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**Evidence from Mexico's Oportunidades over the period 2000-2010**

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Development Bank**

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## Abstract\*

We analyze the correlation between the expansion of the Mexican Conditional Cash Transfer program *Oportunidades* and the evolution of the labor market over the period 2000-10. We find no evidence of perverse effects. Program expansion was not associated with drops in either labor force participation or wage formality. On the contrary, the expansion of *Oportunidades* was strongly correlated with a transition from informal wage employment to self-employment for men (by 1.6% and 0.6% of total employment in rural and urban municipalities respectively). These findings suggest that *Oportunidades* is not creating dependence from social assistance.

*Key words: Conditional Cash Transfers, labor markets, Mexico.*

*JEL Classification: I38, J22.*

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## 1. Introduction

At the end of the 1990s, the Mexican government launched the pioneer conditional cash transfer program PROGRESA (later renamed *Oportunidades*) aimed at providing social assistance to the poor while fostering the human capital development of their children. PROGRESA offered cash grants to poor households that complied with a set of conditions including children's regular school attendance, health check-ups and parents' participation in information workshops. A rigorous impact evaluation agenda showed that the program was effective, and provided the rationale for a fast expansion from rural to urban areas.<sup>1</sup>

Conditional cash transfers (CCTs) have now become flagship social assistance programs in Latin America and the Caribbean. In 2011, eighteen countries in the region were running a CCT, and a few others were planning to introduce one. The number of beneficiaries was around 135 million, and had in many countries exceeded the number of poor (Stampini and Tornarolli 2012). Many among policy makers and development practitioners have been worrying about possible undesired labor market effects. Two issues are of particular concern. The first relates to the links between CCTs and household labor supply. The second, and perhaps the most important, regards the extent to which CCTs may alter the choice between formal and informal work.

In an attempt to address the above mentioned concern, we focus in this paper on the relationship between the expansion of *Oportunidades* and the evolution of the labor market

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<sup>1</sup> See De la Brière *et al.* (2006); Skoufias (2005); Fiszbein and Schady (2009).

in Mexico over the period 2000-10. Using municipality level data from the population censuses, we analyze labor force participation, and the trends in formal wage employment and self-employment. We complement census data with information on the number of CCT beneficiary households, exploiting geographical variation in program intensity.

As rural and urban areas present evident differences both in terms of program expansion and in terms of labor market characteristics, we perform separate analyses. We find that the expansion of *Oportunidades* is not clearly correlated with changes in labor force participation and formal wage employment. It is on the other hand associated with a reallocation of male labor supply from informal wage employment to self-employment (by 1.6 and 0.6 percentage points in rural and urban municipalities respectively).

We acknowledge that our analysis does not rely on a clean identification strategy, as the expansion of *Oportunidades* is potentially endogenous to labor markets initial characteristics and trends. Although we control for many of the initial conditions that are likely to drive labor market dynamics and to be correlated with the introduction of *Oportunidades*, we read our results in terms of correlations rather than causal inference. Nonetheless, we believe that we make an important contribution to the literature, as we are the first to study the long-term relationship between the expansion of *Oportunidades* and the trends in labor force participation and informal employment. Most of the existing literature focused on short term impacts using the experimental design of *Oportunidades* impact evaluation (see Alzúa *et al.* 2010). Our results are more comprehensive as they cover both rural and urban areas, and explore a substantially longer time frame. This paper

aims to provide the motivation for further research and policy debate.

The remainder of the paper is organized as follows. Section 2 provides a background on *Oportunidades* and a brief theoretical framework for the relationship with labor market outcomes. Section 3 discusses data sources and presents descriptive statistics on labor market trends, *Oportunidades* rollout and the introduction of related social assistance programs. Section 4 describes the empirical strategy for the estimation of key correlations, which are presented in turn in Section 5. Section 6 discusses the robustness of the results and their relevance in terms of causality. Section 7 concludes with the implications for policy.

## **2. Background and motivation**

*Oportunidades* is one of the oldest and most established conditional cash transfer programs worldwide. Its implementation started in 1997 under the name PROGRESA (*Programa de Educación, Salud y Alimentación*). By 2010, it benefited about 5.6 million households (or 27 million individuals), providing on average 21% of beneficiaries' household income (36% for those with per-capita income below USD 2.5 per day after purchasing power adjustment; Stampini and Tornarolli, 2012).

Targeting was based on geographic and household characteristics. First, the poorest localities were selected through an index of marginality, calculated on the basis of average local indicators of income, education, and housing characteristics. For program implementation, the existence in the community of health and school infrastructure was

required (which unfortunately led to the exclusion of the most marginal localities). Second, household eligibility was determined through a proxy means test (PMT) of extreme poverty, calculated on the basis of demographic and housing characteristics.<sup>2</sup> Finally, eligibility was validated through community meetings (only in rural areas) and household visits.

The introduction of a CCT is likely to produce different effects on the labor market choices of youth and adults. In the short term, as the payment of the transfer is conditioned on school attendance (in the case of *Oportunidades* until the youth is 22 years old), the program is likely to determine a reduction in youth's labor supply. The findings of the existing literature generally support this hypothesis (Behrman *et al.* 2005; Attanasio *et al.* 2008). The effect may be more pronounced in geographical areas with strong demand for skilled labor, since in those locations the youth can expect to receive the highest returns for each additional year of schooling. In the long term, through the accumulation of human capital, the CCT may increase both labor force participation and the incentives to work in the formal sector. Finding these effects has so far been elusive, not only for *Oportunidades* but also for other CCT programs.

The labor market effects of CCT programs on adults are less straightforward. Adults in potential beneficiary households may alter their labor market decisions for at least three reasons. First, CCTs trigger an income effect which may generate a reduction in the labor

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<sup>2</sup> The initial proxy means formula was based on the following variables: (i) household: dependency index, female headed, presence of children under 12 years old; (ii) household head: age, informal wage employment, level of education; (iii) dwelling: crowding, type of bathroom, dirt floor, type of heating; (iv) asset ownership: car or truck, refrigerator, washing machine; (v) dummies for rural residence and residence in various regions.



supply. This requires at least the following two conditions to hold: (i) the CCT increases household income, i.e. the value of the transfer exceeds the cost of compliance with program conditions, and; (ii) leisure is a normal good.

Second, the availability of a continuous income stream (for the duration of schooling time of the youth) may prompt other changes in labor market decisions. Using data from the experimental impact evaluation, Bianchi and Bobba (2012) find that *Oportunidades* promoted entrepreneurship, enhancing willingness to bear risk as opposed to simply relaxing current liquidity constraints.

Finally, applicants may find it optimal to change their labor market status in order to increase their likelihood of being accepted in the program. This can happen if (i) the proxy means test formula explicitly includes employment variables or if (ii) potential beneficiaries perceive that having a good job will decrease their likelihood of being considered poor. In the case of *Oportunidades*, informal wage employment of the household head positively contributes to the proxy means score, therefore increasing the chances to be declared eligible.

