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Leonardo Corral
Giulia Zane

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Leonardo Corral: Inter-American Development Bank, leonardoc@iadb.org

Giulia Zane: Inter-American Development Bank, giuliaz@iadb.org

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Leonardo Corral, Giulia Zane*

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Abstract

This paper evaluates the impact of rural roads improvement works to benefit indigenous communities in the highlands of Ecuador, largely dependent on agriculture for their livelihoods. The findings suggest that the program had a positive impact on health and that it increased enrollment in secondary education. We find no evidence that treated households increased their investment in plot improvements and agricultural inputs. However, household members are more likely to report self-employment in agriculture as their main occupation. The effect on agricultural output and sales was positive but not statistically significant. Finally, there is no evidence that the program had any positive effect on overall household income, female empowerment and food security.

JEL classifications: O12, O13, O18, Q12, R41

Keywords: Rural Roads, Rehabilitation Works, Indigenous Communities, Food Security, Ecuador

*Corral: Inter-American Development Bank, leonardoc@iadb.org. Zane: Inter-American Development Bank, giuliaz@iadb.org.

1 Introduction

Improved roads are considered a necessary condition for generating economic growth in rural communities. Indeed, by reducing transport costs, improved roads can increase access to markets and important services such as health and education. A large body of literature on the impact of rural roads in developing country found a positive effect on employment, household income and consumption, and agricultural activities (see Hine et al. (2015) for systematic review). However, recent studies are finding that rural roads alone are not sufficient to promote local development in rural areas. In particular, Asher and Novosad (2018) find that, in India, a large rural roads project had no impact on the local economy except for increasing access to jobs outside the community.

This paper presents the impact evaluation of a rural road rehabilitation and improvement project implemented by the provincial government of Chimborazo, Ecuador, between 2013 and 2018 with funding from the Inter-American Development Bank. To reduce the risks of potential false discoveries from hypothesis testing across many outcomes, we base the analysis on an impact evaluation plan that was laid out by the project team during the design phase. Indeed, we take this document as a "pre-analysis plan", to the extent possible, and carry out the analysis that was pre-specified. In particular, we evaluate the impact of the project on access to market and services, investment in agricultural inputs, agricultural productivity and sales, household income, female employment, and food security. As per the "plan", we use a Difference in Difference approach, based on two household surveys: baseline and endline, carried out on a set of treated and carefully chosen control communities.

We find that the program had a positive impact on health and that it increased enrollment in secondary education. We find no evidence that treated households increased their investment in plot improvements and agricultural inputs. The effect on agricultural output and sales of agricultural products was positive but not statistically significant. We find that treated household members were more likely to be self employed in agriculture and less likely to work perform agricultural work for others. As a consequence, we find a negative effect on agricultural wages. However, there is no evidence that the program had an impact on overall household income. Finally, there is no evidence that the program had any positive effect on female empowerment and food security.

The rest of this paper is structured as follows. Section 2 describes the context. Section 3 illustrates the main features of the program and its theory of change. Section 4 presents the evaluation design and data collection. Section 5 describes the econometric approach. Section 6 presents the results. Section 7 concludes.

2 Context

The province of Chimborazo, located in the Sierra region of central Ecuador, has a population of over 450,000 inhabitants, of which about 65% identify as indigenous and 48% live in rural areas. In 2010, 67% of the population was found to be poor, according to the NBI index (INEC, 2010).[1] Before the beginning of the project, the agricultural sector employed over 50% of the economically active population in the province, but its contribution to the province's GDP was only about 12.5%.

According to a diagnostic study conducted by the provincial government (GADPCH, 2012), poor infrastructure, in particular with respect to irrigation and rural roads were found to be among the main causes of low agricultural productivity. Moreover, 99% of Chimborazo farmers lacked formal training in production for high-value crop markets and 90% of them had between 1 and 5 hectares of land under production. Additionally, 32% of the producers within the province used irrigation for crop production, however, most of the systems were in need of construction, improvement or rehabilitation. Crop yield levels were in general lower than the average for the country, in part due to agricultural activities being conducted in steep slopes (58% of the provincial area has slopes above 50°) and poor soils.

The province has 4,553 km of roads. A survey undertaken in 2012 found that less than 20% of these were asphalt roads, while almost 35% were roads with natural dirt surfacing. Moreover, the majority of the existing rural roads in the province (75%) were built without adhering to technical standards or assessing their impacts on people or on the environment. Typically, they have grades that exceed the established design standards, they are narrow, and they lack drainage systems. As a results, they deteriorate whenever it rains and, in the rainy season, rainwater damages the roads, resulting in warping and potholes that adversely affect speed and normal vehicular traffic.

[1] The NBI is an index measuring unsatisfied basic needs, or *Necesidades Básicas Insatisfechas*.

Recognizing that the limited access to improved, year-round, rural roads represented a major constraint for the livelihood of the rural population, the provincial government (GADPCH) has been committed to investing in the improvement and rehabilitation of such infrastructure. Indeed, between 2005 and 2013 the GADPCH invested in 50 road improvement project across the project through loans obtained from various sources, including the World Bank. [2] In 2013, the Provincial Road Plan called for implementing similar improvement works on up to 84 additional road segments, most of which already counted with completed studies. The roads improvement works object of this study were chosen among those included in this plan (IDB, 2013).

