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**The productive role of social policy**

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# THE PRODUCTIVE ROLE OF SOCIAL POLICY

Omar Rodríguez Torres

## ABSTRACT

This paper assesses the productive role of social policy. It analyses the effect that participating in social policy programmes has on business performance of enterprises in Cartagena, Colombia. To investigate these effects, we employ an instrumental variable analysis to account for the potential endogeneity of participation. Exploiting the existence of a partially complied eligibility rule for Participation in the poverty reduction programme we are able to identify the effect on several enterprise indicators. The paper contributes to the literature on entrepreneurship policies in developing countries from the social policy perspective. It sheds light on the effects and potential mechanisms that the participation on social policy schemes has on the entrepreneurial activity of household enterprises. The results show that complier participating entrepreneurs are more credit-oriented and work more hours per day. No statistically significant effect is found on profit measures.

Keywords: Social policy, poverty reduction, entrepreneurship, public policy, enterprise policy  
JEL Classification codes: I31, I32, L26, J48, L53.

# 1. INTRODUCTION\*

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This paper analyses the effect that participating in the Colombian social policy programmes has on enterprises in Cartagena, Colombia. In 2009, the government introduced an income generation policy aimed at enhancing the productive capacity of the poor and vulnerable population. It came after the realisation of the need to boost their income-generating abilities as one of the pivotal aspects in their way out of poverty. This policy was implemented to complement the poverty reduction policy, configuring a comprehensive approach for inclusive social development, where entrepreneurial ability is reinforced by investments in human capital. The government's objective was to build a social policy system that protects the gains in economic growth by securing a stable, self-sustaining permanence out of poverty of strengthened household enterprises.

In this context, productive inclusion can be understood as the result of the harmonization of two policy approaches. On the one hand, entrepreneurship support programmes expected to impact household-enterprise revenues via changes in business practices and hence improvements in business performance; through strengthening the entrepreneurs' basic managerial skillset, improving their chances of getting into financial markets, hence achieving profit increments, cost reductions, or sales increases. These interventions seek to overcome some of the restrictions that entrepreneurs confront, restrictions that are direr for those operating under depressed contexts and poverty conditions.

On the other hand, social policy programmes, usually in the form of Conditional Transfer Programmes (CTPs), have the purpose of breaking the intergenerational transmission of poverty via improvements in the human capital of children (health, education). The monetary component of CTPs, the additional income, has reduced both the intensity and severity of poverty without reducing its incidence (CEPAL, 2016). The entrepreneurship support can help to channel this additional income configuring an indirect effect of CTPs.

Complementarily, the multidimensional analytical toolkit to poverty reduction brings a broader policy perspective into the approach of well-being. In the Colombian case, this approach has resulted in an inter-agency effort to address the multi-natured needs of households (Angulo, 2016);

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it is embodied in the '*UNIDOS Network*' (introduced in section 2.2.2). Under this approach, the non-monetary elements of poverty imply an additional burden on business operation. For instance, the poor population shows worse health indicators, both physical –undernourishment, ailments- and mental –higher levels of stress.<sup>1</sup>

Thus, the ability of firms to achieve growth accelerations may depend on both types of health of the entrepreneur. In this sense, having good health is expected to improve entrepreneurial ability. Complementarily, the fact of having health insurance means a relief from health concerns for the entrepreneur and her household members. In conclusion, the well-being of the household plays an important role in the way business is run and hence justifies its consideration into the analysis of entrepreneurship policies that target businesses operating at the base of the pyramid.

This paper presents an analysis of the potential gains that social policies can have on entrepreneurs under vulnerability and poverty. In particular, we analyse whether entrepreneurs that participate in the Colombian social policy show improvements in their business indicators and business performance. For this assessment, we employ data from a follow-up survey on participants of the entrepreneurship support, and the registration on the social policy (CTPs and multidimensional support). This unique dataset of entrepreneurs enables building groups that allows comparing the interaction of the participation in entrepreneurship policy and social policy interventions. The hypothesis is that entrepreneurship policies are potentiated for the poor when they are complemented by policies directed at improving the well-being of households.

In this quasi-experimental setting, we exploit the imperfect compliance to the assignment rule into the poverty reduction scheme. Following Hahn, Todd, and Van der Klaauw (2001), we use the scoring variable as an instrumental variable to control for the selection bias into this scheme.

This paper is organized as follows. Section 2 reviews the theoretical and empirical literature of both the impact of entrepreneurship support programmes on household-enterprise outcomes and the impact of poverty reduction programmes (CTPs) on non-human capital indicators. Section 3 provides an account of the institutional background. Section 4 introduces the datasets. The methodological approach is presented in Section 0. Section 6 presents and discusses the main results. The final section concludes with a summary of the findings, policy recommendations and suggestions for further research.

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<sup>1</sup> Permanent exposure to shocks and the prospects of their consequences are a source of stress hindering decision-making processes (Mani et al., 2013; Mullainathan & Shafir, 2013), hence interfering in the efficacy of everyday business operation.

## 2. RELEVANT LITERATURE

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Two strands of literature are identified and presented in this section. Both of them revolve around the study of small-scale entrepreneurship but are motivated by different approaches. On the one hand, a large body provides evidence on the impact of entrepreneurship policies, mostly on deprived contexts in developing countries. Although some study poor populations, the social policy component within the analysis of entrepreneurship is commonly missing.

On the other hand, there is increasing evidence of the impact of social policy on outcomes different from the original human capital objectives, for instance, on labour market outcomes such as participation, and occupational choice –(dis)incentives to work. The study of its effects on entrepreneurship is at its initial stage. This paper intends to fill some of these gaps.

### 2.1 Entrepreneurship support

The key elements that contribute to the potential success of an entrepreneurship policy in developed countries have been attributed to aspects ranging from innovation to credit support, to idiosyncratic characteristics and behavioural responses (Audretsch et al., 2007; Lundström & Stevenson, 2005; Morris et al., 2005; Van Der Zwan et al., 2010). Consequently, entrepreneurship policy analysis focuses largely on the kind of support that governments require to foster enterprises that contribute to economic growth and innovation.

The setting changes in developing countries where credit is more constrained. Start-ups and existing businesses face additional obstacles, such as slower business dynamics. The poor population, usually in self-employment or low-return entrepreneurial activities, deal with deficiencies in education, nutrition, health, among other difficulties, finding it even harder to join the labour market or make a living through (in)formal businesses. The rationales behind most policies and programmes supporting subsistence entrepreneurs revolve around two main issues: insufficiency of capital and lack of managerial skills.

Financial inclusion interventions following the principles of microfinance target a twofold purpose, access and adequate levels of capital.

Regarding access to funding, there is a market failure (mostly missing markets) in the provision of capital where the financial institutions fail to reach the poor and poorest. For formal financial institutions lending to this population is expensive, reasons such as high costs of portfolio

management and screening, high default risk, and low repayment rates deter these institutions from entering these markets (Banerjee & Duflo, 2007).

Besides this, the poor are typically ineligible to loans from regular banks. This ineligibility is a symptom of structural issues, often associated with their vulnerability and poverty conditions, i.e., they lack collateral and/or guarantors. The former is a consequence of their lack of assets. The latter suggests low levels of social capital. They lack proper support networks –friends, relatives-, or their networks suffer from similar levels of vulnerability and poverty.

From a behavioural perspective, de Mel, McKenzie and Woodruff (2008) find that some entrepreneurs do not apply for loans self-*deselecting* from the financial market. They explain that entrepreneurs conform to the scale of their business –typically low overall returns- affecting their motivations and aspirations, hence choosing not to borrow. Banerjee, Karlan, and Zinman (2015) confirm this finding, showing evidence of low overall take-up rate from several studies on microfinance.

In consequence, restricted financial markets plus the lack of social capital pushes the poor population to use informal channels. The main source of unconditional financing are moneylenders, who charge high interest rates (Banerjee & Duflo, 2011). In the case of the poor, entrepreneurs included, this financing source ends up suffocating their activity instead of helping them. Entrepreneurs find themselves falling behind on debts, and in a vicious cycle of borrowing to pay loans (Belman & Chang, 2010; Rhyne, 2011). For entrepreneurs, this source requires them to start repaying immediately, clashing with the need of mid- and long-term planning required for growing. Field et al. (2013) test whether changes in the timing of the first instalment affects business performance –return on investment-, finding that longer term contracts encouraged more risky activities suiting more entrepreneurial endeavours.

Trials conducted with entrepreneurs have found that capital injections via (un)conditional cash grants or microcredits destined originally to boost capital were not exclusively spent on business-related uses. de Mel, McKenzie and Woodruff (2009b) and Field et al. (2013) show that female entrepreneurs employ part of a grant in non-business related uses. These findings point to the need to understand the dynamics between household and enterprises to a deeper level and to evaluate the effects of having a social policy scheme in place to prevent this drain.

Concerning entrepreneurial abilities, basic managerial skills interventions aim at changing business practices such as bookkeeping; budgeting; marketing; production techniques; and personnel

management (for those who can hire). The underlying assumption is that changes in business practices affect business indicators -profitability, sales, costs, revenue, or job growth. These interventions commonly consist of: course content, course extension, follow-up, and technical assistance. Drexler, Fischer, and Schoar (2010) test whether teaching simple rules of thumb in lieu of a standard management curriculum improve business practices and indicators, finding that rule of thumb training works better for low educated entrepreneurs.

McKenzie and Woodruff (2013) present a comprehensive survey of experiments and evaluations testing entrepreneurship interventions. A key element is population heterogeneity, and thence differential outcomes of interventions. For instance, whereas Mano et al. (2012); Bloom et al. (2013) and Bruhn, Karlan and Schoar (2013) concentrate on small and medium enterprises finding positive impacts on both business practices and indicators; Calderon, Cunha and de Giorgi (2013) and Valdivia (2015) concentrate on small-scale businesses and poorer contexts, finding less evidence of impact on business indicators. In particular, Valdivia (2015) finds that the effect is higher as the scale of the businesses increases.

Some studies find positive impacts on business practices, although studies that concentrate on long term impacts find that these changes tend to wither (Cho, 2015; Cho & Honorati, 2014; de Mel et al., 2014; Karlan et al., 2012). There is mixed evidence for results on business indicators, most studies find little to no impact on business profits and revenues, as scale diminishes the impact is smaller (McKenzie & Woodruff, 2013).

Karlan and Valdivia (2010); Berge, Bjorvatn, and Tungodden (2014); Blattman et al. (2014); de Mel, McKenzie, and Woodruff (2014); Giné and Mansuri (2014); Karlan, Knight, and Udry (2014) explore the combination of entrepreneurial interventions, i.e. managerial skills training and financial access. These studies find that this combination generates greater impacts than single interventions, tend to be larger when measured in the short term and when the targeted populations are large-scale business. Cho (2015, p. 8) reports that the integration with safety nets is a way of addressing the "complex constraints faced by small-scale entrepreneurs in developing countries".

## 2.2 Social Policy Programmes

The evidence on the impact of social policy programmes comprises two main strands. One studies Conditional Transfer Programmes (CTPs), common in Latin-American countries, and the other on multidimensional support programmes. The former is more developed than the latter as it was introduced around the late 1990s, whereas the latter have risen more recently with the advent of the multidimensional poverty index fostered by the Oxford (see section 2.2.2).



