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Informality and pension reforms in Bolivia

The case of Renta Dignidad

Carla Canelas¹ and Miguel Niño-Zarazúa²

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Abstract: How social protection programmes affect work choices is a question that has been at the centre of labour economics research for decades. More recently, a scant literature has focused on the effects of social protection on work choices and informal employment in the context of low- and middle-income countries. This paper contributes to this scant literature by examining the effect of Bolivia's *Renta Dignidad*, a universal non-contributory old-age pension that covers all Bolivians aged 60 years and older. We exploit the discontinuity introduced by the age eligibility criteria and the timing of the announcement of the programme to implement a difference-in-differences approach. Overall, we find that *Renta Dignidad* has no detrimental effects on labour force participation and the intensity of labour of adult members of beneficiary households. Instead, we find that the pension reduces the intensity of work for girls aged 12–18 living with a pensioner, which indicates a positive effect on intra-household time allocation. In terms of work choices, *Renta Dignidad* reduces the probability of holding a salaried job in rural areas by about 8 percentage points, which denotes a shift from formal to informal employment.

Key words: social protection, informal employment, Bolivia, *Renta Dignidad*, non-contributory old-age pension

JEL classification: J08, J26, I38

¹ The American University of Paris, France, and Centre d'Economie de la Sorbonne, Paris, France, corresponding author: carla.canelas@univ-paris1.fr; ² UNU-WIDER

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Katajanokanlaituri 6 B, 00160 Helsinki, Finland

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1 Introduction

An important question related to the functioning of labour markets is the nature of informal employment and the mechanisms driving its expansion. According to the International Labour Organization (ILO), around half of the world's working-age population engages in the informal economy (ILO 2019). This issue is particularly important among low- and lower middle-income countries, where informality is widespread—absorbing about 80–90 and 70–80 per cent of total non-agricultural employment, respectively—and characterized by low remuneration, precarious working conditions, and limited or no access to institutionalized forms of social protection (World Bank 2019).

Indeed, contributory old-age pensions, health insurance, and other contributory schemes cover just a fraction of the poor. In Latin America, for instance, only about 8.5 per cent of the population in the first quintile of the income distribution receive social insurance benefits, and this share goes down to 5 per cent and 1.6 per cent in sub-Saharan Africa and among low-income countries, respectively (Niño-Zarazúa 2019). Firms operating in the informal economy also face barriers to entry into consumer markets and value chains in industrial production due to low productivity and low-quality products (La Porta and Shleifer 2014; Masatlioglu and Rigolini 2008), credit rationing from formal lenders (Straub 2005; Wellalage and Locke 2016), and exclusion from tax benefits and other government schemes (Hoseini 2020).

The economic literature has traditionally emphasized the dual nature of labour markets in developing countries—the dual labour market hypothesis—whereby an excess supply of unskilled labour is the result of low human capital endowments and efficiency wages that are set above market clearing prices (Fields 1975; Lewis 1954; Stiglitz 1976). Discriminatory norms against women, the elderly, minorities, and vulnerable groups are also expected to exacerbate labour market segmentation, making informal employment a strategy of last resort to avoid hunger and destitution (Chen et al. 2006; Gulyani and Talukdar 2010).

Critics of the dual labour market hypothesis argue that labour market segmentation may not exist if there is free entry movement from informal to formal labour markets (Dickens and Lang 1985; Heckman and Hotz 1986; Pratap and Quintin 2006; Rosenzweig 1988). Informal employment is, from that perspective, not a choice made out of necessity, but the outcome of individual strategic decisions taken to maximize utility and exploit the comparative advantage that the informal employment offers to workers (Gindling 1991; Magnac 1991; Maloney 2004). Adverse incentives in the tax and welfare-benefit systems, together with weak and ineffective legal frameworks and enforcement institutions, would exacerbate the level of informality (Dabla-Norris et al. 2008; Kanbur 2017), with far-reaching consequences for the functioning of labour markets and economic development.

These competing hypotheses can, however, be reconciled by considering the possibility of informal labour markets being heterogeneous and characterized by their own internal duality (Fields 2018; Marcouiller et al. 1997; Tokman 1989). Under this view, informal labour markets are made of a two-tier system in which a lower-tier informal sector—an easy-entry segment in Fields's (2018) terminology—would be the strategy of last resort for the poorest and least-endowed workers, with negligible marginal productivity of labour, whereas an upper-tier informal sector would reflect voluntary and strategic decisions (Canelas 2019; Cunningham and Maloney 2001; Günther and Launov 2012).

While informal employment may be the most likely strategy of last resort among the poorest, at higher levels of capital endowments, workers' strategic choices could be influenced by the presence of social protection benefits. The effect that social protection programmes have on work choices has become an important topic in the labour economics literature of advanced economies. The reviews by Hoynes (1997) and Moffitt (2002) showed that changes in the eligibility for, and generosity of, welfare benefits

can have significant effects on labour supply. Indeed, economic theory suggests that, given competitive market conditions, welfare benefits can reduce labour supply at the margin. They do this by raising the reservation wage of beneficiaries.