3 Description of the program & theory of change

Implemented by the GADPCH between 2014 and 2018 with funding from Inter-American Development Bank (IDB), the Chimborazo Rural Investment Project aimed at improving the livelihoods of rural households in Chimborazo province, Ecuador, by increasing agricultural productivity and access to markets and services. To do so, the program financed the improvement of two types of infrastructure: irrigation systems and rural roads.

This project can be considered to be the continuation of a project implemented by the World Bank between 2009 and 2012, the Chimborazo Development Investment Project (CDIP), which also focused on the improvement of irrigation systems and rural roads within the Chimborazo province (WB, 2015). Indeed, the Chimborazo Rural Investment Project was designed to improve irrigation and rural road systems that had been left out from the CDIP due to resource limitations.

This study focuses on the impact of the rural roads component of this project. Given that investment in the two types of infrastructure took place in different areas (see figure 1), targeting different sets of communities, we can disregard the effects of the irrigation component since it had no impact on the communities included in the road improvement sample.

[2] According to its Project Completion Report (WB, 2015), the project financed by the World Bank supported the rehabilitation of 3 roads, for a total of 50.4 km, benefiting 8,833 families, and decreasing the cost of vehicle operation and maintenance by an estimated 55%.

3.1 Roads improvement component

The road improvement component consisted in paving two rural roads (IDB, 2013). The first was a road connecting two important market centres in Chimborazo province: Pallatanga and Guamote, improved with the objective of connecting rural households to market centres, health facilities, and schools. The second was a road in Penipe canton, which had the objective of facilitating evacuation in case of volcanic events. Since its purpose was unrelated to increasing agricultural productivity and access to markers, during the design phase, it was decided to exclude this road from the scope of the impact evaluation and focus exclusively on the first one.

The Pallatanga-Guamote road improvement works consisted in paving a 38.9 km long section of the road connecting the two market centres. The IDB funded project was responsible the rehabilitation of the first 34.4 km, starting from Guamote, while the remaining 4.5 km were to be paved with resources from the central government. However, due to budgetary restrictions, the improvement works in the government financed section did not take place (OVE, 2018).

3.2 Expected results

Rural road improvement projects can affect rural households livelihoods in a number of different ways. Without a clear initial plan, the researcher who conducts the impact evaluation might test a large number of hypotheses, look at the results, and then describe the theory of change of the project accordingly. To avoid incurring in false discoveries due to multiple hypothesis testing, we follow the impact evaluation plan that was outlined by the project team during the design phase, considering it as a "pre-analysis plan".[3]

According to the impact evaluation plan, the improved road quality should decrease travel time to markets and therefore reduce transactions costs. This should generate an increased use of productive inputs, which would increase agricultural production. Lower travel cost and higher production should both increase sales, generating higher income and food security. Moreover, road improvements should decrease the cost of accessing health and education services, stimulating their use. In addition, these time savings are expected to allow women to change their time allocation, such as supply more labor outside the farm.

[3]During the design phase the theory of change of the project, its expected outcomes, and the evaluation strategy were outlined in detailed by the project team in two documents: (i) "Plan de seguimento y evaluación", which provides information also on the M&E strategy; and (ii) "Evaluation Plan", which is specific to the impact evaluation and provides more details.

4 Evaluation design & data

The impact evaluation is based on a Difference in Difference (DD) strategy. This strategy consists in comparing the *change* in the mean of the outcome variable(s) for the treatment households with that of a (carefully selected) control group. To implement this strategy, a baseline survey was conducted in 2015, prior to the beginning of the road improvement works, and a follow-up survey in 2019, after the program took place, with 564 households in treatment and control communities.

4.1 Selection of treatment and control group

The road systems to be treated were selected by the implementing entity, the GADPCH, before the beginning of the project, from set of roads included in the Provincial Road Plan. The selection based on a set of eligibility criteria as well as political priorities. This process resulted in the identification of 2 roads to be improved. Since one of the roads was an evacuation route to be use in case of volcanic activity, it was decided that the impact evaluation would focus only on one of road (Pallatanga-Guamote).

Along this road, 20 communities were selected to be included in the treated group, identified according to the following criteria: (1) all the communities that were close to the Pallatanga-Guamote road (i.e. the road passes right through these communities); and (2) other communities that indirectly could benefit from the road as it would be their only access point.

The principal challenge in the identification of the causal impact of the program is to select a control group that could plausibly satisfy the DD identification assumption, that is, for which changes in outcome variables would likely be the same as those in treatment group, absent the treatment. With this objective, the team who designed the impact evaluation, identified a set of road systems that satisfied the eligibility criteria for treatment, but were unlikely to be treated during the intervention period due to budgetary and execution capacity constraints.[4] In addition, control group communities (served by the identified roads) were selected to be as similar as possible to the treated communities, in terms of observable characteristics.

Specifically, the team identified 10 road systems, encompassing 31 communities, using the

[4]The design of this impact evaluation was done in collaboration between the IDB (Leonardo Corral, Heath Henderson, Mario Gonzalez Flores, and Paul Winters (SPD/SDV)) and the GADPCH (Irrigation team, led by Juan Carlos Brito).

following criteria: (1) they formally applied to the program; (2) pre-feasibility studies were conducted and reviewed by the GADPCH; (3) investment plans were developed; (4) they were not going to be improved during the project timeline due to budget restrictions. Once additional information on the communities served by these systems was collected by the GADPCH and complemented by data from the 2010 Population Census, 5 of them were chosen to be included in the sample, based on the following criteria: (1) population characteristics were similar to treated communities (majority indigenous); (2) the road system was at least 10 km long; (3) similarity in road type pre-treatment (i.e. dirt road); (4) similar population size. The 5 selected systems included 14 communities.