Overall, there is little evidence that CCT programs reduce adult labor supply, and only in very particular cases they alter the decision between formal or informal jobs.<sup>3</sup> This may be explained by at least three factors. First, CCTs are not typically income tested and, where

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<sup>3</sup> See Bosch and Manacorda (2012) for a review of the effects of CCT programs on the labor market. Most studies find no significant effect of CCTs on labor supply (Parker and Skoufias, 2000; Skoufias and di Maro, 2006; Edmonds and Schady, 2008; Fizbein and Schady, 2009), a few estimate a positive impact (Oliveira et al., 2007; Galasso, 2006), and only one finds a negative correlation (Maluccio and Flores, 2005).

they are, testing is seldom enforced. Second, the poor and very poor have a low income elasticity of leisure. Finally, most of the studies focus on a short time horizon, while it may take several years for the labor market effects to materialize.

### **3. Descriptive analysis: labor markets and rollout of *Oportunidades***

We use four types of data in our analysis: (i) the 2000 and 2010 Mexican population censuses, available through the *Instituto Nacional de Estadística y Geografía* (INEGI); (ii) *Oportunidades* administrative records reporting the number of beneficiaries in each municipality, obtained from the National Office of *Oportunidades*; (iii) the marginality index that measures municipalities' vulnerability, available online through the *Consejo Nacional de Población* (CONAPO), and; (iv) *Seguro Popular* administrative data, reporting the number of beneficiaries in each municipality, obtained from the *Seguro Popular* administrative records. Overall, we have data for 2,442 municipalities, of which 1,461 are rural and 981 are urban.

In most of the analysis we focus on 23-64 year old individuals, as *Oportunidades*' school co-responsibilities are likely to directly impact on younger adults' labor market decisions.

#### ***Overview of the Mexican Labor Market (2000-10)***

Over the period 2000-10, Mexico's population grew from 97 to 112 million individuals and, as is common to many Latin American countries, aged considerably. The share of 0-15 years old decreased from 36% to 31%, while the share of over 41 years old grew from 22%

to 28%.

In this context, labor force participation among 23-64 year old individuals (i.e. the share of individuals that are either employed or unemployed) increased by 4 percentage points (pp), from 62% to 66% (Table 1). This trend was mostly driven by higher female participation (+6.5pp, against +1.2% for males). Employment remained largely informal. The share of formal wage employment (over total employment) was stable at 39%.

The geographical disaggregation shows that urban areas, accounting for 78% of the total population in 2010, broadly replicate (and drive) the national trends. However, substantial differences can be highlighted for rural municipalities (Table 2). First, the increase in labor force participation was smaller (+2.9pp) and nearly equally distributed across genders. Second, the share of formal employment increased substantially (+2.8pp), with a positive variation for both men and women, and across age groups. Finally, the share of male self-employment dropped substantially (-2.9pp).

**Table 1. Select national labor market outcomes (2000-10)**

Variable (Population Aged 23-64 unless Otherwise Stated)	National			
	2000	2010	Change 10/00	
			Level	%
Labor Force Participation	62.3%	66.2%	3.9%	6.3%
Labor Force Participation - Females	38.0%	44.5%	6.5%	17.0%
Labor Force Participation - Males	89.1%	90.2%	1.2%	1.3%
Labor Force Participation - Aged 23-40	65.0%	68.7%	3.8%	5.8%
Labor Force Participation - Aged 41-64	57.8%	63.0%	5.1%	8.9%
Share of Formal Workers (Formal Salaried/Total Workers)	39.1%	39.4%	0.3%	0.8%
Share of Formal Workers - Females	42.8%	42.3%	-0.5%	-1.1%
Share of Formal Workers - Males	37.4%	37.8%	0.5%	1.2%
Share of Formal Workers - Aged 23-40	42.8%	42.4%	-0.4%	-0.9%
Share of Formal Workers - Aged 41-64	32.3%	35.3%	3.0%	9.3%
Share of Self-employed Workers (Self-employed/Total Workers)	25.0%	24.8%	-0.2%	-0.6%
Share of Self-employed Workers - Females	23.1%	24.9%	1.8%	7.6%
Share of Self-employed Workers - Males	25.8%	24.8%	-1.1%	-4.1%
Share of Self-employed Workers - Aged 23-40	20.2%	19.6%	-0.5%	-2.7%
Share of Self-employed Workers - Aged 41-64	33.8%	32.1%	-1.7%	-5.1%
Share of Males	48.7%	48.7%	0.0%	0.0%
Share of Population Aged 0-15	36.3%	31.1%	-5.1%	-14.1%
Share of Population Aged 16-22	13.9%	13.3%	-0.6%	-4.6%
Share of Population Aged 23-40	27.8%	27.7%	0.0%	-0.2%
Share of Population Aged 41-64	16.8%	21.3%	4.5%	27.0%
Share of Population Aged 65+	5.3%	6.6%	1.3%	24.2%
Total Population (Millions)	97.0	112.0	14.9	15.4%
Families in <i>Oportunidades</i> (Millions)	2.5	5.6	3.0	121.0%
Families in <i>Seguro Popular</i> (Millions, 2009)	0.0	10.5	10.5	ND

Sources: 2000 and 2010 Mexican Censuses from INEGI, and authors' calculations.

Notes: Labor participation is the ratio between the labor force (working and unemployed population) and the total population of the respective cohort; the shares of formal wage workers and self-employed are percentages of the working population in the respective cohort.

**Table 2. Select rural and urban labor market outcomes (2000-10)**

Variable (Labor Market Indicators for Population Aged 23-64 unless Otherwise Stated)	Rural				Urban			
	2000	2010	Change 10/00		2000	2010	Change 10/00	
			Level	%			Level	%
Labor Force Participation	53.1%	56.1%	2.9%	5.6%	63.7%	68.0%	4.4%	6.9%
Labor Force Participation - Females	24.2%	27.5%	3.3%	13.5%	39.7%	47.2%	7.5%	18.8%
Labor Force Participation - Males	84.7%	87.7%	3.0%	3.6%	90.0%	90.9%	0.9%	1.0%
Labor Force Participation - Aged 23-40	54.4%	57.3%	2.9%	5.3%	66.5%	70.8%	4.2%	6.4%
Labor Force Participation - Aged 41-64	51.2%	54.5%	3.3%	6.4%	58.7%	64.4%	5.7%	9.7%
Share of Formal Workers (Formal Salaried/Total Workers)	14.3%	17.0%	2.8%	19.3%	43.3%	43.3%	0.1%	0.1%
Share of Formal Workers - Females	19.8%	23.2%	3.4%	17.0%	44.9%	44.3%	-0.6%	-1.3%
Share of Formal Workers - Males	12.5%	14.8%	2.3%	18.2%	42.5%	42.7%	0.3%	0.6%
Share of Formal Workers - Aged 23-40	16.9%	18.8%	1.9%	11.1%	47.1%	46.6%	-0.5%	-1.0%
Share of Formal Workers - Aged 41-64	10.1%	14.6%	4.5%	44.5%	35.8%	38.6%	2.7%	7.7%
Share of Self-employed Workers (Self- employed/Total Workers)	35.7%	33.5%	-2.2%	-6.2%	23.0%	23.3%	0.2%	0.9%
Share of Self-employed Workers - Females	33.0%	33.0%	-0.1%	-0.2%	22.2%	24.2%	1.9%	8.6%
Share of Self-employed Workers - Males	36.5%	33.7%	-2.9%	-7.8%	23.4%	22.7%	-0.7%	-3.1%
Share of Self-employed Workers - Aged 23-40	30.2%	27.6%	-2.6%	-8.5%	18.5%	18.2%	-0.2%	-1.3%
Share of Self-employed Workers - Aged 41-64	44.3%	41.5%	-2.9%	-6.5%	32.0%	30.6%	-1.5%	-4.6%
Share of Males	49.1%	48.9%	-0.2%	-0.4%	48.7%	48.8%	0.0%	0.1%
Share of Population Aged 0-15	42.0%	35.5%	-6.5%	-15.4%	35.5%	30.7%	-4.8%	-13.4%
Share of Population Aged 16-22	13.3%	13.7%	0.4%	3.0%	14.2%	13.3%	-0.9%	-6.3%
Share of Population Aged 23-40	23.0%	24.4%	1.4%	6.1%	28.8%	28.5%	-0.3%	-0.9%
Share of Population Aged 41-64	15.6%	18.8%	3.2%	20.4%	16.7%	21.4%	4.8%	28.6%
Share of Population Aged 65+	6.1%	7.6%	1.5%	24.3%	4.9%	6.1%	1.1%	23.2%
Total Population (Millions)	21.1	22.9	1.8	8.4%	67.3	80.0	12.6	18.8%
Families in <i>Oportunidades</i> (Millions)	1.7	2.9	1.2	68.2%	0.8	2.6	1.8	225.9%
Families in <i>Seguro Popular</i> (Millions, 2009)	0.0	3.7	3.7	ND	0.0	6.8	6.8	ND