### 2.2.1 Conditional Transfer Programmes

CTPs, or Conditional Cash Transfers (CCTs), were originally designed to tackle poverty by breaking its intergenerational cycle of transmission through nudging poor households to increase health standards and education attendance of their children.

CTPs have shown substantial success in achieving the main purposes they were designed for, that is, increase human capital, specifically health and educational outcomes. Comparatively, positive educational outcomes appear to be more consistent than health outcomes, the studies by Fiszbein et al. (2009); Saavedra and García (2012); Manley, Gitter, and Slavchevska (2013); Leroy, Ruel, and Verhofstadt (2009); and Ranganathan and Lagarde (2012) present empirical evidence.

Regarding the indirect effects of CCTs, the analysis has focused on labour market outcomes, for example, occupational choice, incentives to work, incentives to formality, and number of hours worked (Bergolo & Galván, 2018). This is related to the question of the productive role of social protection that could also be connected to its effect on growth (Barrientos & Malerba, 2018; Jorgensen & Siegel, 2019; Kangasniemi et al., 2020; Packard et al., 2019). Alderman and Yemtsov (2012) summarize these effects in individual-level impacts; local economy effects; and overall macro-level effects. At the household level, CCTs present no reductions in the labour market participation of adults from participant households (Banerjee et al., 2017). In contrast, child labour has shown some reduction (Fiszbein et al., 2009). These results are confirmed by Alzúa, Cruces and Ripani (2013) whose findings show that CCTs have not introduced substantial disincentives to work for the cases of Mexico, Nicaragua or Honduras.

Lichand (2010) and Ribas (2014) study the impact of CCTs on entrepreneurship both using the information on *Bolsa Família*, the Brazilian CCT. Lichand (2010, p. 15) finds that *Bolsa Família* stimulates entrepreneurship in urban areas via insurance and wealth alleviation effects. Contrastingly, Ribas (2014, p. 35) shows disincentives to entrepreneurial activity as a result of displacement from formal to informal activities. This result is explained by the disincentive to report earnings given that reported income is used for programme targeting. Bastagli et al. (2016) summarize the empirical evidence on the most recent studies concentrating on savings, investment and production. Most of the studies surveyed concentrate on agricultural contexts.

### 2.2.2 Multidimensional-inspired poverty reduction programmes

Due to its comparatively novelty, studies on the impact and effects of these programmes are somehow at an initial stage. Carneiro et al. (2009), Hoces et al. (2011), and Galasso (2011) have

studied the Chilean case. For the Colombian case, one study commissioned by the government and a study by Martínez-Restrepo, Mejía and Enriquez (2015) attempt to measure the impact of '*Red UNIDOS*'.

Regarding employment outcomes, there is mixed evidence. In Chile, Carneiro et al. (2009) report no effects for the household head but positive impact on employment, and on income and poverty reduction of spouses, mainly via activation from inactivity. Contrastingly, Hoces et al. (2011) find negative or zero impact on the number of employed people, number and percentage of working women and a positive difference-in-differences effect for the employment of the household head.

DNP (2012) assesses the impact of '*Red UNIDOS*' finding no impact on employment outcomes. Martínez-Restrepo, Mejía, and Enriquez (2015) find a reduction in the likelihood of urban programme beneficiaries of having an informal job, although these results only apply to male participants. This is consistent with the results on women empowerment measured by labour force participation rates, entrepreneurship rates and women's household decision making, where no effect was reported.

### 2.2.3 Integrated Poverty Reduction Programmes

Barrientos (2012) defines the combination of the monetary (CCT) and non-monetary (multidimensionality-based) programmes as '*Integrated Poverty Reduction Programmes*'. These programmes are characterised by the provision of a social cash transfer (in-kind, monetary or productive assets) jointly with support to the household in several 'non-income' related dimensions, such as health, family dynamics, and community integration, among others depending on the specific context.

Banerjee et al. (2015) present evidence from six countries (Ethiopia, Ghana, Honduras, India, Pakistan, and Peru) on a multifaceted graduation programme seeking to support the extreme poor to establish sustainable self-employment activities. This support consists of the provision of a productive asset grant, business training, life skills coaching, temporary cash consumption support, access to savings accounts and health information / services. Their theory of change is that the combination of these activities is necessary and sufficient to obtain a persistent impact. In this sense, the different programmes complement and reinforce each other.

In this setting, the proposed theory of change states that receiving a stable, predictable flow of income helps household enterprises lift their liquidity, savings and credit constraints, enabling investment, similar to Bastagli et al. (2016, p. 151). The inclusion of non-monetary components of

the social policy scheme, i.e., preferential access to social services plus life-coaching is also expected to lift several constraints. For instance, childcare programmes can release time, especially for women; and life-coaching can reduce the stress levels associated with poverty improving business decision-making. All these elements are expected to improve business performance –sales, revenue, profits- of small-scale entrepreneurs.

## 3. PUBLIC POLICY BACKGROUND

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### 3.1 The Poverty Reduction Policy

The Colombian social policy scheme comprises the monetary, '*Familias en Acción*', and the non-monetary component, the '*UNIDOS Strategy*'. Although they work independently, they coordinate to benefit the same groups in the search for a persistent impact.<sup>2</sup> The former works as a CCT seeking to align individual incentives with socially desirable behaviours and break the intergenerational transmission of poverty. The latter provides psycho-social support to households through permanent coaching and close follow-up, ensuring preferential access to social programmes to solve the mismatch between social demands and access to these programmes.

Implemented in 2000, '*Familias en Acción*' follows the spirit of the Mexican *Oportunidades* programme. It aims at alleviating poverty by fostering human capital accumulation, in the form of investments in education, nutrition and health among the poorest households in Colombia. Cash transfers are attached to conditions on households to send their children to health check-ups and schools. The first evaluations of the programme identified institutional weaknesses at the local level, as well as a mismatch between social demands and provision of social services, particularly education and health (Acción Social & DNP, 2010). This evidenced that tackling poverty would require an additional effort.

The '*UNIDOS Strategy*' came in 2007 (CONPES, 2006)<sup>3</sup>, as a response to the need of coordinating the provision of social programmes to the poor and the poorest. In practice, the '*Familias en Acción*' beneficiaries were also eligible for '*UNIDOS*'. The Strategy aims at improving the living standards of the poorest households through the effective inclusion in the government social programmes. This objective is pursued at different levels through several actions. At the national level, each agency: i) adjusts their operation to effectively reach the targeted population, ensuring preferential access to attention otherwise provided on a demand basis; and ii) responds expressly to the needs

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<sup>2</sup> This strategy borrows for its conceptual and theoretical framework elements from the capability approach (Nussbaum, 2011; Sen, 1999) understanding poverty as a multidimensional social issue. This multidimensional approach guides its implementation and delivery process, via a multilevel, multiagency government initiative availing each agency's speciality and relying on organised interaction oriented towards the common goal of poverty reduction. In practice, UNIDOS is the confluence of 26 agencies, hence it is also referred to as the UNIDOS Network. The National Agency of Poverty Extreme Overcoming (ANSPE) acts as the institutional hub of the network and the agency accountable for the policy. On the field, ANSPE is responsible for the operation of the strategy.

<sup>3</sup> Initially the JUNTOS Strategy, in 2010 the incoming government (2010 – 2014) rebranded it as UNIDOS, as a way of differentiating it from JUNTOS due to radical distance on several political matters not necessarily related to their approach on social policy. This is similar to the case of *Oportunidades* (previous *Progresas*) in Mexico. Nevertheless, the orientation and mission of the Strategy remained practically unchanged. In summary, UNIDOS was an invigorated and strengthened second phase of the JUNTOS strategy.

of the targeted population, ensuring that resources and interventions help to achieve minimum, acceptable living standards. This is particularly challenging given that the deprivations differ in nature and depth. The deprivations are reflected in the set of nine dimensions summarized in 45 basic achievements. These dimensions are i) identification (unique ID); ii) education and training; iii) health; iv) nutrition; v) family dynamics; vi) access to justice; vii) housing conditions; viii) counselling for banking and savings, and ix) income and employment.

At the local level, the delivery of social programmes is articulated around the household. Then, the targeted population receives the set of programmes as a package reflecting the multidimensional nature of their condition. Operationally, each household is paired with a caseworker. Caseworkers become the bridge between the institutional offer of programmes and each targeted household. They are responsible for coaching households in setting their Household Plan<sup>4</sup>, and for their follow-up and support throughout the household's participation in the Strategy.

### 3.2 The Income Generation Policy

In 2009, the government implemented the Income Generation Policy (CONPES, 2009). Cartagena was the pilot city. A council among the Participatory and Social Development Office, the Social Emergency Plan, and the Chamber of Commerce designated the *Pedro Romero* Entrepreneurship Centre (CEMPRENDE) to deliver the policy at the local level.

Following the One-Stop Career Centres model<sup>5</sup>, CEMPRENDE offered guidance and services aimed at broadening the opportunities for the targeted population, by either enhancing their employability or supporting their entrepreneurship. The *employability* track seeks to help people get into the formal labour market. The services within this track include: i) job matching<sup>6</sup>; ii) job

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<sup>4</sup> The Household Plan is a bespoke action plan concerted between the caseworker and the family at the outset of the household's participation. It functions as a guiding route that helps the caseworker accompany each assigned household through the fulfilment of the different dimensions, prioritizing their current conditions and expectations. This responds to one of the policy pillars, which is the 'joint responsibility' principle. It requires households, and individuals to have an active role all through their process during the government support. This coincides with the agency's principle of the capability approach where enhancing the set of opportunities is as important as the freedom individuals have to choose from this set. Making each household agent and accountable for their own performance within the strategy is expected to enhance the autonomy of households. This means an improvement from the previous orientation of the social protection system from paternalistic to a more transformative-type of social protection.

<sup>5</sup> These centres integrate employment and entrepreneurship services. They were created as a response to articulate different active market labour policies in one place, so unemployed population could receive integral support.

<sup>6</sup> The Centre works permanently on widening the network of firms to keep track of job position openings and then connect them with their database of jobseekers

search<sup>7</sup>; iii) application process<sup>8</sup>, and iv) job fairs<sup>9</sup>. The *entrepreneurship track* seeks to generate opportunities for productive inclusion through the creation, or strengthening of small-scale enterprises. The following section elaborates on this track given the particular interest of this paper.

### 3.2.1 Entrepreneurship Support

Initially, *CEMPRENDE* was meant to support anyone with a start-up idea or a running business; providing support on: *i*) training; *ii*) information provision; *iii*) advisory and technical support; *iv*) follow-up support, and; *v*) marketing, value chain and supplier development. These are cross-cutting elements in a four-track progressive approach, consisting of *Start-Up, Development, Strengthening and Transformation*; meant to fit the enterprise' maturation stage and the needs, skills and expertise of entrepreneurs.