4.2 Data collection

The original plan, informed by power analysis, was to survey 15 households in each of the 20 treated communities and 21 households in each of the 14 communities identified to constitute the control group.

However, 2 communities in the treatment group and 1 community in the control group could not be surveyed. Moreover, one community in the control group was also chosen to be part of the irrigation control group and was therefore excluded from the roads sample. As a result, the final sample includes 301 treated households in 18 treated communities and 281 control households in 12 control communities.

For the treated communities, the set of households to be surveyed were selected randomly from a list of residents. In the case they were not found, a set of replacement households were also pre-identified. For the control communities, given that lists of residents were not available, household selections was carried out through systematic sampling with a random starting point.

The baseline survey was implemented through in-person interviews conducted between April and May 2015. An extensive questionnaire, based on the World Bank's Living Standard Measurement Study - Integrated Survey on Agriculture (LSMS-ISA) survey was administered. The questionnaire included 12 modules with individual level questions about each household member's socio-economic characteristics (demographics, employment, income, etc.) and detailed parcel-crop level information about agricultural inputs and outputs. Additionally, the survey contained a food security' module, based on the FAO's Food Insecurity Experience Scale Survey Module, in which the person in charge for preparing meals for the household, usually a woman, was asked a set of 15 questions about whether, in the three months prior to the survey, the household had faced any episode of "food insecurity" such as having to skip meals.

Additionally, both in the treatment and control communities, a "community survey" was conducted with community leaders with the objective of collecting information on the services available to the community members.

In February 2019, an endline survey was conducted with the same sample and same questionnaire. Overall, 93% of household that participated in the baseline were re-interviewed.

4.3 Balance & attrition checks

Table 2 reports summary statistics and balance checks for the main income components, based on the data collected at baseline. We find that treated households were poorer, reported lower income in terms of agricultural wage and livestock agriculture, and had higher dependence on transfers.

Table 3 reports summary statistics and balances checks for variables related to access to services. Since the information about travel time and cost to reach services in the household questionnaire is asked only to users, we need to use community level information, obtained from community leaders to assess balance and impact on these variables. The table shows that the treated communities had lower access to services (high cost, travel time, and distance) than the control communities. Most of the differences are statistically significant, especially when travel times and costs are considered.

Table 6 shows that the endline survey was completed by 93% of the sample. Treated households were slightly less likely to complete the survey, but the difference is small and not statistically significant.

5 Empirical strategy

Within the DD strategy, the following equation is estimated in order to generate estimates of the average program impact:

$$y_{it} = \beta_0 + \beta_1 Treated_i + \beta_2 Post_t + \beta_3 Treated_i * Post_t + \epsilon_{it} \quad (1)$$

where y_{it} is an outcome variable of interest for household i in period t, such as income, $Treated_i$ is dummy variable equal to one if the household belongs to a treated community, $Post_t$ a period indicator taking the value one if the observation corresponds to the post-program period, and ϵ_{it} is an error term. The parameter β_1 measures the average pre-program difference in the outcome variable between treatment and control groups, while β_2 measures the time trend – or the average difference in the outcome variable in the post- versus pre-program periods for the control group. Finally, β_3 measures the average impact, or treatment effect, of the program. The identifying assumption for β_3 to be an unbiased estimator of the causal impact of the program is that there are no systematic differences across treatment and control groups in terms of unobservable variables that affect the change in the outcome variable. This is the assumption of “parallel trends”, which states that in the absence of the program the average change in the outcome variable of treatment households would have been the same as the average change of the control households.

In section 4.3 we saw that, although the control communities were selected to be as similar as possible to the treated communities, treated and control household presented different demographic and socioeconomic characteristics for the majority of the variables considered (table 2). The parallel trend assumption does not require observable characteristics in treatment and control groups to be balanced at baseline. However, differences in observable characteristics at baseline are likely to be correlated to trends in the outcomes of interest, hence casting doubts on the validity of the DD strategy. Moreover, the lack of balance can make the estimate of the average treatment effect of the program imprecise (Imbens and Rubin, 2015).

To reduce the bias due to covariate imbalance and increase precision, we combine the DD methodology with a Propensity Score Matching (PSM) approach. Specifically, we use the propensity score to obtain an unbiased estimator of the average treatment effect:

$$\hat{\tau} = \frac{1}{N} \sum_{i:Treated_i=1} \lambda_i \Delta y_i + \frac{1}{N} \sum_{i:Treated_i=0} \lambda_i \Delta y_i \qquad (2)$$

where $\Delta y_i = y_{i1} - y_{i0}$ is the difference in the outcome of interest after the program $t = 1$ and before the program $t = 0$ household i, and λ_i is a function of the propensity score for estimated for household i define as follows:

$$\lambda_i = \begin{cases} \frac{1}{\hat{e}(x_i)} & \text{if } Treated_i = 1 \\ \frac{1}{1-\hat{e}(x_i)} & \text{if } Treated_i = 0 \end{cases} \tag{3}$$

where $e(x_i)$ is the propensity score for household i, with observable characteristics x_i, that is $e(x_i) = Pr(Treated_i = 1|X_i = x_i)$.