Sources: 2000 and 2010 Mexican Censuses from INEGI, and authors' calculations.

Notes: See Table 1.

### *Overview of the Oportunidades rollout*

*Oportunidades* rollout started in 1997 from small rural communities (initially with less than 2,500 inhabitants) and was later extended to semi-urban and urban areas. Most of coverage expansion took place by the early 2000s: the number of beneficiary households reached 2.5 million in 2000, 5 million in 2004, and 5.6 million in 2010 (Figures 1 and 2).

The geographic unit for the *Oportunidades* rollout was the locality (which is a sub-unit of a municipality). As urban municipalities may include also rural localities, our classification of

urban and rural beneficiaries does not correspond perfectly with that used by the program. For example, we find that 30% of beneficiary households in 2000 were located in urban municipalities despite the fact that the urban rollout started only in 2002.

While rural beneficiary enrolment was conducted with a census-like approach, in which all households were tested for eligibility through the proxy means test, in urban areas the program used a variety of enrolment strategies (including the chance to apply at predetermined locations). Despite the consequent self-selection of applicants, urban take-up was relatively low, with the share of eligible households receiving payments not exceeding 65% at any time, and with the first payment often taking place more than one year after the application (Soares and Stampini, 2012).

As a measure of *Oportunidades* treatment intensity, we use the ratio between the number of beneficiary households in 2000 and 2010, and the number of household in the municipality in the 2000 census.<sup>4</sup> We choose to keep the denominator at the 2000 level (also when measuring intensity in 2010) to minimize potentially endogenous variations due to the program's effect on migration and household demographic structure.

Program intensity varies considerably across rural and urban municipalities. In the former, mean (median) treatment intensity grew from 0.40 (0.43) in 2000 to 0.67 (0.70) in 2010. This is to be compared with an increase in mean (median) intensity from 0.05 (0.07) in 2000 to 0.16 (0.29) in 2010 in urban municipalities. By 2000 most rural municipalities had

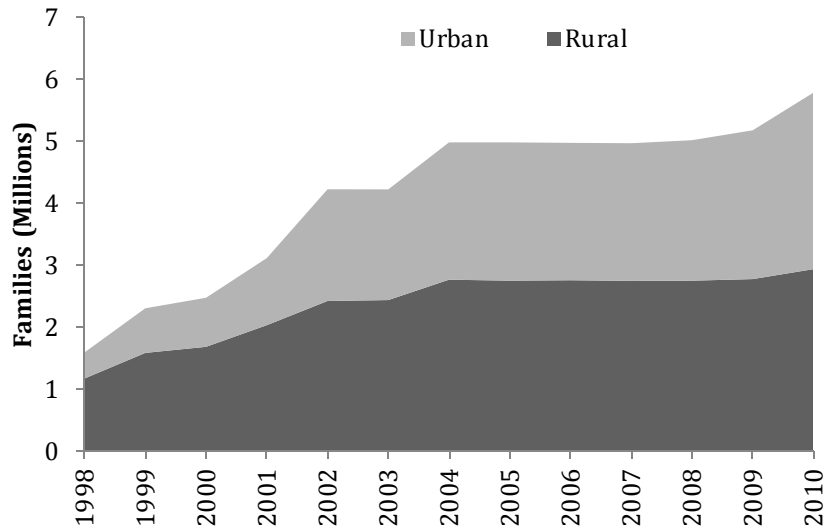
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<sup>4</sup> We choose not to normalize by the number of households in 1990 because of methodological differences in the collection of the 1990 census, and because we assume that any program population effects happened after 2000 (due to the program's limited initial scale).

an intensity indicator between 0.3 and 0.6 (46 percent of municipalities), while most urban municipalities had an intensity lower than 0.3 (81 percent). By 2010 most rural municipalities had an intensity of 0.6 or higher (65 percent), while most urban municipalities had an intensity indicator of 0.3 or lower (52 percent) (Figure 3).

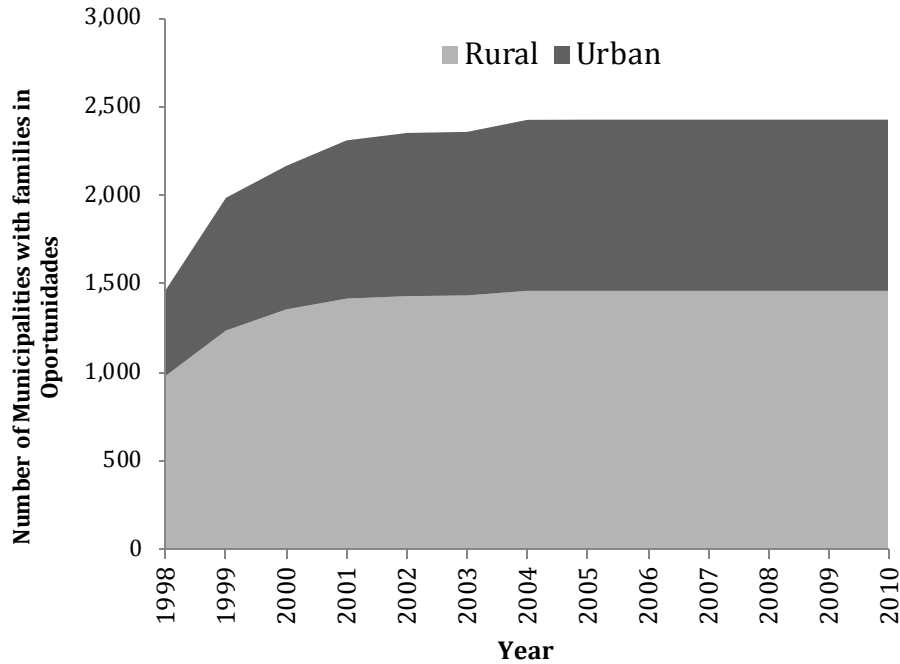
As both the duration and the intensity of the exposure to *Oportunidades* were stronger in rural than in urban municipalities, we may expect that the former experienced most intense labor market effects. On the other hand, rural labor markets are characterized by high incidence of subsistence farming and unpaid family work, and by limited formal wage employment opportunities. Both formal and informal wage employment are more common in urban labor markets, where CCT beneficiaries can access a broader range of work opportunities. This implies that urban beneficiaries, despite being less exposed to the program, may have experienced the strongest incentives to move from formal to informal employment.