The *Start-up track* focuses on the activities related to setting up the business, supporting entrepreneurs move from business conception to gestation as conceptualised by Reynolds et al. (2005). The *Development track* is meant for enterprises that require support in their formalization process, improvement of distribution channels, and trademark registration. The *Strengthening track* is aimed at consolidating specific firm capabilities such as process management and quality systems. In the *Transformation track*, the enterprises receive support to include innovation as part of their production process.<sup>10</sup>

Once *CEMPRENDE* started operations, the high heterogeneity of the vulnerable population became evident to advisors, detecting a mismatch between the actual level of the entrepreneurs/enterprises and the four-track approach. In particular, the advisors noticed that those enterprises supposed to enter the *Development track*, who were expected to be operating with standardized business practices (accounting, bookkeeping, marketing planning), operated closer to long-standing, subsistence enterprises. In response, *CEMPRENDE* adjusted the *Start-up track* to support not only entrepreneurs with a business idea but also entrepreneurs with these subsistence microenterprises. For all of them, the training focuses on the formulation of a business plan, training on business practices, basic managerial skills, financial inclusion and legal advice.

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<sup>7</sup> Advisors offer workshops where people learn strategies for job search

<sup>8</sup> Advisors guide in CV tuning, provide practical advice on how to dress, and how to behave during their interviews

<sup>9</sup> Firms and jobseekers are matched together in one-day events

<sup>10</sup> These last two tracks are channelled through *iNNpalsa Colombia*, the national agency created to promote business innovation and entrepreneurship to foster competitiveness and regional development.

### 3.2.1.1 *Training Provided*

The core intervention of CEMPRENDE is basic managerial skills training. It is conducted by an in-house advisor who guides the group through a didactic, hands-on booklet covering basic business topics. In theory, the training is adjusted to the need of every group of entrepreneurs. To this end, an entry diagnosis is conducted checking socio-demographic features, namely, educational background, type of business, location, and expectations. Each course starts once a minimum quorum is enrolled.

The training is an organized but flexible model and its success depends on the ability to orientate the participants and to solve the needs detected during the same training process. This training helps the participants to foster the skills to formulate their business projects, applying theory and practice culminating with a business plan. In practice, entrepreneurs lack basic literacy and numeracy skills, so their business plan (when they submit it) is assisted by available advisors.

During fieldwork, I participated in the training. I witnessed several of the difficulties faced by the targeted population. Among the salient ones, the course schedule overlaps with regular opening businesses hours, so there is a high opportunity cost of closing their businesses for class time. This presents a choice between receiving training and generating income, which for this population mean the choice between having or not having enough money to feed their families the following day. Travelling time and costs add an extra burden on the poor and vulnerable, especially because they usually live in remote areas. Another issue is childcare. While taking the training a couple of women attended their session with their children creating distractions not only for them but also for the flow of the session. If entrepreneurs are already sacrificing potential earning time, not being able to fully avail their training time represents a major obstacle for their learning.

## 4. DATA OVERVIEW

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For the empirical analysis, we use several datasets. All information related to business and entrepreneurs comes from the CEMPRENDE administrative records and the follow-up survey. Information on household participation in the social policy programmes comes from two government agencies, DPS and ANSPE. Information on household eligibility comes from the government SISBEN registry.

### 4.1 CEMPRENDE records & Follow-up survey

At enrolment, information on basic socio-demographic variables is collected, no business information is collected. Between June and July 2013, a follow-up survey was conducted. For the sampling strategy, CEMPRENDE provided a list of participants. The primary sampling unit is the household enterprise participating in the entrepreneurship programme. The main respondents were the entrepreneur, who is generally the person in charge of the business. The survey was paper-based and carried out among a randomly selected, stratified sample of 356 entrepreneurs. Stratification sought to maintain both the male-female and participant-nonparticipant proportion the same as the target population. The participant group refers to the beneficiaries of the social policy programme.

The survey consists of 66 questions divided into three main parts. Part One (54 questions) covers topics concerning the enterprise -age, location, formalization-, accountancy practices, needs, financing, monthly sales and costs (including detailed cost structure), profits use, net worth, clients, and employees. Part Two (3 questions) asks questions concerning the expenses and income of the household. Part Three (9 questions) enquires about the programme, namely, entrepreneur's attendance and compliance to training requirements, perception of usefulness, among others.

## 4.2 Household Participation in social policy

Household participation in the monetary and non-monetary components is reported by the bureaus operating the programmes, *DPS* and *ANSPE* respectively. Those households appearing in both *Familias en Acción* and UNIDOS datasets are assigned to the *Integrated* group, and those appearing exclusively in one of them are assigned to their respective component (Table 4.1). Participation in only one of the components is understood as a hidden treatment configuring a potential confounding factor (Guerzoni & Raiteri, 2015). Our interest lies in the participation in the full poverty reduction scheme, so the integrated group will be the treatment group. The control group is constructed by those households not participating in any of the components.



Table 4.1 Sampled Entrepreneurs by Treatment

| Treatment  | Treated | Control | Description  |
|--|---------|---------|--|
| <i>Treatment vulnerable to confounding factor*</i> |         |         |  |
| 1. CCT   | 173     | 201     | Households participating in the conditional cash transfer programme (' <i>Familias en Acción</i> ')  |
| 2. UNIDOS  | 185     | 189     | Households participating in the psychosocial support and preferential access to social services programme (' <i>Red UNIDOS</i> ')              |
| <i>Treatment in isolation</i>                      |         |         |  |
| 3. CCT only  | 38      | 151     | Households participating exclusively in the conditional cash transfer programme (' <i>Familias en Acción</i> ')                                |
| 4. UNIDOS only                                     | 50      | 151     | Households participating exclusively in the psychosocial support plus preferential access to social services programme (' <i>Red UNIDOS</i> ') |
| <i>Simultaneous treatments</i>                     |         |         |  |
| 5. CCT+UNIDOS                                      | 135     | 151     | Households participating in the <i>integrated</i> poverty reduction programme (' <i>Familias en Acción</i> ' + ' <i>Red UNIDOS</i> ')          |

Source: Follow-up survey, 2013 Note: \*Groups 1 and 2 do not take into account the potential simultaneity of the components and show the potential hidden confounding factor problem.

### 4.3 Household Eligibility

The SISBEN index<sup>11</sup> is the instrument used by the government to target population beneficiary of social programmes. The *National Planning Bureau* (DNP) conducts a dedicated survey to collect the information necessary to calculate this score. The score is a proxy-means tested indicator that captures the living standards of households. It takes into account several socioeconomic variables of each household -localization, housing conditions and services, ownership of different goods, human capital, social security, demographic and occupational variables (CONPES, 2009).

The fuzzy sets method is used to estimate it, obtaining a range between 0 and 100. The scores are used for ordering the population, and subsequently targeting and locating them.<sup>12</sup> The score is

<sup>11</sup> Its acronym stands for Identification System of Potential Beneficiaries of Social Programs, also referred to as SISBEN score or simply SISBEN.

<sup>12</sup> In 2007, the population at the lowest level was divided according to their score in five quantiles. The two bottom quintiles of the ranking (the poorest of the poor) were targeted. At that time, 1.2 million households (the poorest among the poor) were selected for joining the CCT programme (CONPES, 2006).

designed so the population had no knowledge of which or how variables are used to calculate it, nor the model for its calculation<sup>13</sup>, making it difficult to manipulate it.

Nevertheless, it has been changed and upgraded for several reasons.<sup>14</sup> Firstly, to reflect the dynamic character of poverty and the changing nature of needs and deprivations of the population. Secondly, to avert people's ability to "get through" the system (manipulation). Finally, to reduce identification errors, that is, both selecting those who should not be in (leakage), and leaving out those who should be in (under-coverage) (CONPES, 2001, 2006, 2008).

In our case, we use the score employed at the inception of the poverty reduction strategy in 2007.<sup>15</sup> A household is eligible if it gets a score of 11 points or less.

$$Eligible\ Household_i = \begin{cases} 1, & \text{if } score < 11 \\ 0, & \text{if } score > 11 \end{cases}$$

## 4.4 Final dataset

The final dataset matches these three data sources. To match the entrepreneurs' dataset with the official records, we used the identification information of the participants, i.e. ID number, full name and date of birth.<sup>16</sup> The final analytical sample consists of 286 household enterprises. It is important to note that all of these entrepreneurs have been supported by the entrepreneurship support intervention through the CEMPRENDE. This fact means that the conclusions apply only to entrepreneurs that have requested the entrepreneurial support and have participated in the training.

The lack of information on entrepreneurs not supported by the entrepreneurial intervention limits the construction of a 'pure' control group, this group would allow identifying the effect of the entrepreneurial support. This limitation means that our estimates could be upwards biased because a randomly assigned entrepreneurial support would include also entrepreneurs that otherwise would not be interested in participating in entrepreneurial support. Another way of looking at this issue is that participant entrepreneurs are more motivated to improve their businesses, hence they are more 'entrepreneurial' and are expected to show higher business performance indicators. In any case, this fact applies to both groups, treatment and control.

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<sup>13</sup> Within the government the calculation algorithm is exclusively known by DNP.

<sup>14</sup> The revision process is defined by national policy (CONPES, 2001) and backed by law (Law 715 - 2001)

<sup>15</sup> SISBEN II is the second version of the score

<sup>16</sup> To reduce the number of unmatched registries all three bureaus, DNP, DPS and ANSPE used an approximate matching algorithm allowing for differences in spelling of names and surnames, as well as ID numbers and birth dates.

## 4.5 Outcome Variables

Two groups of outcome variables are analysed. Both are business-related, given our interest in the effect of participation in the poverty reduction scheme in enterprises business indicators. The first group are variables related to borrowing. As presented in the literature review, microenterprises are commonly credit constrained. Either by self-deselecting from the market (demand failure) or by under coverage or exclusion (supply failure). To analyse borrowing we analyse whether the entrepreneur has applied for a loan.<sup>17</sup> It is a binary variable.

The second group of variables capture business performance. For the analysis at hand, we first examine reported hours worked per day. Secondly, we analyse six proxies for business performance. Measurement of profits is critical in assessing the effect of the policy on the target population.<sup>18</sup>

Just like collecting information on sensitive topics such as household income, it is necessary to discuss the difficulty in capturing accurate and reliable business information. One factor is the lack of bookkeeping. De Mel et al. (2009a, p. 21) report low levels of record-keeping around 20% among microenterprises in developing countries. Contrarily, Colombian microenterprises show high indicators in this practice. The Colombian Microenterprise survey reports, in 2009 and 2010, a percentage of bookkeeping around 56.8% and 58.4% respectively. For our sample, 66.6% of the group reported keeping business records. One possible explanation is that all surveyed entrepreneurs participated in the entrepreneurial training.<sup>19</sup>

We follow Willebrands et al. (2012), Daniels (2001b) and de Mel et al. (2009a) and adapt their measures of microenterprise profits. Accordingly, we asked a set of questions regarding business activity to construct several proxies of business profits, mainly defined as revenue minus expenses. We asked entrepreneurs to provide estimates of sales –proxy for revenues- and input costs –proxy for expenses- for three different *levels* of business activity, namely high activity month, mid activity month, and low activity month.<sup>20</sup> In this way, we obtained six estimates, three per revenue-

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<sup>17</sup> Question reads: In the past twelve months have you applied for loans to develop or operate your business?

<sup>18</sup> An initial assessment of the EXCEL file records kept by CEMPRENDE alerted about possible issues in the protocol followed by CEMPRENDE to capture business profits. These issues were corroborated in the fieldwork, plus the additional issue of poor transcription from physical records to the EXCEL file.

<sup>19</sup> See de Mel et al. (2009a) for some results on bookkeeping experiments.

