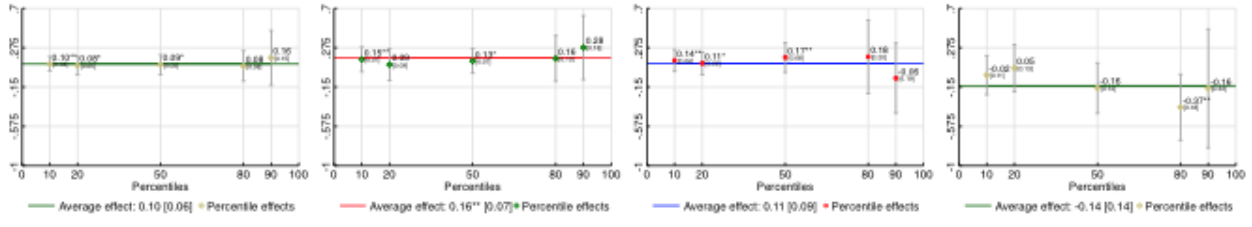
Figure 16. Effects on Saving Rate as Proportion of Income: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

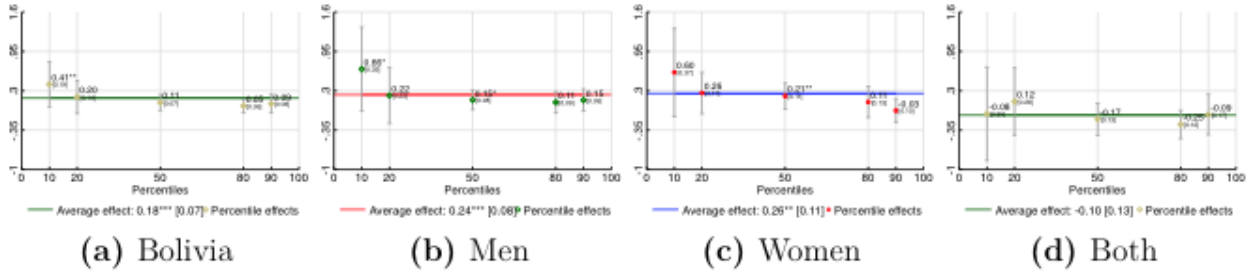
Figure 17. Effects on Saving Rate as Proportion of Consumption: Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

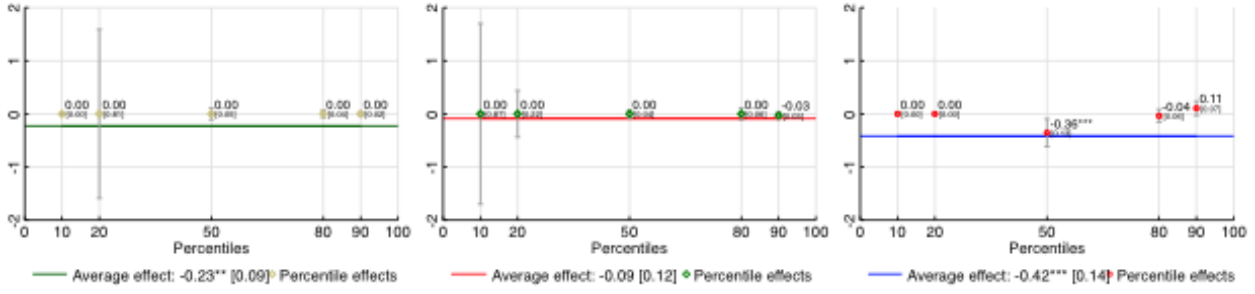
Figure 18. Effects on Saving Rate (log y - log c): Changes-in-Changes



(a) Bolivia (b) Men (c) Women (d) Both

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

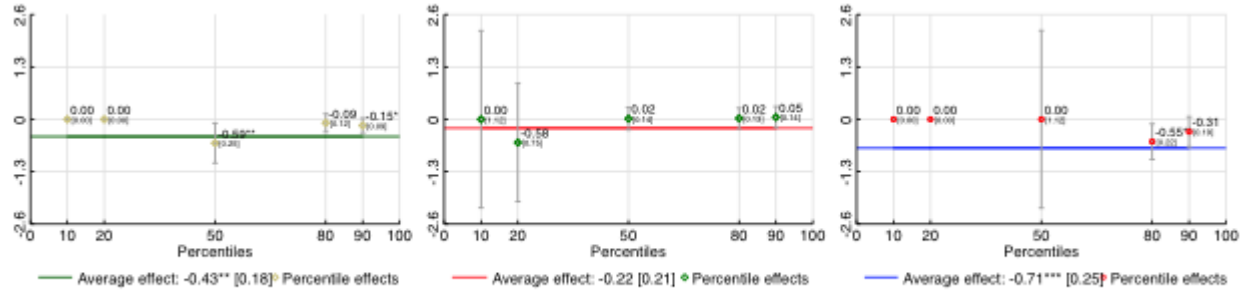
Figure 19. Effects on (log) Labor Supply Intensity: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