In the context of developing countries, a scant although growing literature that examines the effects of non-contributory social protection programmes on adult labour supply and work choices among the poor overwhelmingly finds evidence of positive (or insignificant) effects.¹ A few studies that have analysed the effects of social protection programmes on informal employment have found contrasting results, with some studies reporting an increase in informal employment (Bobba et al. 2020; Bosch and Campos-Vázquez 2014; Camacho et al. 2013; Levy 2018), while others report insignificant effects (Azuara and Marinescu 2013; Campos-Vázquez and Knox 2013; Cruces and Bérgholo 2013).

A much smaller literature has examined specifically the effect of old-age pensions on informality (Antón et al. 2012; Attanasio et al. 2011; Bosch and Guajardo 2012; Bosch and Manacorda 2012; Calderón and Marinescu 2012; Galiani et al. 2016; Hernani-Limarino and Mena 2015). The scant evidence suggests that the presence of social pensions can affect work choices and expectations of the working-age population that exacerbate informal employment, although these effects seem to be heterogeneous across contexts, income levels, and population subgroups.

This paper contributes to this scant literature by assessing the effect of Bolivia's *Renta Dignidad*, a universal non-contributory old-age pension that was introduced in 2008 to cover all adults aged 60 years and older. We focus on Bolivia because, according to recent estimates (Medina and Schneider 2018), Bolivia has the world's largest informal economy, accounting for 62 per cent of the gross domestic product (GDP). Furthermore, when we look at the average contribution of informal employment to total non-agricultural employment over the 2000–18 period, we observe that Bolivia has the largest proportion of informal employment in Latin America, with nearly 80 per cent of workers employed in the informal sector. This makes the case of Bolivia particularly important, as it can provide relevant information about whether (and how) welfare-benefit programmes may exacerbate already widespread incentives for informality.

Overall, our results suggest that access to *Renta Dignidad*, either as a direct or indirect beneficiary, had no effects on labour supply or the intensity of labour, measured by the number of hours worked. However, we find evidence indicating that the pension affected the allocation of labour across formal and informal occupations of family members living with beneficiary pensioners, by decreasing the share of waged employment in rural areas. We discuss in Section 5 the possible mechanisms underpinning these effects. The remainder of the paper is organized as follows: Section 2 provides a review of the literature on labour supply and informal employment, paying attention to the scant literature on the effects of social protection programmes on informality, particularly in the case of social pensions. Section 3 provides an overview of *Renta Dignidad*, highlighting the central features of the old pension reform in terms of age eligibility and transfer size, whereas Section 4 discusses the data and identification and estimation strategies adopted in the study. Section 5 presents the results with regard to the impact of *Renta Dignidad* on labour supply in terms of (1) direct beneficiaries; (2) other family members, including children; and (3) the propensity to engage in informal employment. Section 6 concludes with an analysis of the implications of our findings for policy design.

¹ For reviews of the literature on the impact of social protection programmes on labour supply, see Barrientos and Niño-Zarazúa (2010), Bastagli et al. (2019), and Malerba and Niño-Zarazúa (2021).

2 Literature review

2.1 Social protection and labour supply

A growing literature has examined the effects of social protection programmes on labour supply and work choices in the context of developing countries, although a much more limited literature has specifically focused on the causal relationship between welfare benefits and informal employment.

In Mexico, for instance, Parker and Skoufias (2000) and Behrman and Parker (2013) report positive but small effects of the *PROGRESA/Oportunidades* programme on labour supply, with women reporting larger effects than men. In Colombia, Barrientos and Villa (2015) find positive effects of *Familias en Acción* on labour supply, especially among single mothers and young adult men. Similarly, Ospina (2010) also finds positive effects of *Familias en Acción* on the intensity of paid work, but the effect is limited to men. In the Dominican Republic, Canavire Bacarreza and Vasquez-Ruiz (2013) find positive effects of the *Solidaridad* cash transfer programme on labour force participation among adults. Fewer studies have reported negative effects. For example, Teixeira (2010) report statistically significant reductions in labour intensity resulting from Brazil's *Bolsa Família*.

While most studies have not explicitly addressed the concern of informal employment, one can infer from the level of earnings and the type of work of most beneficiaries of poverty-targeted interventions that any sizeable effect is largely restricted to within the boundaries of the informal sector. This is particularly true for those studies that report a significant time reallocation away from casual and low-paid wage labour to self-employment, as in the cases of Macours et al.'s (2012) analysis of Nicaragua's *Atención a Crisis*; Asfaw et al.'s (2014) study of Kenya's Cash Transfer for Orphans and Vulnerable Children; Covarrubias et al.'s (2012) analysis of Malawi's Social Cash Transfer programme; Daidone et al.'s (2015) analysis of Lesotho's Child Grants programme; and Cheema et al.'s (2020) study on Pakistan's Benazir Income Support Programme.