<sup>20</sup> This is also how Colombian microentrepreneurs somewhat qualify their activity, using adjectives such as bad, regular (so-so) or good.

expenses pair. In addition, we asked for an 18-item detailed account of business expenses to contrast them with reported costs.<sup>21</sup>

Then, we asked entrepreneurs to characterise month by month the period between January 2012 to May 2013 following Willebrands, Lammers, and Hartog (2012) using the three categories mentioned above (high, mid, low activity). In this way, we obtained an approximation of the average monthly activity by capturing some of the variability and seasonality that characterises these microenterprises' activity. This was also to circumvent possible recall issues associated with questions regarding business activity, particularly, those related to profits, revenues, expenses, and purchases (Daniels, 2001b; de Mel et al., 2009a; Samphantharak & Townsend, 2012; Vijverberg, 1992; Vijverberg & Mead, 2000). To complement this information, we enquired about opening days and hours for each month over the same period to calculate an average over the active year.

The survey also requested for profit estimates using the three profit components tested by Daniels (2001a, 2001b) and similar to the one used by de Mel et al. (2009a) from the Mexican National Microenterprise Survey. The three questions read as follows. The first one: *"Does your household consume or use some of the goods or services produced in your business? If yes, what is the (estimated) value of the products normally consumed or used by your household? (Place ZERO if the household has not consumed or used any product)"*.

The second question asks: *"Do you use any of the money earned in your business for you or your household? If yes, how much (estimated) money does your business use for you or your home? (Put ZERO if you do not)"*. The question could be interpreted as a proxy for the sum earmarked as salary by the entrepreneur. These two questions seek to capture the *unreported* categories by microentrepreneurs recognised by de Mel et al. (2009a). These categories are related to the fungibility of resources shared between the business and the household, typical of microenterprises; who in addition to their low bookkeeping do not keep differentiated accounts for the business and the household (de Mel et al., 2009a, pp. 22–23).<sup>22</sup>

The third question reads: *"After making purchases for your business (supplies, materials, raw materials, services, etc.) and after spending some money on you and/or your household, do you*

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<sup>21</sup> Expenses such as: Rent for land and buildings; electricity; gas and fuel; telephone or mobile charges; credit payments; stationery and office supplies purchases; inventory purchases (raw material and supplies / goods for sale); wages and salaries for employees; water; maintenance and general repairs; transport (Hauling, packing, packaging) and travelling expenses; advertising; taxes; interest paid; operating license payments; business registration payments; association fees; and other (cleaning, surveillance, etc.)

<sup>22</sup> Even higher educated entrepreneurs forget to set a salary for themselves, especially in the first years of operation (Vesga et al., 2015).

*usually have money left over? If your answer is YES, usually how much money do you have left after shopping for your business and using some money for yourself and / or your household? (Place ZERO if you have no remaining money left)".* This question could be seen as a rough unadjusted proxy for microenterprise profit. After each question, entrepreneurs were asked to report the frequency of the respective amounts, the options being: *Daily; Weekly; Monthly; Quarterly; Semester; Annually.*

The ease in answering these three questions yields a lower nonresponse rate as reported by Daniels (2001b, p. 604). By construction, this proxy does not allow negative values which in the microenterprise sector are not uncommon.

Table 4.2 displays the definitions of the proxies and their summary statistics. Profit 3 reports revenue minus total expenses (detailed account). Profit 4 and Profit 5 adjusts revenue adding back the first two amounts of the direct profit, assuming that these amounts are neither included in reported revenues nor in reported expenses. Finally, as an additional exercise, we construct a proxy for fixed costs from the detailed total expenses, excluding two items reported, namely, purchase of inventories, and wages and salaries for employees; as these are assumed to be captured by the reported expenses.<sup>23</sup> Thus, Profit 6 is calculated as the adjusted revenue minus adjusted expenses.

The observed Pearson coefficient (.41<sup>24</sup>) between the Direct profit (proxy 1) and Proxy 2 falls within the range reported by de Mel et al. (2009a, pp. 21–22) for other developing countries. The highest coefficient (Profit1 vs Profit6) reported in Table 4.2 reflects the effect of the adjustment for unreported categories. It is noteworthy that the calculated profits for some enterprises are negative when the 18-item detailed costs are used. Using this proxy, around 30% of the sample show negative profits. Although not uncommon in the microenterprise sector, the presence of negative profits raises the question of whether there are businesses consistently running on losses. Again, this proportion is reduced once the unreported categories are considered.

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<sup>23</sup> The observed Pearson coefficient between estimated average monthly costs and the sum of these two items is 0.4478.

<sup>24</sup> The observed Pearson coefficient is even lower for the untrimmed sample, 0.159.

Table 4.2 Microenterprise Profits (Sampled entrepreneurs)

|          |  | Obs. | Mean    | S.D.    | Median | % of negatives | Pearson <sup>a</sup> |
|----------|--|------|---------|---------|--------|----------------|----------------------|
| Revenue  | Reported Sales (June 2012 – May 2013)    | 339  | 1308,79 | 1718,77 | 695,83 | 0              |                      |
| Profit 1 | Direct Profit (Three questions)          | 327  | 520,51  | 805,28  | 350    | 0              | 1                    |
| Profit 2 | Reported Revenue minus Expenses          | 345  | 712,78  | 1471,43 | 340    | 0              | 0.5464*              |
| Profit 3 | Reported Revenue minus Detailed Expenses | 347  | 251,14  | 3955,87 | 235,83 | 29,91          | 0.1693*              |
| Profit 4 | Adjusted Revenue minus Expenses          | 360  | 1016,13 | 1684,36 | 596    | 0              | 0.6886*              |
| Profit 5 | Adjusted Revenue minus Detailed Expenses | 362  | 571,94  | 3940,24 | 408,96 | 18,82          | 0.4002*              |
| Profit 6 | Adjusted Revenue minus Adjusted Expenses | 362  | 784,44  | 1532,70 | 438,33 | 6,18           | 0.6947*              |

Source: Survey 2013, CEMPRENDE. Note: Figures in Colombian pesos (COP) in thousands, one USD was about \$1.879 COP between May and June 2013. The average for 2013 was around \$1.868. All data trimmed at 1/99%. <sup>a</sup> Observed correlation of Profits 2 to 6 with Profit 1.

The mean and median reported profits are roughly 1.3 times as large as the mean and median of Profit 3, while its standard deviation is 2.5 times larger than that of profits. These results are similar to the results reported in other countries as accounted by de Mel et al. (2009a). Apart from Profit 3, the rest of the mean proxies are higher than the directly reported profits between 1.10 and 1.95 times. Medians are higher between 1.17- and 1.70-times excluding Profit 2 and 3.

Table 4.3 presents the summary statistics for the constructed treatment groups.

Table 4.3 Summary statistics

| Outcome variable               | Control | S.D.    | Treatment | S.D.    | Difference | t        |
|--------------------------------|---------|---------|-----------|---------|------------|----------|
| <b>*Borrowing</b>              |         |         |           |         |            |          |
| Ask loan                       | 0.32    | (0.466) | 0.36      | (0.482) | -0.044     | (-0.773) |
| Percentage obtained            | 1.00    | (0.352) | 1.03      | (0.329) | -0.025     | (-0.333) |
| <b>*Business indicators</b>    |         |         |           |         |            |          |
| Hours worked                   | 8.42    | 3.21    | 8.85      | 4.15    | -0.196     | (-0.403) |
| Avg. Monthly Sales Jun12/May13 | 1,759   | (2182)  | 1,086     | (1450)  | 672**      | (2.848)  |
| Profit 1                       | 614     | (645)   | 338       | (296)   | 276***     | (4.249)  |
| Profit 2                       | 833     | (1029)  | 463       | (489)   | 370***     | (3.563)  |
| Profit 3                       | 419     | (1352)  | 444       | (1039)  | -25        | (-0.570) |
| Profit 4                       | 1,176   | (1217)  | 663       | (612)   | 513***     | (4.316)  |
| Profit 5                       | 832     | (1554)  | 647       | (1042)  | 184        | (-0.155) |
| Profit 6                       | 906     | (1128)  | 541       | (571)   | 365**      | (3.319)  |
| Observations                   | 128     |         | 117       |         |            |          |

Source: Follow-up survey, 2013. Note: Figures in Colombian pesos (COP) in thousands, one USD was about \$1.879 COP between May and June 2013. The average for 2013 was around \$1.868. All Business and Household indicators trimmed at 1/99%. Due to missing values, the number of observations varies: for Business variables between [128, 142] for Control group, and [117,130] for Treatment group; and Household variables between [133, 147] for Control group, and [124,132] for Treatment group.

For the analysis, all monetary variables are transformed into logs. For variables Profit3, Profit5, and Profit6 the minimum value is added so there are no negative values before the log-transformation. Thus, the distribution is artificially shifted to avoid any information loss.

Figure 1 presents the six profit proxies by treatment status.