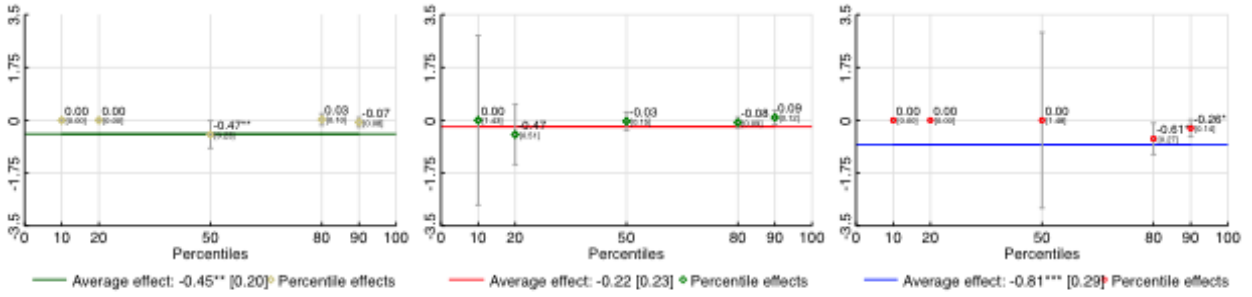
Figure 20. Effects on (log) Hourly Wage: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

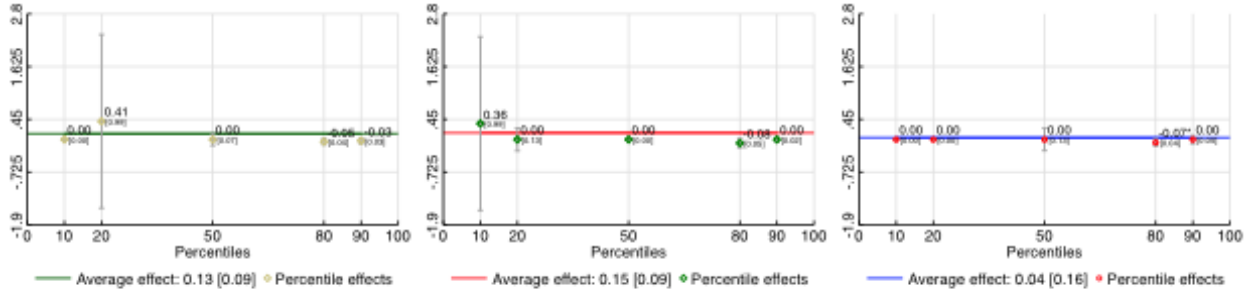
Figure 21. Effects on (log) Labor Income: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

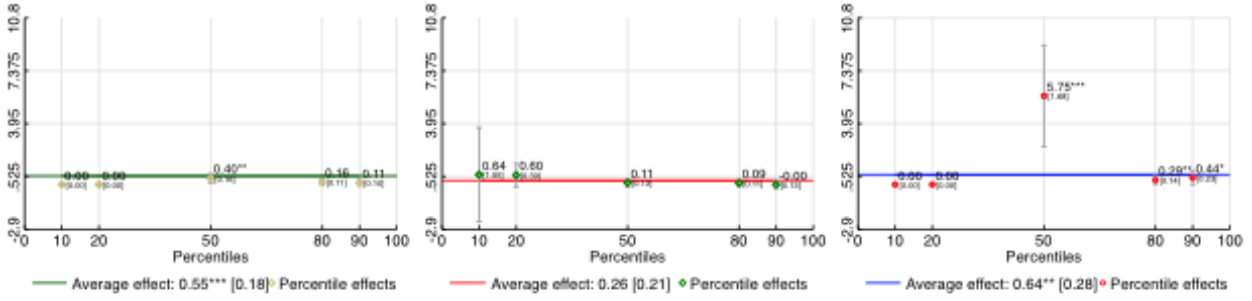
Figure 22. Effects on (log) Labor Supply Intensity of Future Beneficiaries: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