In other contexts, however, studies have found a shift from self-employment to waged employment as a result of social protection interventions, as in the case of Mochiah et al.'s (2014) study of Ghana's Livelihood Empowerment against Poverty (LEAP) programme. While the shift towards wage employment could in some contexts represent a positive outcome, it is unclear whether such a move leads to a transition from informal to formal employment.

2.2 Social protection and informal employment

Very few studies have examined the causal relationship between social protection benefits and informal employment, mainly in the context of Latin America.² de Holanda Barbosa and Corseuil (2014) analysed the case of Brazil's *Bolsa Família*, and found negative but insignificant effects. In Argentina, Garganta and Gasparini (2015) examined the impact of *Asignación Universal por Hijo*, a child allowance programme on informality, and found a significant and large disincentive effect to formalization, although this was constrained to programme beneficiaries who were already active in the informal labour market. The authors did not find evidence of switching choices from formal to informal employment. In Uruguay, Cruces and Bérigolo (2013) examined the expansion of health insurance and its effects on formal workers' dependants. They found significant impacts on formal employment. In Colombia, Camacho et al. (2013) analysed the subsidized regime of public health insurance and found strong evidence of an increase in informal employment of approximately 4 percentage points.

² For an earlier review on the topic, see Bosch and Manacorda (2012).

In Mexico, several studies have focused on the *Seguro Popular*, a non-contributory social health insurance scheme that was introduced in 2003 to expand access to health services among the poor, who had been largely excluded from the public health system due to the truncated nature of contributory social insurance schemes that mainly cover workers in the formal sector. While the studies have exploited the gradual expansion of *Seguro Popular* for identification of the causal effects of the programme, they have found conflicting results.³ For instance, Aterido et al.'s (2011) study found that *Seguro Popular* impacted negatively the propensity to engage in formal employment, with a 3.1 percentage point reduction in the inflow of workers into formality. The impact was larger for those with less education and those whose household members had social security coverage. Similarly, Bosch and Campos-Vazquez (2014) found that *Seguro Popular* had a negative effect on formal employment among small and medium enterprises.

In contrast, using a very similar identification strategy, Azuara and Marinescu (2013) found that *Seguro Popular* had insignificant effects on informality in the overall population, although they found a small increase in informality of about 1.7 per cent for less educated workers. Bosch and Campos-Vazquez (2014) restricted the analysis to large and prosperous cities, and found no evidence of a causal relationship between *Seguro Popular* and the propensity to formal or informal employment. Thus, the scarce evidence seems to suggest the presence of a segmented informal labour market with its own internal duality, whereby poorer and less educated workers are likely to be more responsive to the social health insurance benefits.

2.3 Social pensions and informal employment

In the specific contexts of non-contributory old-age (or social) pensions, there has been a very considerable expansion of these programmes in the developing world, from just 31 social pensions operating in 2000, up to more than 50 programmes in 2018, with a coverage of approximately 200 million direct beneficiaries (Niño-Zarazúa 2019).

While evidence suggests that social pensions have been effective at reducing poverty and vulnerability in old age (Azeem et al. 2019; Barrientos 2015; Kakwani and Subbarao 2007; Zhang et al. 2020), there are concerns about the adverse effects that they can generate in the labour supply, in detriment of formal employment, especially among those close to retirement age (Antón et al. 2012; Bosch and Manacorda 2012). By guaranteeing an income source in old age regardless of workers' contributions to a pension fund, social pensions could de facto increase the benefits of informal employment and reduce the cost of informality (e.g. poverty in old age). This, in turn, can influence workers' expectations and occupational choices, and lead to more workers choosing tax avoidance via informality, with important implications for economic efficiency (Levy 2009).

A very scant literature on the impact of social pensions on informal employment suggests that social pensions can encourage informal employment, although the effects are heterogeneous across contexts and income and population subgroups. In Argentina, Bosch and Guajardo (2012) examined the effect of *Moratorium*, a scheme that provided pension income to workers regardless of whether they had completed their full social security contributions through formal employment. They found that *Moratorium* led to a 2.5 percentage point decrease in formal employment among women aged 60–64 and a large increase in the share of workers in the informal sector receiving a pension. In Colombia, Calderón and Marinescu (2012) looked at the impact of a series of reforms that consisted of unifying the payment of health insurance and pension systems. Using the progressive roll-out of the payment system as an identification strategy, the authors found that the benefit bundling increased both formality and informality by

³ For technical and policy discussions on the implications of *Seguro Popular* for informal employment, see Antón et al. (2012), Levy (2010), and Levy (2018).

small margins of about 1 percentage point. The increase in formality was concentrated among salaried workers, while the increase in informality was concentrated among the self-employed.