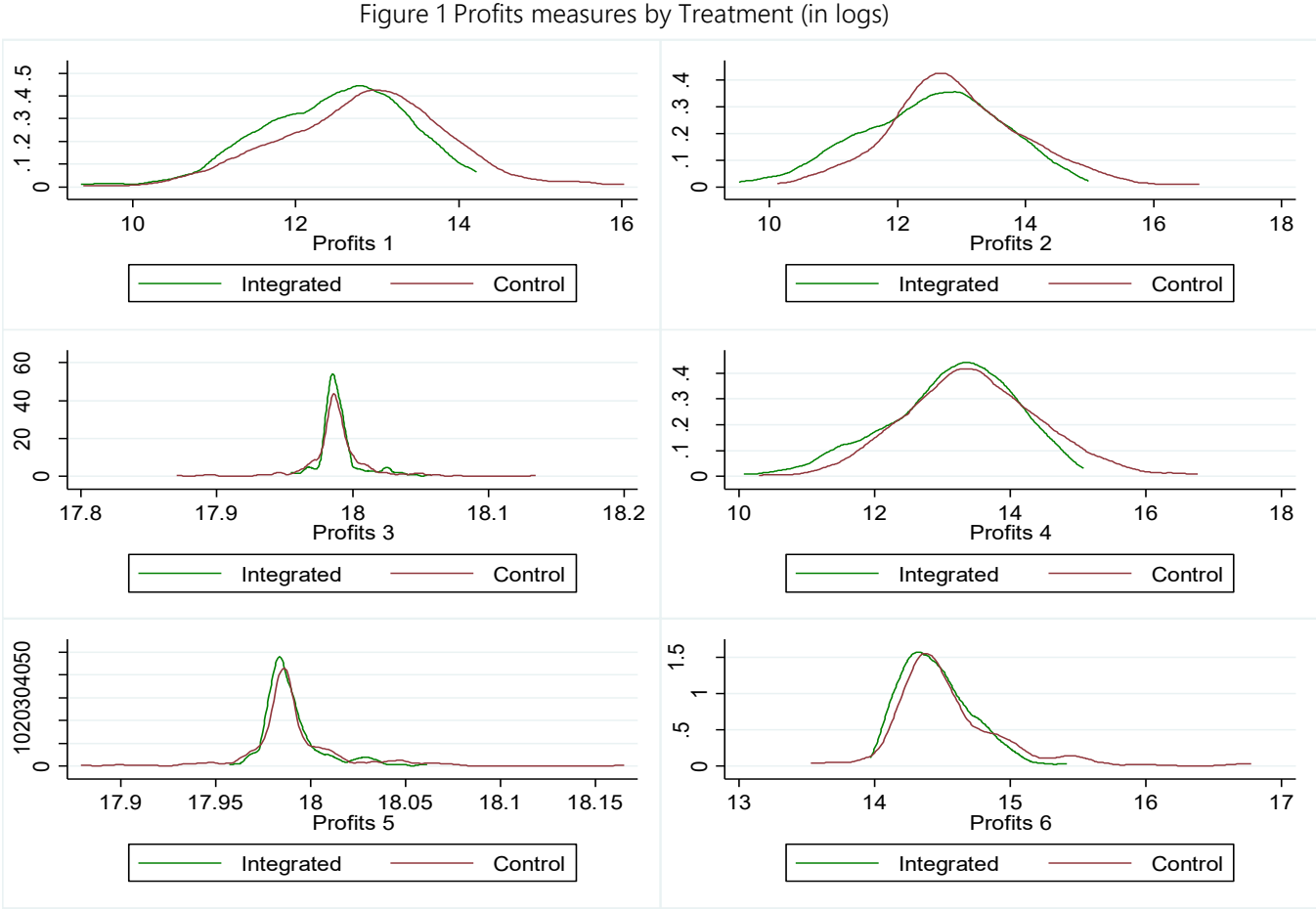


Table 4.4 presents an overview of the characteristics of treatment and control groups. In general, treatment group consists of entrepreneurs composed mainly by women (96.3% vs 77.5%); have around two years less of education; are slightly younger; have had a business before in a higher proportion but have less experience in entrepreneurship (three years or less). These last two variables related to entrepreneurship are included to capture the level of households' initiative, expecting that the longer people have been doing business, the more entrepreneurial they are expected to be.

Social policy participant enterprises consist of start-ups in a higher proportion (25.9% vs 11.9%); appear to register to Chamber of Commerce in a lower proportion (21.8 p.p. less) although registry is low for the whole sample (only 36.4% of control household enterprises are registered); the

proportion of separated production units is also comparatively lower (19.8% vs 36%); treated units concentrate slightly more on trade sector with no difference in their participation in the service sector and a marginally lower proportion of firms dedicated to manufacturing. An interesting fact is that there is no statistically significant difference in record keeping between the two groups, this business practice being identified as pivotal in this sector (de Mel et al., 2009a; Drexler et al., 2010; Karlan et al., 2012).

Table 4.4 Summary Statistics Sample of Entrepreneurs (by Treatment)

| Variable   | Control          | Treatment         | Difference           |
|--|------------------|-------------------|----------------------|
| Proportion Female  | 0.775<br>(0.419) | 0.963<br>(0.190)  | -0.188***<br>(-4.99) |
| Years of schooling*  | 10.66<br>(3.630) | 8.311<br>(3.159)  | 2.345***<br>(5.80)   |
| Age of enrolment   | 43.45<br>(11.97) | 39.46<br>(9.288)  | 3.990**<br>(3.12)    |
| Business before this one?                                    | 0.518<br>(0.501) | 0.669<br>(0.472)  | -0.152*<br>(-2.50)   |
| Years as entrepreneur  | 13.53<br>(9.679) | 10.20<br>(8.746)  | 3.333**<br>(2.95)    |
| Age of business in years                                     | 8.671<br>(7.637) | 5.644<br>(5.393)  | 3.027***<br>(3.62)   |
| Proportion of start-ups*                                     | 0.119<br>(0.325) | 0.259<br>(0.440)  | -0.140**<br>(-2.86)  |
| Proportion of firms registered                               | 0.364<br>(0.483) | 0.145<br>(0.354)  | 0.218***<br>(4.22)   |
| Proportion of firms that don't keep any type of biz. records | 0.243<br>(0.430) | 0.299<br>(0.460)  | -0.0561<br>(-1.01)   |
| Production unit separated from living space?                 | 0.360<br>(0.482) | 0.198<br>(0.400)  | 0.161**<br>(2.93)    |
| Sector: Trade  | 0.462<br>(0.500) | 0.610<br>(0.490)  | -0.149*<br>(-2.43)   |
| Sector: Services   | 0.371<br>(0.485) | 0.314<br>(0.466)  | 0.0571<br>(0.97)     |
| Sector: Manufacturing  | 0.168<br>(0.375) | 0.0763<br>(0.267) | 0.0916*<br>(2.31)    |
| Observations   | 151              | 135               | 286                  |

Source: Follow-up survey, 2013



## 5. EMPIRICAL STRATEGY

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### 5.1 Econometric Methodology

To estimate the effect of participation in social policy on entrepreneurial outcomes, we implement an instrumental variables design. The model framework is as follows,

$$D_i = \alpha_1 + \gamma_1 z_i + \delta_i X_i + \gamma_i W_i + \varepsilon_i$$

$$y_i = \alpha_2 + \gamma_2 z_i + \delta_i X_i + \gamma_i W_i + u_i$$

Where these equations correspond to the first stage, and reduced-form specifications, respectively.  $D_i \in \{0,1\}$  denotes participation in the poverty reduction scheme by individual  $i$ .  $z_i$  is a continuous scoring variable that determines participation defined in section 4.3.  $y_i$  represents the outcome of interest, in our case, the different business performance indicators.  $X_i$  is a vector of covariates related to entrepreneurs characteristics and  $W_i$  a vector of covariates related to enterprise characteristics. Finally,  $\varepsilon_i$  and  $u_i$  are the robust standard errors.

A fuzzy regression discontinuity design (RDD) exploiting the continuous scoring variable determining assignment inspired the identification strategy. This method demands a sufficiently large sample size to provide reliable estimates. For reasons such as limited final sample size, this method was ruled out. In particular, the control group size is small given the higher prevalence of poor population in the groups of entrepreneurs that apply to the entrepreneurship programme, making it hard to find non-poor units among this group.

Hahn et al. (2001) show that the scoring variable in a RDD setting serves as a valid instrument for identification. We employ this fact for the identification strategy. Nevertheless, the discrepancy between eligibility and participation means that the assignment rule does not predict perfectly programme participation configuring a case of imperfect compliance. No full compliance to assignment signifies that there might be unobservable factors affecting participation on both the eligible and non-eligible individuals that might affect both their treatment status and their potential outcomes.

Several factors affect compliance. There are inclusion and exclusion errors which are common in the delivery process of public policy, particularly at the implementation stage. In this case, there is a gap between targeting and actual assignment. Given the high poverty incidence and the need for an even national distribution of resources, the implementing agency at the time -2007- assigned

quotas at the regional or municipal level. This constrained population inclusion in cities where poverty was high, hence households that should have been included (below cut-off score) in the programmes were not. It is also possible to find individuals included in just one of the components (see the *Data* section), these households were excluded from the analytical sample.

For this case, it is possible to identify the effect on the compliers using the local average treatment effect (LATE-IV). The size of the complier groups and the estimated effect may depend on factors affecting participation such as local budget allocation, and prevalence of poverty. Identification of the effect is based on the assumption that SISBEN is a valid instrument.

In this context, selection using the SISBEN score is not expected to have a direct influence on the business indicators other than through the effect on individual participation in the social programme. Heckman (1997) recommends dealing cautiously with the LATE estimator, highlighting the importance of answering a meaningful question due to the restricted analytical sample (treatment and control groups). In policy terms, an interesting question can be answered. The effect of participating in the poverty reduction scheme on those individuals willing to comply given that they are eligible can be determined. This means testing social protection in its role of both safety net and transformative functions (as defined by Devereux & Sabates-Wheeler (2004)).

Formally, the LATE estimator is defined as:

$$\beta_{LATE} = \frac{E[Y_i|Z_i = 1] - E[Y_i|Z_i = 0]}{E[D_i|Z_i = 1] - E[D_i|Z_i = 0]} = E[Y_{1i} - Y_{0i}|D_{1i} > D_{0i}]$$

The LATE is estimated parametrically to control for covariates, affecting both entrepreneur and enterprise.

## 5.2 Identification Strategy

In this setting, the parameters of interest are  $\gamma_1$  and  $\gamma_2$ . The first parameter measures the variation in participation that can be attributed only to the scoring variable. The second parameter measures the changes in the variable outcomes that can be attributed to the scoring variable. The structural effect of interest is the ratio between the reduced-form coefficient ( $\gamma_2$ ) and the first stage coefficient ( $\gamma_1$ ). This is the IV-Wald effect  $\rho = \gamma_2/\gamma_1$  that captures the impact on business indicators.

Identification of  $\rho$  relies on the use of the SISBEN variable as an instrument that needs to satisfy two requirements to be valid. First, the instrument should explain a large proportion of the variation

in household participation. This assumption is tested by checking the statistical significance of the scoring variable on household participation from the first-stage equation.

Second, the instrument should not be correlated with any other determinants of the dependent variable, in our case, business indicators. These determinants are observable and unobservable factors that affect both business performance and treatment status. While this requirement cannot be tested in an IV framework, by construction, the SISBEN score does not include potential determinants of business performance, it is built mainly on housing conditions, and living standards, for instance, productive assets are not included in its calculation. Also, as a lesson learned from the previous version (SISBEN I) income per capita is not included, given its high chance of manipulation detected in studies (Camacho et al., 2010; Flórez et al., 2008). Finally, the social policy programme started operating in 2007 so to a large extent assignment occurred previous to the start of the entrepreneurship policy in 2009.

Unobservable characteristics such as shame or misinformation can explain participation, enrolment and non-compliance, thus a possible source of bias is selection on unobservables, i.e. those variables not observed by the researcher that might also affect the participation decision (Heckman, 1997). It is a strong behavioural assumption that in our case relies on the ability of entrepreneurs to link first their score and then their participation in the social protection scheme on their (future) business performance. Regarding participation decision, it could be argued that individuals' motivation to overcome poverty is reflected in their willingness to participate in the social support programme.

## 6. RESULTS

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Estimations results are organised by outcome variables. In general, all IV-LATE results apply to the complier group, in the similar sense that interpretation of RDD works, attributing the reported differences to the probability of compliance of both treatment and control groups.

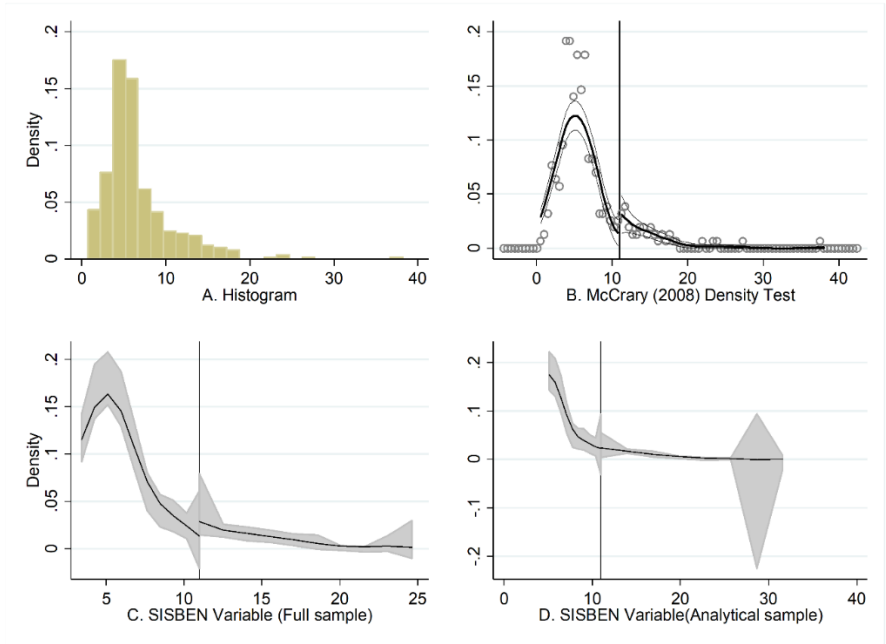
### 6.1 Instrumental variable selection

As explained above, the motivation for this analysis comes from a fuzzy RDD approach. Following McCrary (2008), we checked for potential manipulation of the running variable, SISBEN score. It is reasonable to think that the population have strong incentives to manipulate their score, considering the benefits that receiving social support implies. Presence of such manipulation is

usually interpreted as empirical evidence of self-selection or non-random sorting of units into control and treatment status.