In practice, we first estimate a logistic regression with the dummy $Treated_i$ as depend variable and a set of household characteristics at baseline X_i as independent variables. From this estimation we predict $\hat{e}(x_i)$ for each household and use it calculate the corresponding λ_i, which will be used as inverse probability weight in the following regression:

$$\Delta y_i = \alpha + \beta Treated_i + u_i \tag{4}$$

Under the assumption that, conditional on X_i the changes in the outcome variables in the treatment and control group would have been the same, absent the program, this methodology would yield an unbiased estimate of the average treatment effect, $\hat{\beta}$. However, this estimator is very sensitive to estimated propensity scores that are either close zero or close to one as they would assign very high weight to the corresponding observations. To minimize this issue, we follow Imbens et al. (2009) and restrict the sample to the set of households for which the propensity score belongs to the interval $[\hat{\alpha}, 1-\hat{\alpha}]$, where $\hat{\alpha}$ is chosen, based on the distribution of the propensity score, with the objective to minimize the variance of the estimated average treatment effect.[5]

To estimate the propensity score we need to choose a set of household characteristics at baseline that are unbalanced between treatment and control group and are likely to be correlated with the changes in the outcomes of interest. In principle, we would like to include as many variables as possible to minimize the bias. However, as we increase the number of variables included, we are likely to reduce the size of the "common support" and, therefore, the number of observations used for the analysis. To illustrate this trade-off and to assess the robustness of this methodology, we propose two models to estimate the propensity score.

[5]Specifically, $\hat{\alpha} = \frac{1}{2} - \sqrt{\frac{1}{4} + \frac{1}{\hat{\gamma}}}$ and $\hat{\gamma}$ is the solution of the following equation:

$$\gamma \sum_i \mathbb{1}_{(\hat{e}(x_i)(1-\hat{e}(x_i))^{-1}<\gamma} = \sum_i \frac{1}{\hat{e}(x_i)(1-\hat{e}(x_i)}\mathbb{1}_{(\hat{e}(x_i)(1-\hat{e}(x_i))^{-1}<\gamma} \tag{5}$$

The “basic” model includes 13 variables considered to be important in predicting changes in the outcomes of interest. These are the main demographic characteristics of the household (gender, age, and education of the household head, household size, number of adults), number of plots, a dummy indicating access to irrigation, and dummies indicating participation in the main income sources (agricultural and non agricultural wages, crop and livestock agriculture, self employment, and transfers).

The “extensive” model includes additional variables selected using the methodology illustrated by (Imbens and Rubin, 2015). Specifically, we identify a set of 27 variables that are likely be correlated with the outcomes of interest, these include additional household characteristics and variables measured at baseline. To decide which to include, we add one variable at a time to the logistic regression used to estimate the propensity score and choose the one with highest Likelihood Ratio Statistic to become part of the model. We repeat this step for the remaining 26 variable and stop when the maximum Likelihood Ratio Statistic obtained is lower than 1. Finally, we apply the same procedure to select which quadratics to include. In this case we stop when the maximum Likelihood Ratio Statistics obtained is below the threshold of 2.71. This leads to the selection of 14 additional variables and 2 quadratics.

Figure 2 illustrated the distribution of estimated propensity score for the basic model (panel a) and the extensive model (panel b). For the two models, we estimate $\hat{\alpha}$ as described above and we obtain 0.105 for the basic model and 0.084 for the extensive model. Once we trim the sample to keep the households for which the propensity score lies in the interval $[\hat{\alpha}, 1 - \hat{\alpha}]$, we are left with 472 observations for the basic model and 266 observations for the extensive model.

Tables 4 and 5 report balance tests adjusted for propensity score weighing and trimming for the Basic and Extensive model, respectively. Both tables show improvements in balance with respect to the unadjusted case (table 2. However, for the Basic model, we still reject the hypothesis of balance using the joint F-test and find that the treated household were more likely to have an indigenous head, that the hey had more land and lower income and baseline. For the Extensive model, instead, we cannot reject reject the hypothesis are balanced (p-value=0.99) and we find no statistical differences between the two samples for the variables considered.

5.1 Outcome variables

As explained in section 3, rural road improvement projects are expected to affect a large number of outcomes, many of which can be measured (in different ways) given that the survey administered was quite extensive. In order to avoid incurring in the risk of conducting multiple tests, this analysis follows, to the extent to which it is possible, the original impact evaluation plan. This plan was described in two documents: (i) “Plan de seguimento y evaluación”, which provides information also on the M&E strategy; and (ii) “Evaluation Plan”, which is specific to the impact evaluation and provides more details. Table 1 reports the complete list of outcomes included in these documents and information on whether they can measured based on the data collected.

This impact evaluation includes results for all the outcomes included in the original documents that can be measured, and additional outcomes deriving from the theory of change outlined in section 3.

First, we test whether the project increased access to services, measured in terms of travel time and costs to reach schools, health centers, and markets. Given that information on travel time and cost was collected only among users in the households survey, we base this part of the analysis on community level data and complement it with individual level information on school enrollment and use of health services.

Second, we assess to what extent treated farmers increased their investment in the plot, farm equipment, and agricultural inputs: seeds, hired labor, fertilizer, and other chemicals. Given that the variables measuring amounts spent in each of these inputs are very noisy and likely to be measured with error, we choose to use as outcome variables dummies equal to one if the household purchased any quantity of the respective input.