**Figure 1. Number of households in *Oportunidades* (1998-2010)**



Source: *Oportunidades*

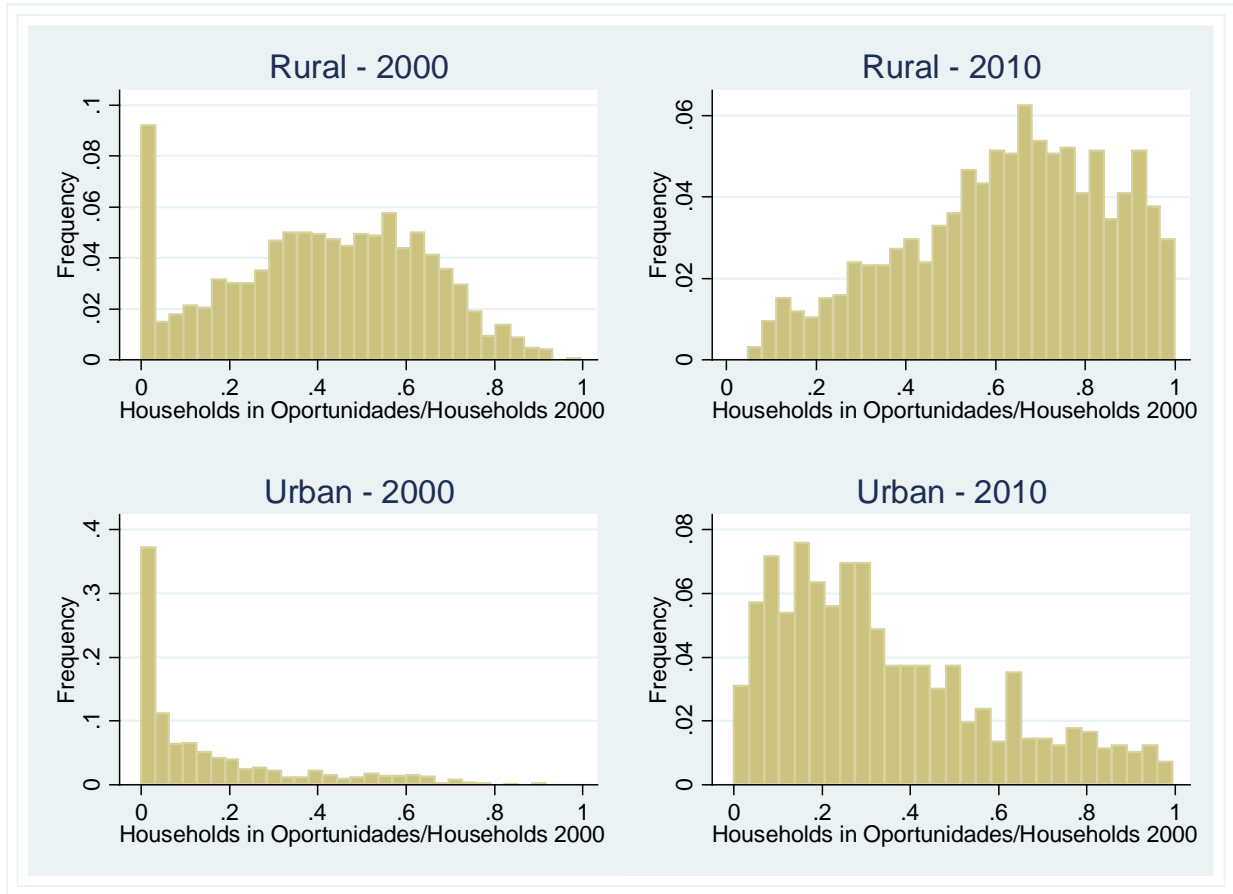
**Figure 2. Number of municipalities in *Oportunidades* (1998-2010)**



Source: *Oportunidades*



**Figure 3. Distribution of municipalities by program intensity in 2000 and 2010**



Source: *Oportunidades*; 2000 and 2010 Censuses, and authors' calculations

### *Other social assistance programs: Seguro Popular*

*Oportunidades* is not the only innovation in the area of social protection in Mexico over the period of our analysis. The Mexican government created and expanded also the *Seguro Popular* (SP) health insurance scheme for individuals not covered by the formal social security system. Eligibility to SP was conditioned on lack of access to formal social security. Economic theory suggests that the introduction of free health insurance for those that are not in formal wage employment provides an incentive to remain or move to informal employment (the only counterargument being that improved health may later increase

labor supply). For this reason, SP has been subject to an extensive research agenda. The consensus seems to be that the program shifted between 0.5 and 1% of employment from formal to informal jobs, especially in small firms.<sup>5</sup>

The concern for this paper is that the expansion of SP could be correlated to both the expansion of *Oportunidades* (which measures the change in our treatment variable) and the labor market trends that we are trying to explain. In order to control for the effects of SP on the labor market we include a measure of its intensity in our regressions.

The SP program started in 2002, and by 2010 benefited about 10.5 million households. By 2009 (the latest year for which municipal level data is available), SP had an average intensity (number of beneficiary households divided by number of households in 2000) of 0.85 in rural municipalities and 0.38 in urban municipalities (vs. 0.67 and 0.16 for *Oportunidades* in 2010).

#### **4. Empirical strategy**

The focus of this paper is on the correlation between the expansion of *Oportunidades* and the evolution of local labor markets over the period 2000-10. We consider three key labor market indicators (labor force participation, formal wage employment and self-employment) and exploit geographical variation in program expansion to estimate the sign and magnitude of the correlation. We estimate the following equations:

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<sup>5</sup> See Bosch et al (2012) for a review of the effects of the *Seguro Popular* on the labor market.

$$(1) \quad \Delta y_{i,10-00} = \theta_i + \delta \Delta t_{i,10-00} + \phi y_{i,00} + \kappa t_{i,00} + \sum_{j=1}^n \eta_j x_{ij,00} + \sum_{j=1}^2 \beta_j SP_{ij,10-00} + \nu_i$$

where  $\Delta y_{i,10-00}$  represents the change in the labor market outcome for municipality  $i$  over the period 2000-10 (i.e.,  $y_{i,10}-y_{i,00}$ );  $\Delta t_{i,10-00}$  is the change in program intensity (i.e.,  $t_{i,10}-t_{i,00}$ );  $t_{i,00}$  is the initial program intensity (measured in 2000), and controls for previous exposure to the program;  $y_{i,00}$  is the initial value of the labor market outcome;  $x_{ij,00}$  is a set of variables ( $j$ ) for municipality  $i$  measured in 2000;  $SP_{10-00}$  measures the expansion of the program *Seguro Popular* over the period 2000-10;  $\nu_i$  represents a set of unobserved characteristics;  $\theta, \delta, \phi, \kappa, \eta$  and  $\beta$  are parameters to be estimated.