In Mexico, Galiani et al. (2016) studied the case of *Adultos Mayores*, a poverty-targeted non-contributory pension scheme that covered adults over 70 years of age. They found that beneficiaries reduced participation in formal employment by about 5 per cent in exchange for an increase of 6 per cent in informal unpaid work within the household. In Chile, Attanasio et al. (2011) examined the impact of the 2008 Chilean pension reform that was introduced to guarantee a minimum level of consumption upon retirement, especially among those who had been employed in the informal sector. They found that the reform reduced the participation in the formal labour market by 4.1 per cent among workers older than 40 years old.

In the specific context of Bolivia, Hernani-Limarino and Mena's (2015) study is to our knowledge the only impact analysis of *Renta Dignidad* that focuses on labour supply and informal employment. They found that the universal non-contributory pension reduced labour market participation by 4 percentage points, which was largely explained by a decline in women's labour force participation in both the formal and informal sectors. They also found an increase of 6 percentage points in informal non-salaried employment among future male social pension beneficiaries.

Overall, the evidence suggests the presence of *direct* effects of social pensions on pensioners' labour supply and work choices, as well as *indirect* effects on incentives and expectations of future beneficiaries of pensions that may exacerbate informality. In the next sections, we describe *Renta Dignidad*, Bolivia's social pension scheme, and the identification strategy that we adopt to assess its effect on labour supply and informality.

3 Background of *Renta Dignidad*

Bolivia is the country in Latin America with the largest informal labour market, and as a consequence just about 10 per cent of all people in old age receive a contributory pension. In order to address poverty and vulnerability in old age, on 28 November 2007, the Bolivian Legislative Assembly passed Law 3791, which established that all Bolivian citizens aged 60 and older, irrespective of their income or whether they received a contributory pension, were eligible to receive a universal pension 'Rental Universal de Vejez—*Renta Dignidad*'.

Renta Dignidad began operations in February 2008 to distribute benefits in two schemes. The first scheme distributed pension benefits to individuals who were not beneficiaries of contributory pensions (*no rentistas*). This group of *no rentistas* pensioners represented 83.6 per cent of the eligible population and received a monthly pension of Bs.200 (equivalent to US\$2.1 PPP a day). The second scheme distributed lower benefits, about Bs.150 per month (approximately US\$1.58 PPP per day), to those who already benefited from a retirement pension (*rentistas*), which was approximately 16.4 per cent of the eligible population (Arauco et al. 2013). The pension is paid monthly, although pensioners can choose the frequency of payments.⁴

Renta Dignidad was preceded by *Bono Solidario* (more commonly known as *BonoSol*) a non-contributory pension that was introduced in 1997 to cover people aged 65 and older, and which ended with the launch of *Renta Dignidad*. By the time of its introduction in 2008, *Renta Dignidad* covered 753,704 benefi-

⁴ Sixty per cent of pensioners receive monthly payments, and nearly 90 per cent choose to be paid either monthly, bimonthly, or quarterly.

ciaries, and by 2011 (the end of the period covered in this analysis) the pension had already reached 823,602 beneficiaries, or 8.5 per cent of Bolivia’s population (Borella Mas et al. 2016).

The introduction of *Renta Dignidad* was part of a wider structural reform that included the nationalization of the extractive industries in 2006, which has since then largely financed the pension via a tax on hydrocarbons (Barrientos and Niño-Zarazúa 2011).⁵ The pension represented about 1.4 per cent of GDP in 2008 and that share decreased to 1.1 per cent by the end of 2011. The universal approach of *Renta Dignidad* made Bolivia the only country in Latin America (apart from Guyana and Surinam) to have a universal—rather than targeted—non-contributory pension scheme at the time of the introduction of the programme (Escobar Loza et al. 2013).

4 Data and empirical strategy

The data used in this study come from the Bolivian National Living Standards Survey MECOVI (*Encuesta Nacional de Condiciones de Vida*) for the period 2005–11, which was conducted by Bolivia’s National Statistics Institute (*Instituto Nacional de Estadística Bolivia*). The MECOVI is a nationally representative household survey of the Bolivian population. The survey collects detailed information on household demographics, health, education, occupations and labour force participation, housing and asset ownership, household food and non-food expenditures, and income, including contributions from social assistance. It also collects information on whether the individual has participated in paid or unpaid market activities for a private and/or family business and the number of hours allocated to these activities. Unfortunately, it does not collect information on domestic tasks and leisure time.

We focused our analysis on individuals aged 55–65 years, as this is the age cohort that is directly affected by the reform.

4.1 Identification strategy

Renta Dignidad targets all Bolivians aged 60 years and older. The discontinuity introduced by the age eligibility criteria allows us to divide the population into control (households with the oldest member aged under 60 years old) and treatment (households with the oldest member aged 60 years old or more) groups. We exploit this variation in coverage to compare household that were eligible to receive the cash transfer (treatment group) with those households that were just below the eligibility threshold at different points in time, and therefore did not benefit from the programme throughout the entire period covered in the analysis (control group). A second source of variation comes from the *timing* of the announcement of the programme implementation—that is, before and after 2008. Thus, we also exploit this exogenous variation to estimate the differences in outcomes between treatment and control groups before and after the programme implementation in a differences-in-differences (DD) framework.