Third, we estimate the effect of the program on agricultural productivity and sales. Specifically, we measure agricultural production as “total value of crops harvested” and agricultural productivity “total value of crop harvested per m^2 sown”. We consider sales of crops, livestock, and livestock by-products (milk, eggs, etc.). Additionally, we test whether the program increase productivity of potato production, the main crop cultivated in the area. Given that production and sales values are very noisy, we exclude from the analysis the households that, either at baseline or at endline, reported values above the 95^{th} percentile.

Forth, we evaluate the impact of the program on net household income, calculated following the methodology proposed by the Rural Income Generating Activities (RIGA) study (Carletto et al., 2007). Specifically, for each of its main sources: agricultural wages, non agricultural wages, crop production, livestock production, transfers, and income from self-employment, net income is calculate as the difference between (gross) income and expenditure. Total income is calculated as the sum of its components. Self-consumption of crop and livestock products is considered to be a part of the household income. Given that self-reported income data are very noisy, households with "total income" below the 5^{th} percentile or above the 95^{th} percentile either at baseline or at endline are dropped from this analysis. We report both the results in terms of household income and income per capita.

Fifth, we test whether the program had any effect on female employment, considered as an important "enabling factor" for female empowerment as it increases the woman's access to and control over the household resources (Malhotra and Schuler, 2002).

Finally, we estimate the effect of the program on three measures of food insecurity. Specifically, households were asked 15 standard question aimed at assessing whether they had experienced episodes of food insecurity in the 3 months prior to the survey. For example "In the past 3 months, did any household member skip a meal?" If the answer was "yes", then they would be ask to describe the frequency of such event choosing among three options: "almost never", "some times", and "almost always". The first measure we created is simply a dummy, "Any event", equal to 1 if the answer was "yes" for at least 1 of the questions. The second measure, "N events", is a count variable equal to the number of events for which the household answered "yes". The third variable, "Intentsity", is the sum of the frequency reported for each event where "almost never" is counted as 1, "some times" is counted as 2, and "almost always" is counted as 3.

6 Results

In this section, we report the estimated effects of the program on the set of outcomes outlined in section 5.1. Where possible, we conduct the analysis at the household level and we report three set of results. The first, *First Difference-OLS* is a regression of the first difference of the outcome variable on treatment status, which is equivalent to the DD estimation. The second and the third, *First Difference-PSM* estimate the same regression using a PSM technique either based on the "Basic Model" or on the "Extensive Model" presented in section 5.

Access to services and markets: we check whether the roads improvement reduced travel time and cost to reach schools, health services, and market centres. Given that in the household dataset this information is only available for those that use the services, we base this analysis on community level data. This implies that we can only rely on the DD strategy. The results are reported in tables 7, 8, and 9. The program seem to have increased access to secondary education by decreasing time and cost to reach secondary schools and high schools. The time to reach the closest university also decreased, but the cost increased. The time to reach health services declined substantially, but the cost of reaching a pharmacy increased. Finally, the time to reach market centres and agricultural supply dealers decreased, but travel costs increased.

We also test whether the road improvements increased school enrollment between age 12 and 20. To do so, we split the sample and obtain DD estimates for each year of age.[6] The results, reported in table 10 show an increase in enrollment at age 13 (when children move from primary to secondary school) and 18 (university). For all other age groups the effects are generally negative, although only significant at age 16.

Moreover, we look at whether use of health services was affected by the program (table 11). Treated households are less likely to have members experiencing health issues (column 1) and more likely to use health services (column 1-6). These results are consistent across specifications although not statistically significant, with the exception of two coefficients in panel A, which report the DD results.

Agricultural inputs and farm investment: we estimate the effect of the program on purchases of agricultural inputs (seeds, labor, fertilizer, and chemicals), and on investment in plot improvements and machinery. We find no evidence that the program had a positive effect on any of these outcomes. On the contrary, table 12 shows that treated households were less likely to invest in plot improvements, compared to the control group. This results is stable across specifications, although is no longer statistically significant when we estimate the propensity score with the extended model (panel C). The effect on machinery, measured as number of equipment owned, is not statistically different than zero and the sign of the point estimate is not stable across specifications. Similarly, the effect of the program on purchases of inputs not statistically significant and mixed (table 13). Point estimates show a decrease in the probability of purchas-

[6]Given that each regression is run on a relatively small subsample, we do not utilize the PSM methodology for this analysis.

ing seeds and an increase in the probability of purchasing fertilizer, while the effect on labor and other chemical products is not stable across specifications.

Agricultural productivity: we measure the effect of the program on crop production and productivity, and on sales of crop, livestock, and livestock by-products (milk, eggs, etc.). Table 14 shows the results.[7] Although most of the coefficients are not statistically different from zero, we observe an increase in crop production and sales (columns 2 and 4) coupled with a decrease in agricultural productivity measured either as quantity of potatoes harvested per hectare (column 1) or value of crops harvested per squared meter (column 3). The effect on sales of livestock and livestock products is not consisted across specifications and becomes negative when the propensity score is estimated using the extensive model (panel C).

It is important to mention that self-reported production and sales data are typically noisy and measured with error. Therefore, the given that the sample available is relatively small, this analysis might be under-powered.