The dependent variable  $y$  represents in turn: (i) labor force participation (number of employed and unemployed divided by total population); (ii) share of formal wage employment (number of formal wage employees divided by number of employed), and; (iii) share of self-employment (number of self-employed divided by number of employed). Dependent variables are generally defined with reference to the 23-64 year age group, as well as to gender and age sub-groups. As discussed in Section 3, the treatment intensity variable is defined as the ratio between the number of beneficiary households and the number of households in the census of 2000.

The inclusion of the initial value of the labor market outcome and of vectors X and SP aims to reduce the likelihood of omitted variable bias.<sup>6</sup> A negative sign of  $\phi$  indicates that growth

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<sup>6</sup> The expansion of Oportunidades over the period 2000-10 is correlated with variables included in X.

in the labor market outcome is slower when starting from a higher initial level. The vector of municipality-level control variables  $X$  comprises: (i) the logarithm of the population; the marginality index in 2000; the shares of the population aged 0-15, 16-22 and over 64 years, and; the share of male population. The vector  $SP$  includes duration of exposure (number of quarters since the program was introduced in the municipality),<sup>7</sup> and intensity (number of beneficiary households divided by number of households living in the municipality in 2000).

Our interest is focused on sign and significance of  $\delta$ , which measures the correlation between the change in *Oportunidades* intensity and the change in the level of the labor market outcome, conditional on the initial characteristics of the municipalities. Since the program started before our period of analysis, we include the level of the intensity of the program in 2000 ( $t_{i00}$ ), which also captures the growth in intensity between 1990 (when the program did not exist) and 2000. The parameter  $\kappa$  provides an estimate of lagged labor market effects of the expansion of *Oportunidades*. Negative and significant values of  $\delta$  and  $\kappa$  would indicate that the contemporary and lagged expansions of the program are correlated with a drop in the labor market outcome of interest.

In the next section, we present the OLS estimation of equation (1) using population weights for the overall sample and separately for urban and rural municipalities.

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<sup>7</sup> We include the duration of exposure because of important variation in this variable across municipalities. Around 50% of municipalities have had SP for 25 quarters or less, while the other 50% of municipalities have had it for between 26 and 37 quarters, contrary to the expansion *Oportunidades* for which nearly 97% of the municipalities already had some presence of the program by 2002.

## 5. Associations between the expansion of *Oportunidades* and changes in labor market outcomes

A simple cross-plot analysis suggests the existence of: (i) negative correlation between the expansion of *Oportunidades* and the change in labor force participation in rural areas, and; (ii) positive correlation between program expansion and the change in the share of formal wage employment in urban areas (Figure 4). Simple correlation analysis, however, fails to control for a number of local characteristics that are correlated with the rollout of *Oportunidades*, including initial labor market outcomes (with likely convergence towards the mean).

The estimation of equations (1) suggests that the expansion of *Oportunidades* is not clearly correlated with changes in labor force participation and in the share of formal wage employment, while we find evidence of positive correlation with changes in the share of self-employment. In other words, higher program coverage is associated with a reallocation of labor from informal wage employment to self-employment. Results disaggregated by area and gender are presented in Tables 3.1, 3.2, and 3.3.

### *Labor force participation*

We find no significant correlation between the expansion of *Oportunidades* and changes in labor force participation (Table 3.1). The estimates of coefficient  $\delta$  from equation (1) are consistently negative for rural areas and positive for urban areas, yet none of them is statistically different from zero.

Interestingly, we find evidence of a significant association between previous program expansion (or lagged program intensity) and the change in female labor force participation in rural municipalities, which decreased by 0.078 percentage points for each point of program intensity in 2000. Although we do not interpret this result in terms of causality, we compute the counterfactual to give a sense of the magnitude of the correlation. As the rural intensity of *Oportunidades* averaged 40% in 2000, the lagged treatment intensity is associated with a 3.1 percentage point drop in female rural labor force participation.

### *Formal wage employment*

Similar to previous studies, we fail to find a clear correlation between the expansion of *Oportunidades* and changes in the share of workers engaged in formal wage employment (Table 3.2). The estimates of coefficient  $\delta$  from equation (1) are all positive, but none is statistically different from zero. This is not entirely surprising since, contrary to other programs such as the *Seguro Popular*, *Oportunidades* did not automatically exclude households with members engaged in formal wage employment, and applicants were unlikely to know the details of the proxy means test formula.

We find evidence of a significant lagged correlation only for rural male formal employment, whose share decreased by 0.027 percentage points for each point of program intensity in 2000 (corresponding to a 1 percentage point drop over the period 2000-10).

### *Self-employment*

The estimation of equations (1) shows that the expansion of *Oportunidades* over the period

2000-10 is positively correlated with the share of male workers engaged in self-employment, in both rural and urban municipalities. The magnitude of the contemporaneous relationship is relatively large, with program expansion associated with an increase by 1.6 percentage points in rural areas, and of 0.6 percentage points in urban areas.

In addition, we find evidence of a positive and statistically significant correlation between the evolution of self-employment and the lagged expansion of *Oportunidades* for males in both rural and urban municipalities and for women in urban areas only. Previous program intensity is associated with an increase in the share of self-employment by 2.3 percentage points for males in rural municipalities, and by 0.9 percentage points for both males and females in urban areas.