The government updates regularly the scoring system (see section 4.3). Nonetheless, if the population were able to manipulate their score, a sharp increase of the selected population around the threshold should show, in particular on the left side of the distribution. Addressing this concern, Figure 2 shows graphic evidence of no manipulation of the score. Formally, the McCrary test (2008) supports the validity of the proposed design. The test shows the log difference in the height of the density function of 1.05 and a standard error of 0.63, in this case, we fail to reject the null hypothesis of no discontinuity around the selection threshold (Panel B). An alternative test is also conducted using a local polynomial density estimation procedure following Cattaneo, Jansson, and Ma (2018, 2019) to calculate a robust bias-corrected estimated height for the full and analytical samples of 0.9937 and 0.0029, with p-values of 0.3204 and 0.9977 (Panels C and D, respectively). The test is run with a bandwidth selection based on MSE of each density separately, on each side (left, and right) of the score threshold, given the limited amount of data, particularly for the control group. These results provide evidence that there is no manipulation of the SISBEN score.

Figure 2 SISBEN (scoring variable): Discontinuity tests



Notes: Panel A presents the density of the SISBEN variable (bin width=1.5%). Panel B presents the finely gridded histogram, smoothed using a local linear regression separately on each side of the threshold (11 points). The McCrary test reports a log difference (standard error) in the height of the density function of 1.05 (0.63) (McCrary, 2008). Panel C and D display discontinuity test for the whole sample and the analytical sample using the local polynomial density estimator suggested by [Cattaneo, Jansson, and Ma \(2018, 2019\)](#).

## 6.2 The effects of participation on social policy on Business performance

### 6.2.1 Borrowing

For the analysis of loan application, we use a nonlinear latent index bivariate probit model to account for the nonlinearity of the conditional expectation function. After controlling for individual and firm characteristics, treated household enterprises show a statistically significant higher probability of applying for a loan.

Error! Reference source not found. reports the IV-LATE estimation results, Panel A presents the two-stage least squares estimators (2SLS), where both first and second stage regressions are modelled as linear dependent models (LPM), as a benchmark. Panel B reports results of the bivariate probit estimator, where both first and second stage regressions are modelled as binary dependent models. Different instruments are reported, SISBEN, SISBEN squared, and sub-district localization (UCG). Last columns report estimates when locality variables are included in the outcome regression as a dummy to capture any local economy effect on business. Each column in the table contains estimates from different combinations of instruments and dummies.

The IV-LATE results suggest that participating in social protection programme increases the chances of entrepreneurs applying for loans in 33 p.p (column (6), Panel B.), estimates from an alternative functional form, using the LPM for the first-stage equation yield more conservative estimates, 30.5 p.p. (column (6), Panel A), with lower statistical significance.

In substantive terms, this result shows that participating in the social policy programmes comparatively reduces potential self-deselection from financial markets in the complier population. This result suggests that whereas the entrepreneurship training helps entrepreneurs recognise those businesses areas that require investment (working/fixed capital), their participation in social policy by receiving information on financial inclusion -non-monetary component- and an additional, stable income -monetary component- allows them to organize their finances and project their income flow in a longer-term perspective in a way that allows them to take the risk of requesting loans, hence opening the opportunity to increase the capital levels of their enterprises.

Table 6.1 Effect of participation in the social programme on Loan application

| PANEL A. 2SLS estimates   |                |                |                |                |                |               |
|---------------------------|----------------|----------------|----------------|----------------|----------------|---------------|
|                           | (1)            | (2)            | (3)            | (4)            | (5)            | (6)           |
| Effect                    | 0.0409         | 0.313          | 0.175          | 0.277*         | 0.185          | 0.305**       |
| SE                        | (0.311)        | (0.243)        | (0.162)        | (0.147)        | (0.167)        | (0.153)       |
| CI                        | [-0.572,0.654] | [-0.167,0.794] | [-0.145,0.494] | [-0.013,0.568] | [-0.143,0.514] | [0.003,0.607] |
| <i>Instruments</i>        |                |                |                |                |                |               |
| Score                     | ✓              | ✓              | ✓              | ✓              | ✓              | ✓             |
| Score Sq.                 |                | ✓              |                | ✓              |                | ✓             |
| Sub-district loc.         |                |                | ✓              | ✓              | ✓              | ✓             |
| F                         | 11.67          | 10.74          | 7.08           | 6.71           | 8.29           | 7.16          |
| Dummies                   | No             | No             | No             | No             | Yes            | Yes           |
| Observations              | 198            | 198            | 198            | 198            | 197            | 197           |
| PANEL B. Bivariate Probit |                |                |                |                |                |               |
|                           | (1)            | (2)            | (3)            | (4)            | (5)            | (6)           |
| Effect                    | 0.174          | 0.171          | 0.325***       | 0.326**        | 0.325**        | 0.330**       |
| SE                        | (0.183)        | (0.199)        | (0.123)        | (0.128)        | (0.131)        | (0.140)       |
| CI                        | [-0.184,0.533] | [-0.220,0.561] | [0.084,0.565]  | [0.075,0.578]  | [0.069,0.582]  | [0.057,0.604] |
| <i>Instruments</i>        |                |                |                |                |                |               |
| Score                     | ✓              | ✓              | ✓              | ✓              | ✓              | ✓             |
| Score Sq.                 |                | ✓              |                | ✓              |                | ✓             |
| Sub-district loc.         |                |                | ✓              | ✓              | ✓              | ✓             |
| Rho                       | -0.278         | -0.271         | -0.690*        | -0.694*        | -0.686*        | -0.697        |
| Wald                      | 0.501          | 0.401          | 3.201          | 2.904          | 2.716          | 2.344         |
| test(rho=0)               |                |                |                |                |                |               |
| Dummies                   | No             | No             | No             | No             | Yes            | Yes           |
| Observations              | 198            | 198            | 198            | 198            | 197            | 197           |

Notes: Number of observations in treatment group = 109; in control group = 91. P-value (\* 0.1 \*\* 0.05 \*\*\* 0.01)

## 6.2.2 Business indicators

Error! Reference source not found. presents the IV-LATE estimation results, showing that the complier group, who participates in the social policy programmes, reports more average hours worked per day. Results show a positive effect between 2.3 to 3.1 hours worked per day (Panel A columns 4, 5 and 6); in line with findings on labour outcomes of CCT participants (Alzúa et al., 2013; Arau Pontones, 2014; ECLAC & ILO, 2014; Fernald et al., 2008; Fiszbein et al., 2009).

For the 2SLS, there is a trade-off between the statistical significance of the coefficient and the validity of the instruments. When employing the three instruments the results are significant, at the cost of a lower F-statistic for the instruments. The IV-LATE using the endogenous treatment model (binary first stage equation) provides more robust, as well as more conservative, results (Panel B columns 3 and 4).

A potential mechanism suggests that thanks to the availability of care programmes, entrepreneurs –usually women– have more time for productive purposes. Time that otherwise would spend caring for children or the elderly. This complements the original CCT purpose of reducing absenteeism since households have greater incentives to send children to school.

Table 0.1 in Appendix report the IV-LATE estimates for the different measures of performance. Results show no statistically significant difference in any business indicators for the complier group, in either of the specifications, LPM or binary first stage. Estimates close to zero may suggest a null effect after controlling for others factors associated with enterprise and entrepreneur that can affect business profits. The fact that treatment group of entrepreneurs showed lower results in several observable variables is factored in, one possible interpretation is that the social policy intervention is working as a levelling factor among otherwise different group of entrepreneurs.

This result needs to be interpreted considering the positive impact on hours worked on the complier group because, other factors hold constant, productivity may be lower for social programme participants, who even after exerting a higher effort –represented in more hours worked– no gains seem to show in their profitability.

Table 6.2 Effect of participation in the social protection programme on Hours worked per day

|   | (1)            | (2)            | (3)            | (4)            | (5)            | (6)           |
|---|----------------|----------------|----------------|----------------|----------------|---------------|
| PANEL A. 2SLS (Linear outcome + LPM first-stage regression) |                |                |                |                |                |               |
| Effect  | 2.674          | 3.338          | 2.090          | 2.348*         | 2.931*         | 3.126**       |
| SE  | (2.150)        | (2.194)        | (1.457)        | (1.411)        | (1.623)        | (1.557)       |
| CI  | [-1.569,6.917] | [-0.993,7.669] | [-0.786,4.965] | [-0.437,5.133] | [-0.272,6.135] | [0.052,6.200] |
| <i>Instruments</i>  |                |                |                |                |                |               |
| Score   | ✓              | ✓              | ✓              | ✓              | ✓              | ✓             |
| Score Sq.   |                | ✓              |                | ✓              |                | ✓             |
| Sub-district loc.   |                |                | ✓              | ✓              | ✓              | ✓             |
| F   | 9.886          | 8.779          | 6.629          | 6.292          | 7.757          | 6.682         |
| Dummies   | No             | No             | No             | No             | Yes            | Yes           |
| Observations  | 190            | 190            | 190            | 190            | 189            | 189           |
| PANEL B. Linear regression with Endogenous Treatment        |                |                |                |                |                |               |
|   | (1)            | (2)            | (3)            | (4)            |                |               |
| Effect  | 2.215*         | 2.020          | 2.417**        | 2.340**        |                |               |
| SE  | (1.331)        | (1.317)        | (1.014)        | (1.006)        |                |               |
| CI  | [-0.393,4.822] | [-0.562,4.601] | [0.430,4.405]  | [0.369,4.311]  |                |               |
| <i>Instruments</i>  |                |                |                |                |                |               |
| Score   | ✓              | ✓              | ✓              | ✓              |                |               |
| Score Sq.   |                | ✓              |                | ✓              |                |               |
| Sub-district loc.   |                |                | ✓              | ✓              |                |               |
| Lambda  | -1.082         | -0.951         | -1.388**       | -1.334**       |                |               |
| se(lambda)  | 0.836          | 0.829          | 0.666          | 0.662          |                |               |
| Dummies   | No             | No             | No             | No             |                |               |
| Observations  | 190            | 190            | 190            | 190            |                |               |

Notes: Number of observations in treatment group = 109; in control group = 91. Linear regression with endogenous treatment. \* p-value<0.1 \*\* p-value<0.05 \*\*\* p-value<0.01).