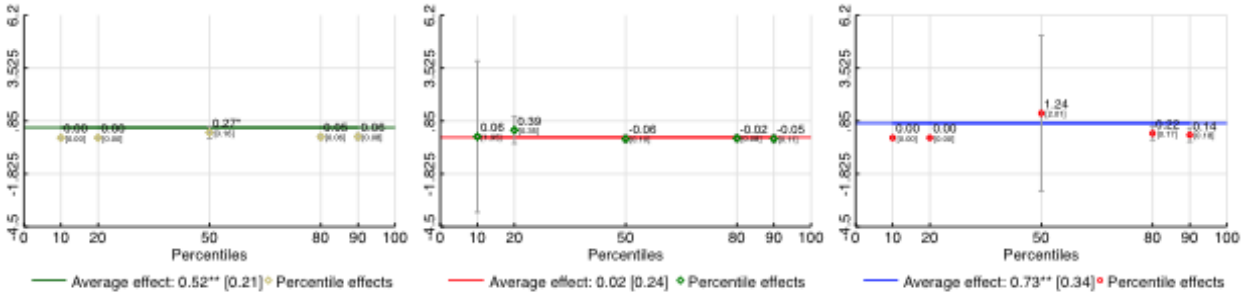
Figure 23. Effects on (log) Hourly Wage of Future Beneficiaries: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

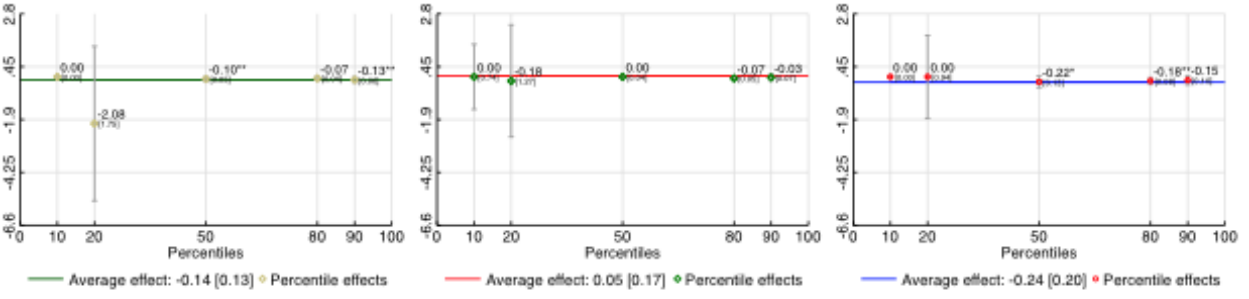
Figure 24. Effects on (log) Labor Income of Future Beneficiaries: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

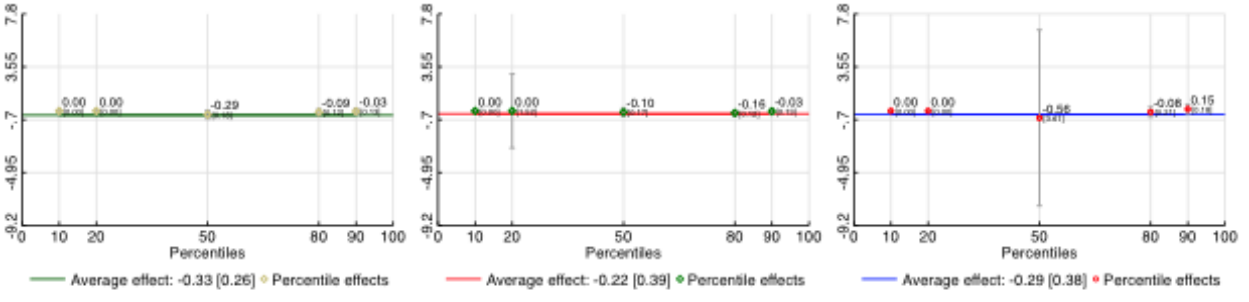
Figure 25. Effects on (log) Labor Supply Intensity of Young Adults: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