4.2 Estimation strategy

We estimated the effect of the programme on household poverty and labour market outcomes using a DD approach. The DD equation is:

$$Y_{igt} = \beta_0 + \beta_1 T_{ig} + \gamma T_{ig} * P_{it} + \sum_{j=1}^J X_{ij} \theta_j + \delta_t + \varepsilon_{igt} \quad (1)$$

⁵ In 2008, taxes on hydrocarbons contributed 63 per cent of the costs of *Renta Dignidad*, and by 2011 this share had increased to 77.5 per cent.

where Y is the outcome of interest—that is, poverty status of the household, labour force participation, and hours worked. T is a dummy variable equal to 1 for eligible persons (households with at least one person aged 60 years or older) and 0 otherwise; P is a dummy variable equal to 1 for the years when the transfer was paid (2008–11), and γ is the parameter of interest yielding the programme treatment effect. X_i is a vector of sociodemographic characteristics, including gender, ethnicity, the household structure, and years of education. We also include in X_i controls for rural households, and geographical dummies for the nine departments in Bolivia, whereas δ_t controls for potential time-varying effects of each round of data. The specification includes robust standard errors clustered at the household level.

The DD estimates provide unbiased treatment effects of the programme under the assumption of ‘parallel trends’—that is, in the absence of the treatment the outcomes of the two groups would have followed similar trends. While this assumption cannot be tested formally, one can compare trends in outcomes between treatment and control groups before the programme started. If they are similar, it is likely they would have been the same in the post-treatment period in the absence of the programme (Attanasio et al. 2010). We test this formally using data from 2005–07 (the pretreatment period) and present the results in Table A1 in the Appendix. We find that time trends are similar for both groups.

It is also possible that an unbalanced distribution of observed characteristics between the treatment ($Z_i = 1$) and control ($Z_i = 0$) groups affects the outcomes of interest Y_{it} and thus bias the results. To address this problem, we first match treatment and control observations using a kernel propensity score matching, impose a common support, and then calculate the DD matching (DDM) estimator proposed by Blundell and Dias (2009):⁶

$$DDM = \{E(Y_{it=1}|D_{it=1} = 1, Z_i = 1) - w_{it=1}^c * E(Y_{it=1}|D_{it=1} = 0, Z_i = 0)\} \\ - w_{it=0}^t * \{E(Y_{it=0}|D_{it=0} = 0, Z_i = 1) - w_{it=0}^c * E(Y_{it=0}|D_{it=0} = 0, Z_i = 0)\} \quad (2)$$

where D_{it} is the treatment indicator, equal to 1 for the treatment group in the follow-up period and 0 otherwise; $w_{it=0}^c$, $w_{it=1}^c$, and $w_{it=0}^t$ are the kernel weights for the control and treatment groups in the baseline ($t = 0$) and follow-up ($t = 1$) periods, respectively. The common support is composed of members of the treatment group for whom a counterfactual is found in each of the control samples.⁷

Tables A3–A7 in the Appendix show the characteristics of the matched samples at baseline and the p -values of the mean differences for each of the observed characteristics we are controlling for.

5 Results

In this section, we report the effects of the transfer on household poverty and labour market outcomes of direct beneficiaries, as well as on other household members. We report the results first for the full sample and then by different sub-population groups. The first column of the tables reports the DDM estimates on the full sample. Columns 2 and 3 present the results of the DDM estimates by area of residence, and the last two columns of the tables show the results by gender.

5.1 Poverty

According to a recent study from the IMF, Bolivia has the world’s largest informal economy. Indeed, the study estimates that the informal economy in Bolivia accounted for an average of 62.28 per cent of the country’s GDP for the period 1991–2015. The World Development Indicators show that informal

⁶ This method was also used by Canelas and Niño Zarazúa (2019) in a similar context.

⁷ See Blundell and Dias (2009) for more details on the estimation and Villa (2016) for a software implementation.

employment (as a percentage of total non-agricultural employment) in the country accounted for 73 per cent of the working population in 2018 (94 per cent in 2006).

One of the main concerns of informal work is the incidence of poverty among this group of workers. In general, a high proportion of informal employment is of poor quality and informally employed workers are found to have a relatively low education level and low wages, which in turn creates concerns about the future of these workers.

Table 1 reports the effect of *Renta Dignidad* on the likelihood of poverty in households with at least one eligible member. Our results show that *Renta Dignidad* has no significant effect on the poverty status of the household, measured in terms of income. Other studies, however, have found positive effects in terms of household consumption—see, for instance, Escobar Loza et al. (2013).