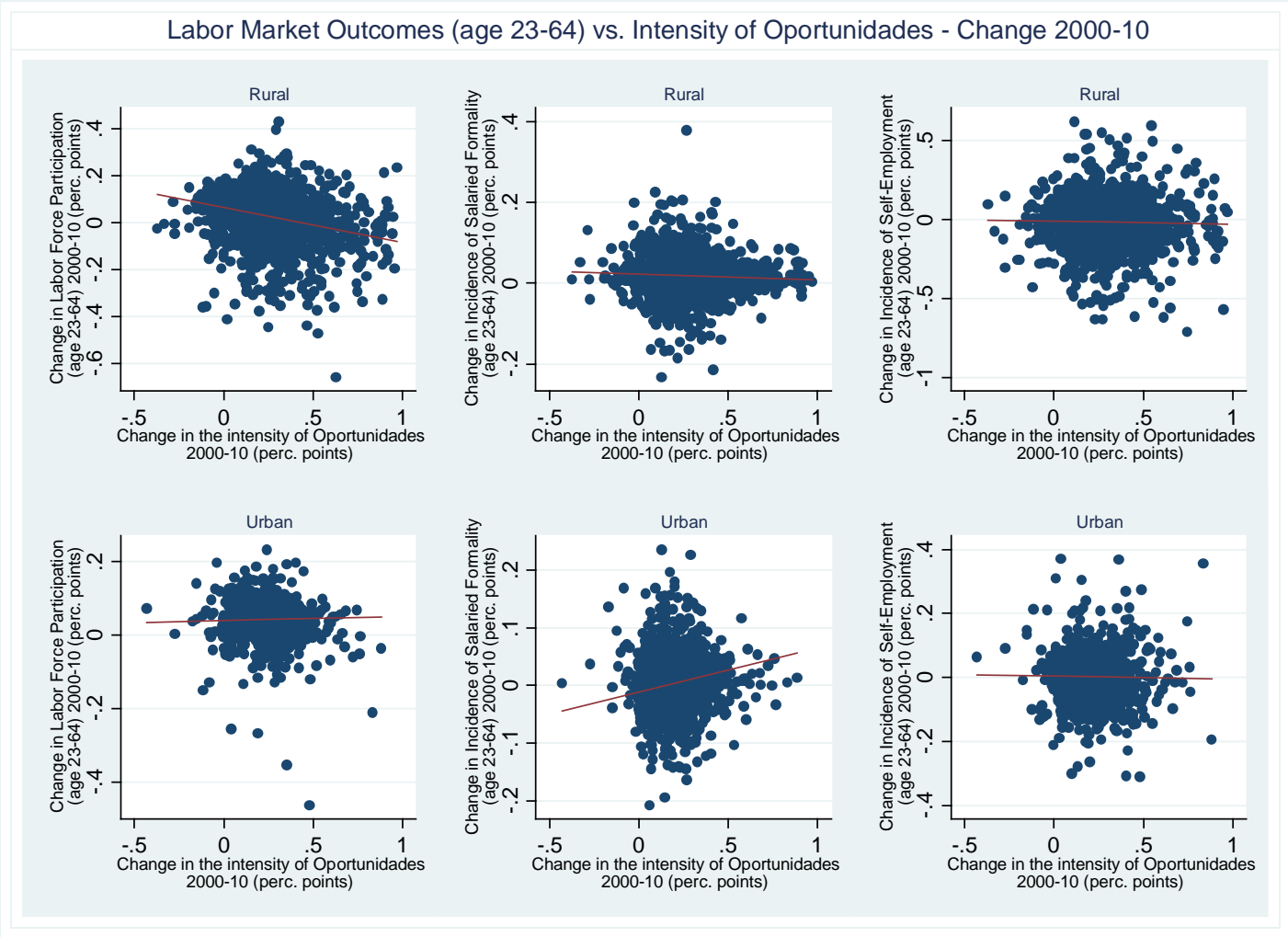
Our findings extend those of Bianchi and Bobba (2011), who showed that the availability of *Oportunidades* in rural areas was key to explaining a shift towards self-employment, due to the fact that the program enhanced the recipients' willingness to bear risk.

Taken at face value, our analysis suggests that the expansion of *Oportunidades* was associated with a shift from informal wage employment to self-employment.<sup>8</sup>

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<sup>8</sup> Results for informal wage employment (the omitted category in our analysis) are available upon request.

**Figure 4. Correlations between change in labor market outcomes and change in intensity of Oportunidades**



Source: *Oportunidades*; 2000 and 2010 Censuses, and authors' calculations



**Table 3.1. OLS associations between *Oportunidades* expansion and labor force participation**

Dependent Variable: Change in the share of formal wage employed (age 23-64) between 2000 and 2010	All		Males		Females	
	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Independent variables:</b>	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)
Change in <i>Oportunidades</i> Intensity 2010-2000	-0.0116 (0.0118)	0.0048 (0.0146)	-0.0079 (0.0125)	0.0106 (0.0125)	-0.0226 (0.0173)	0.0152 (0.0226)
<i>Oportunidades</i> Intensity in 2000	-0.0427*** (0.0136)	-0.0099 (0.0146)	-0.0049 (0.0143)	-0.0226* (0.0125)	-0.0780*** (0.0200)	0.0017 (0.0228)
Labor Force Participation <sub>ij</sub> in 2000 (i=rural, urban; j=all, males, females)	-0.7089*** (0.0180)	-0.4419*** (0.0249)	-0.6875*** (0.0179)	-0.6486*** (0.0223)	-0.7080*** (0.0197)	-0.4266*** (0.0278)
Log of Municipality Population in 2000	0.0119*** (0.0018)	0.0016 (0.0010)	0.0024 (0.0019)	0.0010 (0.0008)	0.0224*** (0.0027)	0.0022 (0.0015)
Marginality Index in 2000	-0.0351*** (0.0036)	-0.0339*** (0.0050)	-0.0126*** (0.0038)	-0.0030 (0.0041)	-0.0550*** (0.0053)	-0.0635*** (0.0079)
Share of population <=15 years old	-0.0485 (0.0539)	0.1227** (0.0542)	-0.0703 (0.0569)	0.1210*** (0.0464)	-0.0112 (0.0785)	0.1244 (0.0845)
Share of population 16-22 years old	0.0864 (0.1115)	0.0301 (0.0918)	0.3090*** (0.1180)	-0.0325 (0.0787)	-0.0238 (0.1640)	0.0993 (0.1434)
Share of population >=65 years old	-0.2293** (0.1066)	-0.1340 (0.1016)	-0.3099*** (0.1129)	-0.1588* (0.0884)	-0.1255 (0.1543)	-0.2963* (0.1563)
Share of Males in 2000	0.1580 (0.0999)	-0.1628* (0.0893)	0.3368*** (0.1072)	0.0678 (0.0770)	-0.4533*** (0.1453)	-0.2552* (0.1432)
Number of quarters in <i>Seguro Popular</i> as of December 2009	-0.0007** (0.0003)	-0.0003 (0.0002)	-0.0004 (0.0003)	-0.0003** (0.0002)	-0.0010** (0.0005)	-0.0001 (0.0003)
<i>Seguro Popular</i> Intensity in 2009	0.0178*** (0.0054)	0.0138** (0.0060)	0.0097* (0.0057)	0.0061 (0.0052)	0.0280*** (0.0079)	0.0157* (0.0094)
Observations	1,461	981	1,461	981	1,461	981
Adjusted R2	0.692	0.433	0.651	0.624	0.632	0.351
State Dummies	X	X	X	X	X	X

Sources: 2000 and 2010 Mexican Censuses, CONAPO, *Oportunidades*, and authors' calculations.

Notes: The table reports the estimate of parameters in equations (1). Statistically significant at the 1% (\*\*\*) , 5% (\*\*) and 10% (\*). Standard errors are reported in parentheses. OLS estimates with population weights.