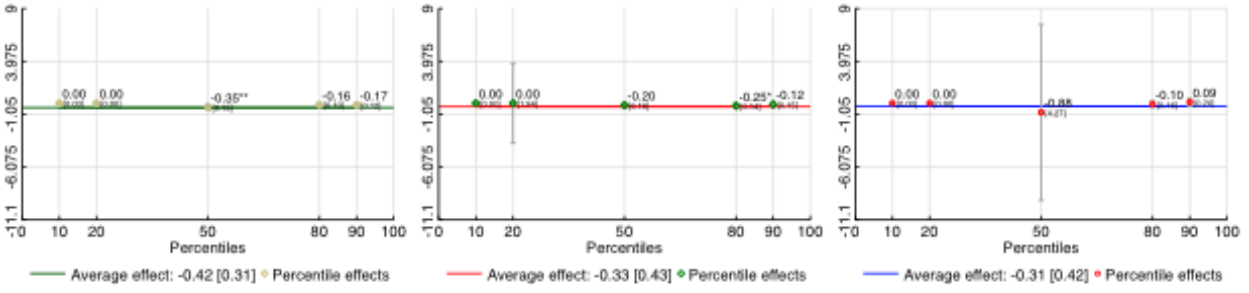
Figure 26. Effects on (log) Hourly Wage of Young Adults: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Figure 27. Effects on (log) Labor Income of Young Adults: Changes-in-Changes



(a) Bolivia (b) Men (c) Women

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Unconditional CIC estimates. Standard errors in brackets. * means the coefficient is statistically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

Table 54. Evolution of Formal Employment and Coverage of Contributory Old-Age Pensions in Bolivia by Sex

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2011	2012	2013
(a) Formal employments														
Bolivia	12.02	11.53	11.11	10.50	11.62	13.24	10.59	12.68	13.60	12.24	14.11	16.26	15.95	18.65
Women	8.51	8.16	8.22	7.53	8.90	10.64	8.43	9.30	10.40	9.00	10.66	12.28	12.48	14.63
Men	15.89	15.18	14.22	13.70	14.57	16.12	12.99	16.46	17.17	15.79	17.83	20.49	19.78	23.04
Ratio (w/m)	0.54	0.54	0.58	0.55	0.61	0.66	0.65	0.57	0.61	0.57	0.60	0.60	0.63	0.64
(b) Elderly who do not receive contributory pensions														
Bolivia	87.45	86.84	89.42	87.27	90.26	87.34	84.42	87.40	86.22	89.35	86.58	88.01	89.13	89.89
Women	93.87	92.93	92.59	90.53	92.39	91.47	89.65	89.14	92.75	91.88	89.14	89.51	90.63	91.90
Men	79.94	80.15	86.42	83.91	87.86	82.05	77.82	85.62	79.32	86.64	84.07	86.49	87.46	87.26
Ratio (w/m)	1.17	1.16	1.07	1.08	1.05	1.11	1.15	1.04	1.17	1.06	1.06	1.03	1.04	1.05

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: A worker is in a formal employment if she contributes to the Bolivian Pension Fund System (AFP). Formal employment calculated for people in the age interval [25,65). Coverage of contributory old-age pensions estimated for the age interval [60,65).

Table 55. Non-Contributory Pensions in Relation to Labor Income and Poverty Variables