Table 1: Impact of the *Renta Dignidad* programme on the economic status of the household

	National sample	Rural	Urban	Male	Female
Effect	−0.006 (0.029)	−0.044 (0.044)	0.021 (0.036)	0.043 (0.039)	−0.055 (0.045)
Observations	5,009	1,990	3,005	2,896	2,092

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

5.2 Labour market effects

One of the main concerns about cash transfer programmes is the introduction of perverse incentives in the labour market. In particular, the reduction of labour supply and/or an increase in labour market informality. In this section, we look first at the effects of *Renta Dignidad* on labour force participation.

Tables 2–4 report the results for participation in the labour market. It is worthwhile noting that *Renta Dignidad* has no incentives for total withdrawal from the labour force. The transfer is universal and the only eligibility criteria is age. Thus, it is important to analyse other mechanisms through which the transfer may affect labour market outcomes. Tables 5–7 report the effects of *Renta Dignidad* at the intensive margin, captured by total hours worked.

Table 2: Impact of the *Renta Dignidad* programme on labour force participation (age 55–65)

	National sample	Rural	Urban	Male	Female
Effect	−0.016 (0.023)	−0.032 (0.029)	−0.016 (0.029)	0.006 (0.024)	−0.050 (0.036)
Observations	6,547	2,652	3,875	3,376	3,159

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

Table 3: Impact of the *Renta Dignidad* programme on labour force participation (age 19–54)

	National sample	Rural	Urban	Male	Female
Effect	−0.032 (0.028)	−0.015 (0.045)	−0.031 (0.033)	−0.018 (0.039)	−0.043 (0.037)
Observations	6,568	1,756	4,753	2,953	3,613

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

Table 4: Impact of the *Renta Dignidad* programme on labour force participation (age 12–18)

	National sample	Rural	Urban	Male	Female
Effect	–0.009 (0.046)	–0.066 (0.077)	0.059 (0.046)	0.007 (0.062)	–0.005 (0.062)
Observations	2,687	1,078	1,582	1,371	1,294

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

In general, the programme does not appear to have an effect on labour force participation or hours worked for any adult member of the household. It seems to have, however, a positive effect at intensive margin for girls aged 12–18 living with an eligible member. The reduction is around two hours of work per week.⁸ There also seems to be a reduction of hours worked in urban areas. These results are in line with those found by Barros (2008) for Mexico and Alzúa et al. (2013) for Mexico, Nicaragua, and Honduras.

Table 5: Impact of the *Renta Dignidad* programme on hours worked (age 55–65)

	National sample	Rural	Urban	Male	Female
Effect	0.056 (0.170)	0.045 (0.217)	0.142 (0.307)	0.083 (0.197)	0.055 (0.256)
Observations	5,091	2,406	2,666	2,960	2,121

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

Table 6: Impact of the *Renta Dignidad* programme on hours worked (age 19–54)

	National sample	Rural	Urban	Male	Female
Effect	0.036 (0.189)	–0.007 (0.297)	0.042 (0.247)	–0.232 (0.255)	0.327 (0.266)
Observations	4,558	1,492	3,037	2,252	2,300

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

Table 7: Impact of the *Renta Dignidad* programme on hours worked (age 12–18)

	National sample	Rural	Urban	Male	Female
Effect	–0.673 (0.470)	0.032 (0.537)	–1.566* (0.927)	–0.178 (0.554)	–2.095*** (0.698)
Observations	1,017	668	298	553	441

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

5.3 Change in the probability of holding an informal job

In this section, we focus only on individuals who work and directly test the hypothesis that *Renta Dignidad* is associated with a flow of workers from the formal to the informal sector. We define the informal sector first, in terms of firm size. That is, we assume that individuals working in firms with fewer than five employees are in the informal sector. The second definition is based on employment composition.

⁸ The surveys do not have data on the time spent on schooling, domestic activities, and leisure, thus we were unable to account for the substitution effects between different activities. We did check, however, whether there was any increase in school enrolment for this group of the population, and we did not find any significant effect.

For this, we assume the formal sector is constituted by salaried workers. Self-employed and unpaid workers are in the informal sector.

In Tables 8 and 9 we report the effects of *Renta Dignidad* on labour informality among individuals aged 19–54 years old. We focus on this group of workers because formal employment rates are particularly low for younger and older individuals.

Table 8: Impact of the *Renta Dignidad* programme on informal work (age 19–54)

	National sample	Rural	Urban	Male	Female
Effect	-0.007 (0.031)	-0.049 (0.050)	0.002 (0.038)	-0.02 (0.044)	0.024 (0.0)
Observations	4,558	1,492	3,037	2,252	2,300

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

In terms of firm size, we find no significant effects. In terms of employment composition, however, our results indicate that *Renta Dignidad* had a sizeable effect on the probability of holding an informal job in rural areas. Indeed, our results show that among workers in rural areas, those who had access to *Renta Dignidad*, as indirect beneficiaries, are around 8 percentage points more likely to be working informally (i.e. as self-employed/unpaid workers).