Income: table 15 reports the effects of the program on the main income sources: agricultural wages, non agricultural wages, crop agriculture, livestock agriculture, transfers, and self employment (columns 1-6). It also reports the effect on total household income, the sum of all the sources mentioned above (column 7), and on and income per capita (column 8).[8] We find no evidence that the program had a positive effect on household income nor on any of the income sources considered. Most of the results are not stable across specifications, except for the effect on agricultural wages which is negative, although not statistically significant when the propensity score is estimated with the extensive model.

As discussed above for the case of agricultural production and sales, self-reported income variables are very noisy and this analysis is likely to be under-powered.

Female empowerment: one of the expected results of the project was an increase in the likelihood of women to be employed in sectors other than agriculture or, at least, outside agricultural self-employment. Access to such employment opportunities was expected to have a positive effect of female empowerment.

[7]The results presented in 14 are sensitive to the way outliers are dealt with, the presented specification is obtained by dropping all households with values above the 95th percentile (and also below the 5th in columns 1 and 3) either at baseline or at endline.

[8]The results reported in table15 are sensitive to the way outliers are dealt with, the presented specification is obtained by dropping all households with “total income” above the 95th percentile or below the 5th percentile either at baseline or at endline.

Table 16 reports the effect of the program on female and male employment for household members with age between 18 and 65.

These results show that both the share of household members whose main occupation is agricultural self-employment increased for both women and men (columns 1 and 4), while the share of household members employed in other jobs decreased (columns 2 and 5). These results are robust across specifications and statistically significant. Finally, the impact of the program on employment outside agriculture was negative, although small and not statistically significant for both genders (columns 3 and 6).

Although we cannot conclude that the program did not have an impact on female empowerment, these findings suggest that the program increased the probability for people to work on their own farm (instead of providing agricultural labor to others), which is consistent with the decrease in agricultural wages as source of income for the household discussed above.

Food security: table 17 shows the effect of program on food insecurity. The results are generally small an not stable across specifications. Indeed, while panel A and B suggest that the program decreased food insecurity, panel C, where propensity score is estimated using the extensive model, yields the opposite result.

7 Conclusions

This paper used a rigorous quasi-experimental approach to evaluate the impact of the rural road improvement works implemented as part the Chimborazo Rural Investment Project, in Chimborazo province, Ecuador. The findings suggest that the program had a positive impact on health and that it increased enrollment in secondary education. We find no evidence that treated households increased their investment in plot improvements and agricultural inputs. The effect on agricultural production and sales was generally positive but not statistically significant. We find that treated household members were more likely to be self employed in agriculture and less likely to work perform agricultural work for others, which resulted in a decrease in agricultural wages as income source. However, there is no evidence that the program had an effect on overall household income. Finally, there is no evidence that the program had any positive effect on female empowerment and food security.

This impact evaluation followed the plan laid out by the project team during the design phase as a “pre-analysis plan” and hence its main analysis was based on the techniques and the outcomes that were pre-specified in those documents. However, upon the realization that the observable characteristics across treatment and control group were not balanced at baseline, we propose a propensity score matching methodology aimed at reducing the bias potentially caused by covariates imbalance and increase precision. This approach lead to confirm the results estimated through the main Difference in Difference analysis when the estimation of the propensity score was based on a limited set of variables. However, when we increased the number of covariates included in the propensity score estimation, we found limited common support and lack of robustness in the estimated results.

One possible explanation for the limited effectiveness of the program could be that, at the time of data collection, part of the planned road improvement works to be funded through resourced from the central government had not been completed by the time of data collection.