## 7. CONCLUDING REMARKS

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This paper analysed the effects of social policy participation by entrepreneurs. Using partial compliance into this participation we compare the subgroup of compliers in both treatment and control groups. We find evidence that poor entrepreneurs supported by social policy apply in higher proportion to loans, showing that social protection may reduce self-deselection from credit markets thanks to financial inclusion intervention and a more stable source of income.

Concerning performance, findings show a positive impact on reported hours worked per day. This is in line with CCT studies that find positive impacts on labour market outcomes on the targeted population. Null results in the analysis of profit measures need to be interpreted cautiously as these estimates seem unable to detect a significant difference in business profits between complier groups. Studies by Cho (2015), Cho and Honorati (2014), and McKenzie and Woodruff (2013) discuss the difficulties in identifying any effect on entrepreneurship interventions, particularly in developing contexts and when target poor population.

Nevertheless, for the purpose of inclusive development of poor and vulnerable population, profit still needs to be a key indicator of policy success, for it is the way to ensure sufficient, autonomous income for households. It is important to note that the use of profits may be a better indicator of viability and/or self-sustenance –in the sense of survival. However, maximizing profits may not be the goal of the business. In this case, entrepreneurship is a buffer against poverty. For instance, profits can be improved by employing fewer family members and getting more work from the few that does. To delve into this type of conclusions it would be necessary to study the household assignment of tasks and their role in the business.

Some caveats are important. Even though the group of entrepreneurs surveyed is representative of the population supported by the entrepreneurship programme; the reduced sample limits the statistical power of the results given that IV estimation analyses only the complier groups around the assignment threshold in a similar vein as fuzzy RDD does.

Among the limitations, a ‘pure’ control group (neither entrepreneurship nor social support) would be ideal to assess the impact of the entrepreneurship policy independently and the additionality of interacted interventions. Nonetheless, locating these household enterprises is particularly

cumbersome considering that they operate with no front sign, and would require a more sophisticated, and costly survey logistics.

Further avenues for research in the study of productive effects of social protection are to include time of participation into the social policy to capture differential effects of intensity or dosage. In addition, including the amount of the cash transfer received would allow to assess its impact more accurately. Finally, considering that our group of entrepreneurs concentrate below the cut-off score, studying in depth the factors affecting their entrepreneurial activities in poverty is still of great interest, for instance, identifying additional cut-off points to compare poor and the 'ultra-poor'.

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## Appendix

Table 0.1 Effect of participation in social policy programme on Profit Measures

| PANEL A. Linear regression with LPM first-stage |                |              |                |                |                |                |                |              |              |    |              |
|---|----------------|--------------|----------------|----------------|----------------|----------------|----------------|--------------|--------------|----|--------------|
| Log Sales 12-13                                 |                |              |                |                |                |                |                |              |              |    |              |
|   | (1)            | (2)          | (3)            | (4)            | (5)            | (6)            |                |              |              |    |              |
| Effect  | 0.228          | 0.350        | 0.138          | 0.212          | 0.138          | 0.0710         |                |              |              |    |              |
| SE  | 0.609          | 0.630        | 0.366          | 0.373          | 0.366          | 0.412          |                |              |              |    |              |
| CI  | [-0.974,1.429] | [-           | 0.892,1.593]   | [-             | 0.583,0.860]   | [-             | 0.524,0.947]   | [-           | 0.583,0.860] | [- | 0.741,0.883] |
| F   | 10.733         | 9.621        | 7.075          | 6.728          | 7.075          | 6.930          |                |              |              |    |              |
| Dummies   | No             | No           | No             | No             | Yes            | Yes            |                |              |              |    |              |
| Observations                                    | 196            | 196          | 196            | 196            | 196            | 195            |                |              |              |    |              |
| Log Direct Measure                              |                |              |                |                |                |                |                |              |              |    |              |
|   | (1)            | (2)          | (3)            | (4)            | (5)            | (6)            |                |              |              |    |              |
| Effect  | 0.475          | 0.615        | -0.160         | 0.00829        | -0.160         | -0.322         |                |              |              |    |              |
| SE  | 1.274          | 1.231        | 0.470          | 0.496          | 0.470          | 0.528          |                |              |              |    |              |
| CI  | [-             | 2.040,2.990] | [-1.816,3.046] | [-1.087,0.767] | [-0.971,0.988] | [-1.087,0.767] | [-1.365,0.721] |              |              |    |              |
| F   | 10.593         | 8.727        | 6.171          | 5.834          | 6.171          | 5.611          |                |              |              |    |              |
| Dummies   | No             | No           | No             | No             | Yes            | Yes            |                |              |              |    |              |
| Observations                                    | 179            | 179          | 179            | 179            | 179            | 178            |                |              |              |    |              |
| Log Gross Profits                               |                |              |                |                |                |                |                |              |              |    |              |
|   | (1)            | (2)          | (3)            | (4)            | (5)            | (6)            |                |              |              |    |              |
| Effect  | -0.316         | -0.249       | -0.0522        | -0.0361        | -0.0522        | -0.283         |                |              |              |    |              |
| SE  | 0.586          | 0.564        | 0.356          | 0.349          | 0.356          | 0.380          |                |              |              |    |              |
| CI  | [-1.473,0.841] | [-           | 1.363,0.864]   | [-0.756,0.651] | [-             | 0.726,0.653]   | [-             | 1.033,0.468] |              |    |              |
| F   | 11.346         | 9.833        | 6.744          | 6.508          | 6.744          | 6.382          |                |              |              |    |              |
| Dummies   | No             | No           | No             | No             | Yes            | Yes            |                |              |              |    |              |
| Observations                                    | 192            | 192          | 192            | 192            | 192            | 191            |                |              |              |    |              |
| <i>Instruments</i>                              |                |              |                |                |                |                |                |              |              |    |              |
| Score   | ✓              | ✓            | ✓              | ✓              | ✓              | ✓              |                |              |              |    |              |
| Score Sq.                                       |                | ✓            |                | ✓              |                | ✓              |                |              |              |    |              |
| Sub-district loc.                               |                |              | ✓              | ✓              | ✓              | ✓              |                |              |              |    |              |

Notes: Number of observations in treatment group = 109; in control group = 91. Linear regression with LPM first-stage. \* p-value<0.1

\*\* p-value<0.05 \*\*\* p-value<0.01)

(continued)

| Log Operating Profits   |                |                |                |                |                |             |
|---|----------------|----------------|----------------|----------------|----------------|-------------|
|   | (1)            | (2)            | (3)            | (4)            | (5)            | (6)         |
| Effect  | -0.0850        | 0.0242         | -0.120         | -0.0726        | -0.120         | -0.0859     |
| SE  | 0.129          | 0.107          | 0.075          | 0.065          | 0.075          | 0.069       |
| CI  | [-0.339,0.169] | [-0.187,0.235] | [-0.267,0.027] | [-0.201,0.056] | [-0.267,0.027] | [-0.223,0.0 |
| F   | 11.519         | 10.856         | 6.994          | 6.803          | 6.994          | 6.851       |
| Dummies   | No             | No             | No             | No             | Yes            | Yes         |
| Observations  | 193            | 193            | 193            | 193            | 193            | 192         |
| Log Adjusted Gross Profits  |                |                |                |                |                |             |
|   | (1)            | (2)            | (3)            | (4)            | (5)            | (6)         |
| Effect  | 1.151          | 1.457          | 0.401          | 0.545          | 0.401          | 0.145       |
| SE  | 1.268          | 1.233          | 0.579          | 0.570          | 0.579          | 0.531       |
| CI  | [-1.350,3.653] | [-0.976,3.890] | [-0.741,1.543] | [-0.581,1.670] | [-0.741,1.543] | [-0.904,1.1 |
| F   | 11.991         | 10.902         | 6.873          | 6.501          | 6.873          | 6.760       |
| Dummies   | No             | No             | No             | No             | Yes            | Yes         |
| Observations  | 196            | 196            | 196            | 196            | 196            | 195         |
| Log Adjusted Operating Profits  |                |                |                |                |                |             |
|   | (1)            | (2)            | (3)            | (4)            | (5)            | (6)         |
| Effect  | -0.0739        | 0.0513         | -0.100         | -0.0431        | -0.100         | -0.0660     |
| SE  | 0.146          | 0.110          | 0.082          | 0.068          | 0.082          | 0.072       |
| CI  | [-0.362,0.214] | [-0.166,0.268] | [-0.261,0.061] | [-0.177,0.091] | [-0.261,0.061] | [-0.209,0.0 |
| F   | 12.358         | 11.937         | 7.095          | 6.839          | 7.095          | 6.986       |
| Dummies   | No             | No             | No             | No             | Yes            | Yes         |
| Observations  | 194            | 194            | 194            | 194            | 194            | 193         |
| Log Adjusted Operating Profits (Adjusted Revenue – Adjusted Expenses) |                |                |                |                |                |             |
|   | (1)            | (2)            | (3)            | (4)            | (5)            | (6)         |
| Effect  | -0.259         | -0.164         | 0.0759         | 0.0821         | 0.0759         | -0.0390     |
| SE  | 0.284          | 0.258          | 0.179          | 0.169          | 0.179          | 0.179       |
| CI  | [-0.819,0.302] | [-0.673,0.344] | [-0.277,0.429] | [-0.251,0.415] | [-0.277,0.429] | [-0.393,0.3 |
| F   | 12.165         | 10.974         | 6.807          | 6.480          | 6.807          | 6.624       |
| Dummies   | No             | No             | No             | No             | Yes            | Yes         |
| Observations  | 194            | 194            | 194            | 194            | 194            | 193         |
| <i>Instruments</i>  |                |                |                |                |                |             |
| Score   | ✓              | ✓              | ✓              | ✓              | ✓              | ✓           |
| Score Sq.   |                | ✓              |                | ✓              |                | ✓           |
| Sub-district loc.   |                |                | ✓              | ✓              | ✓              | ✓           |

Notes: Number of observations in treatment group = 109; in control group = 91. Linear regression with LPM first-stage. \* p-value<0.1 \*\* p-value<0.05 \*\*\* p-value<0.01)