Table 9: Impact of the *Renta Dignidad* programme on self-employment/unpaid work (age 19–54)

	National sample	Rural	Urban	Male	Female
Effect	-0.009 (0.036)	0.077** (0.031)	-0.027 (0.044)	-0.009 (0.049)	-0.017 (0.047)
Observations	4,558	1,492	3,037	2,252	2,300

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Robust standard errors are clustered at the household level in parentheses. Significance level at * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: authors' calculations.

National trends, however, show a different picture. Overall, between 2005 and 2011, salaried work has increased in both urban and rural areas.⁹ Rural employment in Bolivia is concentrated in agriculture, fishing, and mining. According to the ECLAC, the percentage of rural workers working in the primary sector of the economy went from 82.7 per cent in 2005 to 81.2 per cent in 2014 (CEPAL 2016).

Bolivia is one of the poorest countries in Latin America, with a poverty rate of 45.1 per cent in 2011.¹⁰ The incidence of poverty is more acute in rural areas, at almost 62 per cent compared to 37 per cent in urban areas in 2011. Extreme poverty is mostly a rural phenomenon, affecting close to 42 per cent of the rural population as opposed to 11 per cent of the urban population.¹¹ Poverty rates are higher among agricultural workers, for whom agriculture is mostly a subsistence activity. In this context, household members may have an incentive to look for job opportunities outside agricultural activities.

Salaried work concerns mostly the secondary and tertiary sectors of the economy, and thus non-agricultural activities. Our results suggest a reallocation of work from formal (salaried work) to informal employment rather than a reduction of labour force participation for rural workers. Thus, it is possible that *Renta Dignidad* has reduced the need to find non-agricultural work outside the household and has allowed indirect beneficiaries to switch from wage activities to work in a family business. This result

⁹ It went from 11.4 to 15.4 per cent between 2005 and 2011, according to official statistics from the INE.

¹⁰ Official statistics, INE. The poverty rate was 34.6 per cent in 2018, which is the last year for which figures are available.

¹¹ Official statistics, INE.

is in line with those found by Galiani et al. (2016) for direct beneficiaries of a similar programme in Mexico.

6 Conclusion

An important question related to the labour market is the nature of informal employment and the mechanisms driving its expansion. This question is even more important in developing countries, where informality is widespread and mostly characterized by low remuneration and limited access, if any, to institutionalized forms of social protection. Indeed, contributory old-age pensions, health insurance, and other contributory schemes cover just a fraction of the poor, who are largely employed in the informal economy. In Latin America, for instance, only about 8.5 per cent of the population in the first quintile of the income distribution receive social insurance benefits, and this share falls to 5 per cent and 1.6 per cent in sub-Saharan Africa and among low-income countries, respectively (Niño-Zarazúa 2019).

Bolivia has the world's largest informal economy, accounting for 62 per cent of the GDP for the period 1991–2015. Furthermore, the country has the largest proportion of informal employment in Latin America, with nearly 80 per cent of workers employed in the informal sector. This makes the case of Bolivia particularly relevant for understanding the incentives that pension schemes can generate for the lower tier of the labour market.

In this paper, we analyse the effects of *Renta Dignidad*, a universal non-contributory old-age pension, on labour market outcomes. One of the main concerns about welfare benefits systems is that they can introduce perverse incentives in the labour markets that can lead to reductions in labour supply and increases in informal employment. However, the results from our analysis indicate that: (1) *Renta Dignidad* has no detrimental effects on labour force participation among adult members of beneficiary households; (2) the pension has no adverse effects on the intensity of labour, measured by the number of hours worked per week, for any adult member of the household. Rather, the pension shows a significant reduction at the intensive margin for girls aged 12–18 living with an eligible member, which reveals positive intra-household trickle-down effects from the pension. (3) In terms of work choices, *Renta Dignidad* reduces the probability of holding a salaried job in rural areas by about 8 percentage points, which indicates a reallocation of work from formal to informal employment, rather than a reduction of labour force participation among adults.

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Appendix A: Extra tables

Table A1: Pre-programme time trends in poverty, work, and hours worked (all)

	Poverty	Work participation	Hours worked
Treatment group * 2007	-0.051 (0.037)	0.039 (0.029)	-0.293 (0.208)
Observations	-	4,932	3,815

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Bootstrapped standard errors are clustered at the household level, 1,200 repetitions. Significance level at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: authors' calculations.

Table A2: Pre-programme time trends in poverty, work, and hours worked (males)

	Poverty	Work participation	Hours worked
Treatment group * 2007	-0.073 (0.049)	0.040 (0.035)	0.074 (0.260)
Observations	-	2,333	2,063

Note: coefficients are estimated using kernel propensity score matching using a DD approach. In all specifications we use control variables and time- and department-fixed effects. Bootstrapped standard errors are clustered at the household level, 1,200 repetitions. Significance level at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: authors' calculations.