**Table 3.2. OLS associations between *Oportunidades* expansion and formal wage employment**

Dependent Variable: Change in the share of formal wage employed (age 23-64) between 2000 and 2010	All		Males		Females	
	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Independent variables:</b>	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)
Change in <i>Oportunidades</i> Intensity 2010-2000	0.0126 (0.0117)	0.0082 (0.0219)	0.0178 (0.0122)	0.0036 (0.0240)	0.0200 (0.0167)	0.0063 (0.0261)
<i>Oportunidades</i> Intensity in 2000	-0.0308** (0.0135)	0.0224 (0.0223)	-0.0266* (0.0141)	0.0174 (0.0244)	-0.0148 (0.0192)	0.0418 (0.0267)
Share of Salaried Formality <sub>ij</sub> in 2000 (i=rural, urban; j=all, males, females)	-0.3690*** (0.0199)	-0.1984*** (0.0207)	-0.3240*** (0.0202)	-0.2008*** (0.0211)	-0.5588*** (0.0215)	-0.3214*** (0.0220)
Log of Municipality Population in 2000	0.0094*** (0.0018)	-0.0006 (0.0015)	0.0059*** (0.0019)	-0.0019 (0.0016)	0.0164*** (0.0026)	0.0039** (0.0018)
Marginality Index in 2000	-0.0236*** (0.0037)	-0.0350*** (0.0077)	-0.0229*** (0.0038)	-0.0398*** (0.0084)	-0.0198*** (0.0053)	-0.0400*** (0.0091)
Share of population <=15 years old	-0.0247 (0.0532)	-0.0402 (0.0835)	-0.0510 (0.0554)	0.0029 (0.0918)	-0.0982 (0.0758)	-0.1557 (0.0984)
Share of population 16-22 years old	0.1345 (0.1102)	-0.2086 (0.1415)	0.1155 (0.1150)	-0.3103** (0.1558)	0.0908 (0.1582)	-0.2304 (0.1667)
Share of population >=65 years old	-0.1807* (0.1058)	0.0012 (0.1591)	-0.2719** (0.1110)	-0.0121 (0.1774)	-0.1076 (0.1486)	-0.2634 (0.1826)
Share of Males in 2000	0.1033 (0.0974)	0.1415 (0.1366)	0.1632 (0.1016)	0.2455 (0.1501)	0.0977 (0.1397)	-0.0662 (0.1623)
Number of quarters in <i>Seguro Popular</i> as of December 2009	-0.0007** (0.0003)	-0.0005 (0.0003)	-0.0005 (0.0003)	-0.0002 (0.0003)	-0.0016*** (0.0005)	-0.0013*** (0.0004)
<i>Seguro Popular</i> Intensity in 2009	-0.0114** (0.0053)	0.0146 (0.0093)	-0.0098* (0.0056)	0.0146 (0.0102)	-0.0268*** (0.0076)	0.0076 (0.0109)
Observations	1,461	981	1,461	981	1,460	981
Adjusted R2	0.229	0.331	0.213	0.323	0.372	0.363
State Dummies	X	X	X	X	X	X

Sources: 2000 and 2010 Mexican Censuses, CONAPO, *Oportunidades*, and authors' calculations.

Notes: See Table 3.1.

**Table 3.3. OLS associations between *Oportunidades* expansion and self-employment**

Dependent Variable: Change in the share of self-employed (age 23-64) between 2000 and 2010	All		Males		Females	
	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Independent variables:</b>	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)
Change in <i>Oportunidades</i> Intensity 2010-2000	0.0498** (0.0215)	0.0414* (0.0223)	0.0606** (0.0238)	0.0530** (0.0243)	-0.0219 (0.0237)	0.0381 (0.0265)
<i>Oportunidades</i> Intensity in 2000	0.0755*** (0.0248)	0.0783*** (0.0227)	0.0845*** (0.0274)	0.0822*** (0.0248)	0.0352 (0.0272)	0.0904*** (0.0269)
Shared of Self-employed <sub>ij</sub> in 2000 (i=rural, urban; j=all, males, females)	-0.6535*** (0.0215)	-0.4352*** (0.0245)	-0.6355*** (0.0217)	-0.4060*** (0.0237)	-0.7957*** (0.0218)	-0.5485*** (0.0272)
Log of Municipality Population in 2000	0.0019 (0.0033)	0.0060*** (0.0015)	0.0037 (0.0036)	0.0069*** (0.0016)	-0.0038 (0.0036)	0.0032* (0.0017)
Marginality Index in 2000	0.0314*** (0.0067)	0.0154** (0.0074)	0.0298*** (0.0074)	0.0109 (0.0080)	0.0285*** (0.0073)	0.0242*** (0.0089)
Share of population <=15 years old	-0.0283 (0.0970)	-0.0436 (0.0845)	0.0594 (0.1074)	-0.0676 (0.0918)	-0.1387 (0.1069)	-0.0261 (0.1004)
Share of population 16-22 years old	0.2952 (0.2038)	-0.1014 (0.1425)	0.2060 (0.2255)	0.0077 (0.1549)	0.4782** (0.2244)	-0.3044* (0.1698)
Share of population >=65 years old	0.5225*** (0.1912)	-0.1718 (0.1580)	0.7414*** (0.2116)	-0.1001 (0.1724)	0.0287 (0.2101)	-0.2697 (0.1861)
Share of Males in 2000	0.0109 (0.1799)	-0.1331 (0.1389)	0.0495 (0.1993)	-0.1444 (0.1509)	-0.2828 (0.1980)	0.0225 (0.1667)
Number of quarters in <i>Seguro Popular</i> as of December 2009	-0.0014** (0.0006)	0.0003 (0.0003)	-0.0013** (0.0006)	0.0003 (0.0003)	-0.0012* (0.0006)	0.0003 (0.0004)
<i>Seguro Popular</i> Intensity in 2009	-0.0006 (0.0098)	0.0149 (0.0094)	-0.0002 (0.0108)	0.0178* (0.0102)	0.0023 (0.0107)	0.0107 (0.0111)
Observations	1,461	981	1,461	981	1,460	981
Adjusted R2	0.425	0.294	0.401	0.284	0.518	0.362
State Dummies	X	X	X	X	X	X

Sources: 2000 and 2010 Mexican Censuses, CONAPO, *Oportunidades*, and authors' calculations.  
Notes: See Table 3.1.

## 6. Robustness check

### *Evidence for the 16-22 year old group*

As previously discussed, the analysis of section 5 excludes individuals 16-22 years old, that are expected to be directly affected by program co-responsibilities that condition grant

payments on school attendance. In other words, it is expected that labor force participation decreases in this age group due to program design. In order to verify this hypothesis, we present the estimates of equations (1) for young adults in Table 4.

We find that the expansion of *Oportunidades* was significantly correlated with a drop in female labor force participation, by 1 and 0.8 percentage points in rural and urban municipalities respectively. We also find evidence of a significant correlation with lagged program expansion, for urban males (-0.8pp) and rural females (-1.9pp).

Surprisingly, however, we also find that the existence of a correlation between program expansion and a transition towards self-employment is confirmed for young male individuals in both rural and urban municipalities. Overall, this reinforces the main finding presented in section 5, and suggests that the program is correlated with unexpected changes in the labor market outcomes of the youth, which reach beyond its co-responsibilities.

### *Correlations versus causality (placebo test)*

The interest of policy makers is in the causal impact of the expansion of social assistance programs on labor market outcomes. Although the experimental design of PROGRESA's impact evaluation provided an opportunity to study the short-term effects of the program on the labor markets, after a few years the control sample was incorporated among the beneficiaries and started receiving transfers. Consequently, researchers cannot rely on a credible control group to rigorously address questions on long-term labor market impacts.

In our analysis, bias could derive from: (i) the omission of relevant explanatory variables; (ii) potential endogeneity of the treatment variable.

As both the dependent variable and treatment intensity are measured as variations over the period 2000-10, equation (1) controls for time invariant municipality fixed effects. Omission bias could still derive from failing to consider time variant characteristics that are correlated with both labor market trends and the expansion of *Oportunidades*, such as poverty levels or the different industry composition at the municipality level. In addition, endogeneity could be due to reverse causality, e.g. because the evolution of the labor market affects the number of *Oportunidades* beneficiaries through its impact on poverty.