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Non-contributive transfer (Bs.)											
Anually	790	840	1800	1800	1800	1800	1800	2400	2400	2400	2400
Monthly	65.83	70.00	150.00	150.00	150.00	150.00	150.00	200.00	200.00	200.00	200.00
Nominal minimum wage and mean monthly labor income (Bs. x month)											
Minimum wage	400.00	430.00	440.00	440.00	440.00	500.00	525.00	577.50	647.00	679.50	815.40
	(0.16)	(0.16)	(0.34)	(0.34)	(0.34)	(0.30)	(0.29)	(0.35)	(0.31)	(0.29)	(0.25)
Bolivia	732.34	1050.05	898.09	970.82	1389.64	1283.64	1481.64	1522.65	1714.49	n.a.	2113.86
	(0.09)	(0.07)	(0.17)	(0.15)	(0.11)	(0.12)	(0.10)	(0.13)	(0.12)	(n.a.)	(0.09)
Self-employed	565.40	617.93	627.17	692.71	1059.55	786.65	964.04	1090.31	1367.68	n.a.	1669.54
	(0.12)	(0.11)	(0.24)	(0.22)	(0.14)	(0.19)	(0.16)	(0.18)	(0.15)	(n.a.)	(0.12)
Informal salaried	719.32	1755.59	1039.63	908.16	1118.38	1692.43	1854.53	1994.04	1842.48	n.a.	2070.32
	(0.09)	(0.04)	(0.14)	(0.17)	(0.13)	(0.09)	(0.08)	(0.10)	(0.11)	(n.a.)	(0.10)
Formal salaried	1932.16	3001.84	2109.78	2743.78	3569.54	2636.50	3122.62	3457.31	2888.84	n.a.	3591.69
	(0.03)	(0.02)	(0.07)	(0.05)	(0.04)	(0.06)	(0.05)	(0.06)	(0.07)	(n.a.)	(0.06)
Moderate poverty lines (Bs. x month)											
O. urban	318.79	326.55	332.31	355.13	366.35	390.49	469.57	535.26	507.42	539.18	578.70
	(0.21)	(0.21)	(0.45)	(0.42)	(0.41)	(0.38)	(0.32)	(0.37)	(0.39)	(0.37)	(0.35)
La Paz	407.74	403.04	416.87	436.57	460.31	482.73	554.18	634.54	640.40	664.57	735.19
	(0.16)	(0.17)	(0.36)	(0.34)	(0.33)	(0.31)	(0.27)	(0.32)	(0.31)	(0.30)	(0.27)
Cochabamba	474.80	467.61	435.73	466.07	510.36	555.26	674.87	793.93	807.37	833.48	895.12
	(0.14)	(0.15)	(0.34)	(0.32)	(0.29)	(0.27)	(0.22)	(0.25)	(0.25)	(0.24)	(0.22)
Santa Cruz	418.94	430.52	433.38	450.49	464.43	488.05	618.20	729.78	747.97	815.32	876.47
	(0.16)	(0.16)	(0.35)	(0.33)	(0.32)	(0.31)	(0.24)	(0.27)	(0.27)	(0.25)	(0.23)
Rural	256.19	259.19	261.84	278.89	290.29	309.35	374.53	432.16	422.31	443.70	481.89
	(0.26)	(0.27)	(0.57)	(0.54)	(0.52)	(0.48)	(0.40)	(0.46)	(0.47)	(0.45)	(0.42)
Extreme poverty lines (Bs. x month)											
O. urban	175.67	179.95	183.12	195.70	201.88	215.19	258.76	294.96	279.62	297.12	318.90
	(0.37)	(0.39)	(0.82)	(0.77)	(0.74)	(0.70)	(0.58)	(0.68)	(0.72)	(0.67)	(0.63)
La Paz	214.01	211.55	218.81	229.15	241.60	253.37	290.87	333.06	336.13	348.81	385.88
	(0.31)	(0.33)	(0.69)	(0.65)	(0.62)	(0.59)	(0.52)	(0.60)	(0.60)	(0.57)	(0.52)
Cochabamba	241.88	238.23	221.98	237.44	260.00	282.88	343.81	404.47	411.32	424.62	456.02
	(0.27)	(0.29)	(0.68)	(0.63)	(0.58)	(0.53)	(0.44)	(0.49)	(0.49)	(0.47)	(0.44)
Santa Cruz	204.36	210.00	211.40	219.75	226.54	238.07	301.55	355.98	364.85	397.70	427.53
	(0.32)	(0.33)	(0.71)	(0.68)	(0.66)	(0.63)	(0.50)	(0.56)	(0.55)	(0.50)	(0.47)
Rural	147.20	148.92	150.44	160.24	166.79	177.74	215.19	248.31	242.65	254.93	276.88
	(0.45)	(0.47)	(1.00)	(0.94)	(0.90)	(0.84)	(0.70)	(0.81)	(0.82)	(0.78)	(0.72)

Source: Authors' estimation based on ARU's harmonized set of household surveys.
Notes: Ratios of non-contributory pensions to the indicated variable in parentheses. Labor income variables are the average of the labor income of population in the [55,60) cohort for Bolivia and the indicated sectors. A worker is in a formal job if she contributes to the Bolivian Pension Fund System (AFP). Moderate and extreme poverty lines extracted from Mena, Hernani-Limarino, and Jiménez (2013). "O. urban"=Other urban areas. All are monthly nominal values expressed in Bs. unless otherwise stated.

Table 56. Normative of Non-Contributory Pensions in Bolivia

Normative	Date	Content
Law No. 1544	21-March-1994	Capitalization of public enterprises and transfers its benefits to Bolivia citizens
Law No. 1732	29-November-1996	Pension system reform and creation of BONOSOL
D No. 24576	24-April-1997	Normative of BONOSOL
Law No. 1864	15-June-1998	Substitutes BONOSOL with BOLIVIDA
D No. 25994	24-November-2000	Creates BOLIVIDA and norms the payments of 1998 and 1999
D No. 26024	12-December-2000	Settles new value of BOLIVIDA
D No. 26445	18-December-2001	Settles new value of BOLIVIDA for payments of 2000 and 2001
Law No. 2427	29-November-2002	BONOSOL's law
Law No. 3791	28-November-2007	Law of universal old-age non-contributive pension (Renta Dignidad)
DS No. 29400	29-December-2007	Renta Dignidad's normative

Source: Authors' compilation.