Table A3: Characteristics across matched and unmatched samples, group 1

Weighted variable(s)	Matched sample			<i>t</i>	<i>p > t</i>
	Mean control	Mean treated	Diff.		
Male	0.473	0.471	-0.002	0.150	0.881
Rural	0.423	0.431	0.008	0.560	0.575
Indigenous	0.624	0.630	0.007	0.530	0.599
Years of education	4.753	4.521	-0.232	1.800	0.0720*
Chuquisa	0.085	0.083	-0.002	0.220	0.828
Cochabamba	0.168	0.167	-0.001	0.100	0.922
Oruro	0.115	0.115	0.001	0.110	0.911
Potosi	0.117	0.118	0.001	0.130	0.897
Tarija	0.075	0.074	-0.001	0.200	0.843
Santa Cruz	0.130	0.129	-0.001	0.170	0.862
Beni	0.053	0.055	0.002	0.240	0.807
Pando	0.022	0.022	0.000	0.020	0.984

Note: group 1 refers to the sample at the national level. Significance level * $p < 0.10$.

Source: authors' calculations.

Table A4: Characteristics across matched and unmatched samples, group 2

Weighted variable(s)	Matched sample			<i>t</i>	<i>p > t</i>
	Mean control	Mean treated	Diff.		
Male	0.457	0.458	0.001	0.030	0.973
Indigenous	0.740	0.744	0.004	0.200	0.840
Years of education	2.450	2.317	-0.133	1.010	0.311
Chuquisa	0.093	0.089	-0.003	0.250	0.802
Cochabamba	0.142	0.140	-0.002	0.120	0.905
Oruro	0.139	0.142	0.004	0.230	0.819
Potosi	0.195	0.197	0.003	0.140	0.885
Tarija	0.077	0.078	0.001	0.040	0.967
Santa Cruz	0.090	0.088	-0.002	0.140	0.885
Beni	0.037	0.036	0.000	0.040	0.967
Pando	0.019	0.017	-0.002	0.290	0.773

Note: group 2 refers to the sample at the rural level. Significance level * $p < 0.10$.

Source: authors' calculations.

Table A5: Characteristics across matched and unmatched samples, group 3

Weighted variable(s)	Matched sample			<i>t</i>	<i>p > t</i>
	Mean control	Mean treated	Diff.		
Male	0.486	0.492	0.006	0.340	0.735
Indigenous	0.538	0.543	0.005	0.270	0.787
Years of education	6.371	6.202	-0.169	0.980	0.325
Chuquisa	0.068	0.070	0.002	0.250	0.804
Cochabamba	0.180	0.181	0.001	0.090	0.928
Oruro	0.108	0.109	0.000	0.030	0.979
Potosi	0.061	0.062	0.001	0.170	0.863
Tarija	0.077	0.073	-0.004	0.420	0.674
Santa Cruz	0.163	0.162	-0.001	0.080	0.940
Beni	0.069	0.071	0.002	0.240	0.811
Pando	0.023	0.023	0.000	0.050	0.962

Note: group 3 refers to the sample at the urban level. Significance level * $p < 0.10$.

Source: authors' calculations.

Table A6: Characteristics across matched and unmatched samples, group 4

Weighted variable(s)	Matched sample			<i>t</i>	<i>p > t</i>
	Mean control	Mean treated	Diff.		
Indigenous	0.614	0.625	0.011	0.570	0.569
Rural	0.403	0.412	0.009	0.460	0.644
Years of education	5.982	5.803	-0.179	0.990	0.324
Chuquisa	0.071	0.067	-0.004	0.380	0.705
Cochabamba	0.161	0.162	0.001	0.040	0.967
Oruro	0.110	0.114	0.004	0.310	0.754
Potosi	0.109	0.110	0.001	0.090	0.931
Tarija	0.082	0.080	-0.002	0.170	0.869
Santa Cruz	0.150	0.145	-0.005	0.320	0.747
Beni	0.062	0.062	0.001	0.060	0.954
Pando	0.028	0.030	0.001	0.180	0.854

Note: group 4 refers to the sample of males. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: authors' calculations.

Table A7: Characteristics across matched and unmatched samples, group 5

Weighted variable(s)	Matched sample			<i>t</i>	<i>p > t</i>
	Mean control	Mean treated	Diff.		
Indigenous	0.641	0.647	0.007	0.350	0.727
Rural	0.436	0.442	0.006	0.310	0.760
Years of education	3.567	3.354	-0.213	1.260	0.206
Chuquisa	0.086	0.085	-0.001	0.080	0.934
Cochabamba	0.175	0.173	-0.002	0.130	0.897
Oruro	0.122	0.125	0.003	0.200	0.840
Potosi	0.126	0.126	0.000	0.020	0.986
Tarija	0.071	0.069	-0.001	0.140	0.885
Santa Cruz	0.113	0.111	-0.002	0.190	0.850
Beni	0.047	0.048	0.001	0.090	0.926
Pando	0.016	0.016	0.000	0.000	1.000

Note: group 5 refers to the sample of females. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: authors' calculations.