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A Figures

Figure 1: Project map

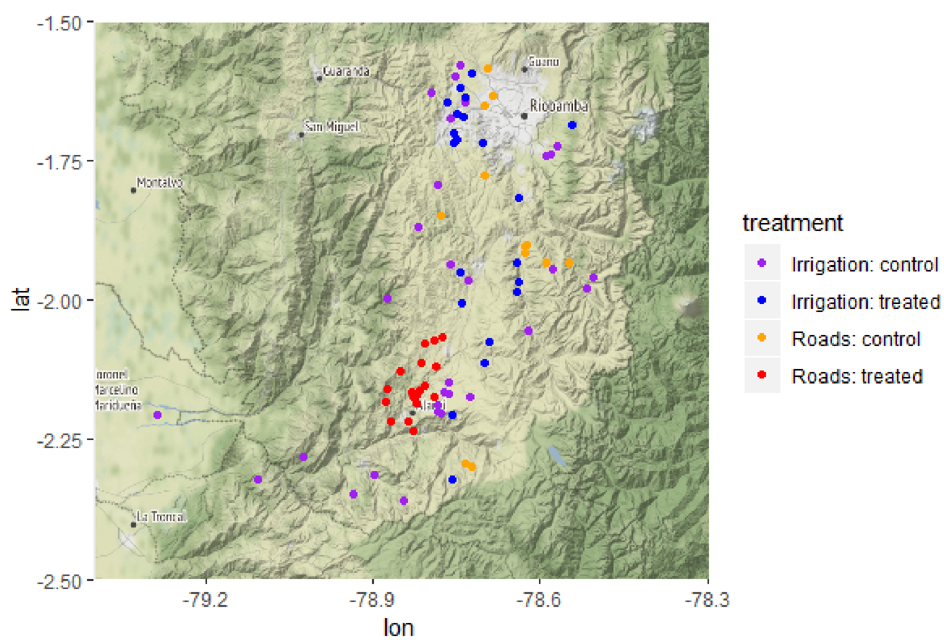
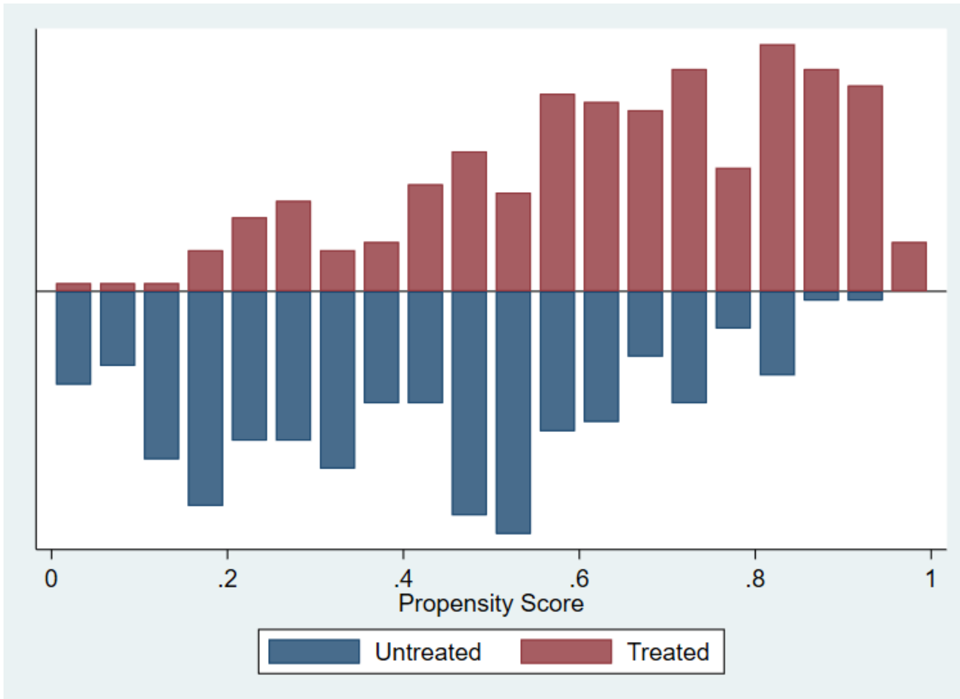
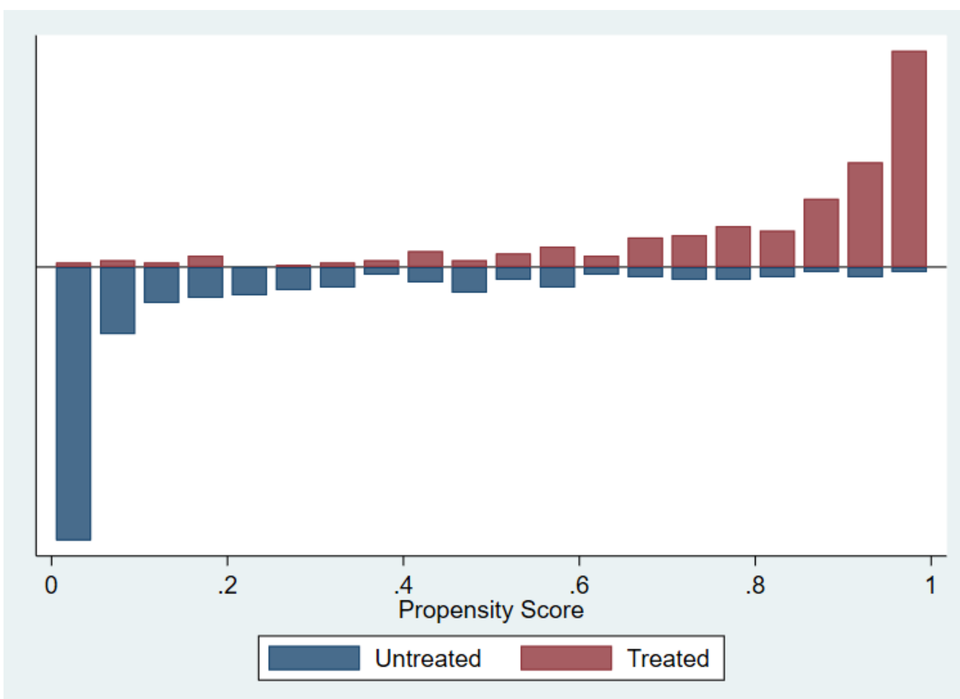


Figure 2: Propensity Score

(a) Basic Model



(b) Extensive Model



B Tables

Table 1: Outcome variables (original plan)

	Outcome	Indicator	Can it be measured?
1	Access to services	Travel time to reach schools	Yes (community level)
		Travel time to reach health centers	Yes (community level)
		Number of visits to health centers	Yes
		Perception over access to education	No, not measured
		Perception over access to health services	No, not measured
2*	Inputs	Expenditure in inputs for agricultural production	Yes
3*	Investment	Farm investment	Yes
4	Agricultural productivity	Value of production/cultivated area	Yes
		Quantity of potatoes harvested per hectare	Yes
5	Agricultural income	Income from crop and livestock farming	Yes
6*	Income	Producer income (per capita) [from all sources]	Yes
7*	Personal income	Consumption	No, not measured
8	Female empowerment	Employment [except ag self-employed]	Yes
		Occupation [in service sector]	No, we can only distinguish ag vs non-ag
		Time use	No, only endline information available
		Control over income	No, not measured
		Participation in hh decision making	No, not measured
		Attitude towards gender roles	No, not measured
9	Food security	Household Dietary Diversity Index (HDDI)	HDDI cannot be calculated as there is no consumption data. But information on food security is available

Notes: The list of outcomes is obtained from the document “Plan de Seguimiento y Evaluación”, Table 4. The symbol (*) indicated the additional outcomes mentioned in the document “PIDD Impact Evaluation Plan”, Table 1.