The inclusion of the vector  $X$  and of the lagged dependent variable in the specification of equation (1) aims to reduce the likelihood and magnitude of the above mentioned bias. For example, the inclusion of the marginality index (that guided the rollout of *Oportunidades*) aims to account for the fact that labor market trends are likely to be correlated with initial marginality and poverty.

We also test whether the expansion of *Oportunidades* over the period 2000-10 is a significant predictor of labor market trends in the previous decade. The intuition is that if the expansion of the program were exogenous in our analysis, it should not explain former changes in labor market outcomes (which are highly correlated with the dependent variables in equation (1)). We estimate the following equations:

$$(2) \quad \Delta y_{i,00-90} = \theta'_i + \delta \Delta t_{i,10-00} + \phi y_{i,90} + \kappa \Delta t_{i,00-90} + \sum_{j=1}^n \eta_j x_{ij,90} + u_i$$

Where all variables are defined as in equation (1),  $v'$  represents a set of unobserved characteristics;  $\theta', \delta', \phi', \kappa', \eta'$  are parameters to be estimated. *Seguro Popular* variables are not included because the program started only in 2002. The main parameter of interest is  $\delta'$ .

The dependent variable  $y$  represents labor force participation and share of self-employment. We cannot analyze the change in the share of formal wage employment as the census of 1990 did not include questions related to social security coverage. A second limitation of data from 1990 is that the questionnaire did not include a set of questions aimed at verifying the declared labor market status. More specifically, once the respondent indicated to be out of the labor force (e.g. because the main occupation was household work or school attendance), she was not asked if she worked at least one hour which is the standard threshold for the definition of employment. Consequently, census micro-data lead to estimations of labor force participation that are lower than the ones officially reported on the website of INEGI. The latter are likely to have been corrected with a statistical procedure.

The difference is highest for females, for whom census micro-data lead to an estimate of labor participation of around 23 percent, far from the figure of around 30 percent reported by INEGI. For males, census micro-data lead to an estimate of labor force participation of 78 percent, very close to 80 percent reported in revised official figures. The estimation of parameters from equation (2) would still be consistent if the measurement error was random across municipalities (e.g. a fixed share of real labor force participation). Yet,

results for females should be considered less reliable.

Results are presented in Table 5. The future expansion of *Oportunidades* is significantly correlated with the change in urban labor force participation over the period 1990-2000. The relationship is positive, suggesting that the urban expansion of the program was strongest in municipalities in which labor force participation had been previously increasing.

Importantly, the parameter  $\delta'$  is never significant for self-employment, in both rural and urban municipalities. This provides comfort on the reliability of the evidence of a shift towards self-employment presented in Section 5.

**Table 4. OLS Associations between *Oportunidades* expansion and youth labor market outcomes**

	All		Males		Females	
	Rural	Urban	Rural	Urban	Rural	Urban
<b>Dependent Variable: Change in Labor Force Participation (age 16-22) between 2000 and 2010</b>	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
Change in Oportunidades Intensity 2010-2000	-0.0330** (0.0147)	-0.0620** (0.0241)	-0.0325 (0.0201)	-0.0400 (0.0318)	-0.0369** (0.0147)	-0.0702*** (0.0250)
Oportunidades Intensity in 2000	-0.0407** (0.0170)	-0.0999*** (0.0246)	-0.0253 (0.0231)	-0.1564*** (0.0329)	-0.0471*** (0.0171)	-0.0371 (0.0254)
<b>Dependent Variable: Change in the share of formal wage employed (age 16-22) between 2000 and 2010</b>	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
Change in Oportunidades Intensity 2010-2000	0.0160 (0.0140)	0.0018 (0.0330)	0.0164 (0.0138)	-0.0273 (0.0347)	0.0338* (0.0202)	0.0274 (0.0435)
Oportunidades Intensity in 2000	-0.0358** (0.0161)	0.0690** (0.0335)	-0.0400** (0.0159)	0.0402 (0.0353)	-0.0140 (0.0233)	0.1262*** (0.0441)
<b>Dependent Variable: Change in the share of self-employed (age 16-22) between 2000 and 2010</b>	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
Change in Oportunidades Intensity 2010-2000	0.0886*** (0.0213)	0.0622*** (0.0230)	0.1078*** (0.0235)	0.0908*** (0.0257)	0.0097 (0.0239)	0.0220 (0.0298)
Oportunidades Intensity in 2000	0.0832*** (0.0244)	0.0676*** (0.0236)	0.1023*** (0.0269)	0.0825*** (0.0264)	0.0206 (0.0274)	0.0605** (0.0303)

Sources: 2000 and 2010 Mexican Censuses, CONAPO, Oportunidades, and authors' calculations.

Notes: The table reports the estimate of parameters  $\delta$  and  $\kappa$  in equations (1). Statistically significant at the 1% (\*\*\*) , 5% (\*\*) and 10% (\*). Standard errors are reported in parentheses. OLS estimates with population weights.



**Table 5. Placebo test - OLS associations between *Oportunidades* expansion over 2000-10 and labor market outcomes from 1990-2000**

Dependent Variable (expressed as changes between 1990 and 2000)	All		Males		Females	
	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)
Labor Force Participation (age 23-64)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)
Change in <i>Oportunidades</i> Intensity 2010-2000	0.0031 (0.0144)	0.0368*** (0.0140)	-0.0216 (0.0154)	0.0422*** (0.0152)	0.0345* (0.0191)	0.0374** (0.0189)
Self-employed Workers (age 23-64)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)	coef/(se)
Change in <i>Oportunidades</i> Intensity 2010-2000	0.0213 (0.0209)	0.0093 (0.0210)	0.0228 (0.0228)	0.0091 (0.0233)	0.0154 (0.0264)	0.0216 (0.0273)
Number of Observations	1461	958	1461	958	1461	958
Municipality Controls and State Dummies	X	X	X	X	X	X

Sources: 1990, 2000 and 2010 Mexican Censuses; CONAPO, *Oportunidades* and authors' calculations

Notes: The table reports the estimate of parameter  $\delta$  in equations (2). Statistically significant at the 1% (\*\*\*), 5% (\*\*) and 10% (\*). Standard errors are reported in parentheses. OLS estimates with population weights.

## 7. Conclusions

We study the evolution of labor force participation, formality and self-employment in Mexico during the expansion of *Oportunidades* over the period 2000-10. *Oportunidades* is one of the oldest, largest and most consolidated CCT programs worldwide. Its 15-year implementation period makes it a natural candidate for the analysis of CCTs' labor market outcomes.

We use municipal level data from three censuses and administrative records on the number of beneficiary households, and find that the expansion of the program was associated with a shift from informal wage employment to self-employment. In addition, we find no clear association with the level of labor force participation and wage formality.

Our findings provide reassurance that the expansion of *Oportunidades* has not produced perverse effects on the Mexican labor markets over the past decade. The lack of evidence of

an association with either lower labor force participation or wage formality suggests that the payment of a conditional cash transfer has not produced dependence on social assistance. Furthermore, the finding of a correlation with a shift towards self-employment suggests that the program may have contributed to the generation of entrepreneurship, possibly through the alleviation of credit constraints.

Further research is needed to understand (through a clean identification strategy) the causal relationship between CCTs and labor market decisions. We hope that this paper will stimulate this research.

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