(continued)

| PANEL B. Linear regression with endogenous treatment |                    |                    |                    |                    |                     |                    |
|--|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|
| Log Sales 12-13                                      |                    |                    |                    |                    |                     |                    |
|  | (1)                | (2)                | (3)                | (4)                | (5)                 | (6)                |
| Effect   | 0.124              | 0.100              | 0.128              | 0.0948             | 0.0407              | 0.0110             |
| SE   | 0.408              | 0.407              | 0.305              | 0.303              | 0.334               | 0.333              |
| CI   | [-<br>0.675,0.923] | [-<br>0.696,0.897] | [-<br>0.469,0.725] | [-<br>0.499,0.688] | [-0.614,0.695]      | [-<br>0.641,0.663] |
| lambda   | -0.241             | -0.225             | -0.280             | -0.254             | -0.231              | -0.209             |
| se(lambda)   | 0.257              | 0.257              | 0.202              | 0.201              | 0.219               | 0.219              |
| Dummies  | No                 | No                 | No                 | No                 | Yes                 | Yes                |
| Observations   | 196                | 196                | 196                | 196                | 195                 | 195                |
| Log Direct Measure                                   |                    |                    |                    |                    |                     |                    |
|  | (1)                | (2)                | (3)                | (4)                | (5)                 | (6)                |
| Effect   | 0.485              | 0.528              | 0.151              | 0.172              | -0.107              | -0.0861            |
| SE   | 0.643              | 0.640              | 0.491              | 0.487              | 0.525               | 0.522              |
| CI   | [-0.776,1.747]     | [-0.726,1.782]     | [-0.812,1.114]     | [-0.783,1.128]     | [-1.136,0.923]      | [-1.110,0.937]     |
| lambda   | -0.173             | -0.203             | 0.064              | 0.048              | 0.222               | 0.208              |
| se(lambda)   | 0.407              | 0.405              | 0.329              | 0.327              | 0.348               | 0.347              |
| Dummies  | No                 | No                 | No                 | No                 | Yes                 | Yes                |
| Observations   | 179                | 179                | 179                | 179                | 178                 | 178                |
| Log Gross Profits                                    |                    |                    |                    |                    |                     |                    |
|  | (1)                | (2)                | (3)                | (4)                | (5)                 | (6)                |
| Effect   | -0.232             | -0.230             | -0.0774            | -0.0939            | -0.256              | -0.271             |
| SE   | 0.396              | 0.395              | 0.296              | 0.294              | 0.321               | 0.320              |
| CI   | [-<br>1.009,0.544] | [-<br>1.004,0.544] | [-<br>0.657,0.503] | [-0.671,0.483]     | [-0.885,0.372]      | [-<br>0.898,0.355] |
| lambda   | 0.013              | 0.012              | -0.108             | -0.095             | -0.003              | 0.009              |
| se(lambda)   | 0.251              | 0.250              | 0.198              | 0.197              | 0.213               | 0.212              |
| Dummies  | No                 | No                 | No                 | No                 | Yes                 | Yes                |
| Observations   | 192                | 192                | 192                | 192                | 191                 | 191                |
| Log Operating Profits                                |                    |                    |                    |                    |                     |                    |
|  | (1)                | (2)                | (3)                | (4)                | (5)                 | (6)                |
| Effect   | 0.0167             | 0.0137             | -0.0391            | -0.0397            | -0.0468             | -0.0462            |
| SE   | 0.072              | 0.072              | 0.057              | 0.057              | .                   | 0.061              |
| CI   | [-0.124,0.157]     | [-0.127,0.154]     | [-0.150,0.072]     | [-0.151,0.071]     | [-0.047,-<br>0.047] | [-0.166,0.073]     |
| lambda   | 0.021              | 0.023              | 0.068              | 0.069              | 0.070               | 0.069              |
| se(lambda)   | 0.045              | 0.045              | 0.038              | 0.038              | 0.000               | 0.040              |
| Dummies  | No                 | No                 | No                 | No                 | Yes                 | Yes                |
| Observations   | 193                | 193                | 193                | 193                | 192                 | 192                |
| <i>Instruments</i>                                   |                    |                    |                    |                    |                     |                    |
| Score  | ✓                  | ✓                  | ✓                  | ✓                  | ✓                   | ✓                  |
| Score Sq.  |                    | ✓                  |                    | ✓                  |                     | ✓                  |
| Sub-district<br>loc.                                 |                    |                    | ✓                  | ✓                  | ✓                   | ✓                  |

| PANEL B. Linear regression with endogenous treatment |                |                |                |                |                |                |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
| Log Sales 12-13                                      |                |                |                |                |                |                |
|  | (1)            | (2)            | (3)            | (4)            | (5)            | (6)            |
| Effect   | 0.124          | 0.100          | 0.128          | 0.0948         | 0.0407         | 0.0110         |
| SE   | 0.408          | 0.407          | 0.305          | 0.303          | 0.334          | 0.333          |
| CI   | [-             | [-             | [-             | [-             | [-0.614,0.695] | [-             |
|  | 0.675,0.923]   | 0.696,0.897]   | 0.469,0.725]   | 0.499,0.688]   |                | 0.641,0.663]   |
| lambda   | -0.241         | -0.225         | -0.280         | -0.254         | -0.231         | -0.209         |
| se(lambda)   | 0.257          | 0.257          | 0.202          | 0.201          | 0.219          | 0.219          |
| Dummies  | No             | No             | No             | No             | Yes            | Yes            |
| Observations   | 196            | 196            | 196            | 196            | 195            | 195            |
| Log Direct Measure                                   |                |                |                |                |                |                |
|  | (1)            | (2)            | (3)            | (4)            | (5)            | (6)            |
| Effect   | 0.485          | 0.528          | 0.151          | 0.172          | -0.107         | -0.0861        |
| SE   | 0.643          | 0.640          | 0.491          | 0.487          | 0.525          | 0.522          |
| CI   | [-0.776,1.747] | [-0.726,1.782] | [-0.812,1.114] | [-0.783,1.128] | [-1.136,0.923] | [-1.110,0.937] |
| lambda   | -0.173         | -0.203         | 0.064          | 0.048          | 0.222          | 0.208          |
| se(lambda)   | 0.407          | 0.405          | 0.329          | 0.327          | 0.348          | 0.347          |
| Dummies  | No             | No             | No             | No             | Yes            | Yes            |
| Observations   | 179            | 179            | 179            | 179            | 178            | 178            |
| Log Gross Profits                                    |                |                |                |                |                |                |
|  | (1)            | (2)            | (3)            | (4)            | (5)            | (6)            |
| Effect   | -0.232         | -0.230         | -0.0774        | -0.0939        | -0.256         | -0.271         |
| SE   | 0.396          | 0.395          | 0.296          | 0.294          | 0.321          | 0.320          |
| CI   | [-             | [-             | [-             | [-0.671,0.483] | [-0.885,0.372] | [-             |
|  | 1.009,0.544]   | 1.004,0.544]   | 0.657,0.503]   |                |                | 0.898,0.355]   |
| lambda   | 0.013          | 0.012          | -0.108         | -0.095         | -0.003         | 0.009          |
| se(lambda)   | 0.251          | 0.250          | 0.198          | 0.197          | 0.213          | 0.212          |
| Dummies  | No             | No             | No             | No             | Yes            | Yes            |
| Observations   | 192            | 192            | 192            | 192            | 191            | 191            |
| Log Operating Profits                                |                |                |                |                |                |                |
|  | (1)            | (2)            | (3)            | (4)            | (5)            | (6)            |
| Effect   | 0.0167         | 0.0137         | -0.0391        | -0.0397        | -0.0468        | -0.0462        |
| SE   | 0.072          | 0.072          | 0.057          | 0.057          | .              | 0.061          |
| CI   | [-0.124,0.157] | [-0.127,0.154] | [-0.150,0.072] | [-0.151,0.071] | [-0.047,-      | [-0.166,0.073] |
|  |                |                |                |                | 0.047]         |                |
| lambda   | 0.021          | 0.023          | 0.068          | 0.069          | 0.070          | 0.069          |
| se(lambda)   | 0.045          | 0.045          | 0.038          | 0.038          | 0.000          | 0.040          |
| Dummies  | No             | No             | No             | No             | Yes            | Yes            |
| Observations   | 193            | 193            | 193            | 193            | 192            | 192            |
| <i>Instruments</i>                                   |                |                |                |                |                |                |
| Score  | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| Score Sq.  |                | ✓              |                | ✓              |                | ✓              |
| Sub-district loc.                                    |                |                | ✓              | ✓              | ✓              | ✓              |

Notes: Number of observations in treatment group = 109; in control group = 91. Linear regression with endogenous binary first-stage. \* p-value<0.1 \*\* p-value<0.05 \*\*\* p-value<0.01)

(continued)

| Log Adjusted Gross Profits |              |              |                |              |              |                |
|----------------------------|--------------|--------------|----------------|--------------|--------------|----------------|
|                            | (1)          | (2)          | (3)            | (4)          | (5)          | (6)            |
| Effect                     | 1.088        | 1.108        | 0.528          | 0.518        | 0.254        | 0.248          |
| SE                         | 0.738        | 0.736        | 0.556          | 0.553        | 0.607        | 0.605          |
| CI                         | [-           | [-           | [-0.561,1.617] | [-           | [-           | [-0.937,1.433] |
|                            | 0.359,2.534] | 0.335,2.552] |                | 0.566,1.602] | 0.935,1.443] |                |
| lambda                     | -0.546       | -0.562       | -0.179         | -0.172       | -0.008       | -0.004         |
| se(lambda)                 | 0.467        | 0.466        | 0.373          | 0.372        | 0.402        | 0.401          |
| Dummies                    | No           | No           | No             | No           | Yes          | Yes            |
| Observations               | 196          | 196          | 196            | 196          | 195          | 195            |

| Log Adjusted Operating Profits |                |                |              |              |              |                |
|--------------------------------|----------------|----------------|--------------|--------------|--------------|----------------|
|                                | (1)            | (2)            | (3)          | (4)          | (5)          | (6)            |
| Effect                         | 0.0336         | 0.0293         | -0.0225      | -0.0241      | -0.0356      | -0.0360        |
| SE                             | 0.078          | 0.078          | 0.062        | 0.062        | 0.067        | 0.067          |
| CI                             | [-0.119,0.186] | [-0.123,0.181] | [-           | [-           | [-           | [-0.167,0.095] |
|                                |                |                | 0.143,0.098] | 0.145,0.097] | 0.167,0.096] |                |
| lambda                         | 0.019          | 0.022          | 0.067        | 0.068        | 0.073        | 0.073          |
| se(lambda)                     | 0.049          | 0.049          | 0.041        | 0.041        | 0.044        | 0.044          |
| Dummies                        | No             | No             | No           | No           | Yes          | Yes            |
| Observations                   | 194            | 194            | 194          | 194          | 193          | 193            |

| Log Adjusted Operating Profits (Adjusted Revenue – Adjusted Expenses) |              |                |              |              |                |              |
|---|--------------|----------------|--------------|--------------|----------------|--------------|
|   | (1)          | (2)            | (3)          | (4)          | (5)            | (6)          |
| Effect  | -0.121       | -0.123         | 0.0632       | 0.0518       | -0.0254        | -0.0344      |
| SE  | 0.186        | 0.185          | 0.139        | 0.138        | 0.151          | 0.150        |
| CI  | [-           | [-0.486,0.241] | [-           | [-           | [-0.321,0.271] | [-           |
|   | 0.485,0.244] |                | 0.210,0.336] | 0.219,0.323] |                | 0.329,0.260] |
| lambda  | 0.116        | 0.118          | -0.013       | -0.004       | 0.045          | 0.052        |
| se(lambda)  | 0.118        | 0.118          | 0.094        | 0.093        | 0.100          | 0.100        |
| Dummies   | No           | No             | No           | No           | Yes            | Yes          |
| Observations  | 194          | 194            | 194          | 194          | 193            | 193          |

| <i>Instruments</i> |   |   |   |   |   |   |
|--------------------|---|---|---|---|---|---|
| Score              | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Score Sq.          |   | ✓ |   | ✓ |   | ✓ |
| Sub-district loc.  |   |   | ✓ | ✓ | ✓ | ✓ |

Notes: Number of observations in treatment group = 109; in control group = 91. Linear regression with endogenous binary first-stage. \* p-value<0.1 \*\* p-value<0.05 \*\*\* p-value<0.01)

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