Table 2: Summary Statistics & Balance - Household Level

	Roads: treated (1)	Roads: control (2)	(1) vs. (2) (3)
HH head female	0.12	0.10	0.02
	(0.02)	(0.02)	(0.03)
HH head age	47.48	53.78	-6.31***
	(0.89)	(0.94)	(1.30)
HH head indigenous	0.96	0.58	0.39***
	(0.01)	(0.03)	(0.03)
HH head education (years)	3.62	3.43	0.19
	(0.14)	(0.15)	(0.21)
HH size	5.19	3.82	1.37***
	(0.16)	(0.13)	(0.21)
N adults	2.34	2.04	0.30**
	(0.08)	(0.09)	(0.12)
N plots	2.60	3.70	-1.10***
	(0.08)	(0.14)	(0.16)
Land size (m^2)	67143.05	22990.16	44152.89*
	(23513.82)	(2555.75)	(25271.22)
Irrigation	0.41	0.59	-0.18***
	(0.03)	(0.03)	(0.04)
Share plots irrigated	0.20	0.34	-0.14***
	(0.02)	(0.02)	(0.03)
Aspersion	0.08	0.22	-0.15***
	(0.02)	(0.03)	(0.03)
Ag wages	58.45	195.66	-137.21***
	(20.05)	(49.46)	(50.96)
Non ag wages	872.88	1144.01	-271.13
	(125.39)	(165.37)	(204.66)
Crop income	340.91	295.14	45.76
	(66.01)	(165.79)	(170.29)
Livestock income	204.47	653.24	-448.77***
	(65.01)	(124.04)	(135.20)
Transfers	773.24	433.86	339.38***
	(81.03)	(49.22)	(98.14)
Self employment	15.54	115.78	-100.24
	(22.87)	(80.77)	(79.35)
Tot hh income	2265.50	2837.70	-572.20*
	(171.59)	(286.99)	(325.04)
N	301	263	564
Joint F-Stat			20.95
P-value			0.000

Notes: * $p < .10$,** $p < .05$, *** $p < .01$.

Table 3: Summary Statistics & Balance - Access to Services - Community Level

	Roads: treated (1)	Roads: control (2)	(1) vs. (2) (3)
Avg cost (usd) to reach transport	0.56	0.19	0.36***
	(0.05)	(0.06)	(0.08)
Avg cost (usd) to reach school	0.64	0.42	0.23***
	(0.04)	(0.08)	(0.08)
Avg cost (usd) to reach health care	0.84	0.51	0.33***
	(0.05)	(0.05)	(0.07)
Avg cost (usd) to reach services	1.25	0.51	0.75***
	(0.11)	(0.06)	(0.15)
Avg cost (usd) to reach market	1.09	0.66	0.43***
	(0.05)	(0.12)	(0.12)
Avg time (hrs) to reach transport	33.81	22.36	11.44
	(4.25)	(5.33)	(6.85)
Avg time (hrs) to reach school	63.15	35.06	28.09***
	(4.70)	(5.73)	(7.50)
Avg time (hrs) to health care	67.99	32.61	35.38*
	(13.17)	(4.70)	(17.36)
Avg time (hrs) to reach services	75.00	30.76	44.24***
	(7.13)	(4.66)	(9.87)
Avg time (hrs) to reach market	80.56	34.39	46.16**
	(13.57)	(6.49)	(18.19)
Avg distance (km) to reach transport	11.26	14.43	-3.17
	(2.24)	(8.69)	(7.31)
Avg distance (km) to reach school	21.06	18.03	3.03
	(2.77)	(4.14)	(4.80)
Avg distance (km) to health care	17.61	13.97	3.64
	(3.37)	(1.81)	(4.56)
Avg distance (km) to reach services	25.89	14.39	11.49**
	(4.00)	(1.84)	(5.35)
Avg distance (km) to reach market	26.50	21.77	4.73
	(3.97)	(3.89)	(5.93)
N	18	12	30
Joint F-Stat			1.78
P-value			0.152

Notes: * $p < .10$,** $p < .05$, *** $p < .01$.

Table 4: Balance Checks - Basic Model

	Roads: treated (1)	Roads: control (2)	(1) vs. (2) (3)
HH head female	0.10	0.11	-0.01
	(0.02)	(0.02)	(0.03)
HH head age	50.13	50.59	-0.46
	(1.07)	(1.09)	(1.53)
HH head indigenous	0.95	0.56	0.39***
	(0.02)	(0.04)	(0.04)
HH head education (years)	3.56	3.52	0.04
	(0.18)	(0.18)	(0.26)
HH size	4.49	4.46	0.03
	(0.16)	(0.18)	(0.24)
N adults	2.34	2.26	0.08
	(0.11)	(0.11)	(0.15)
N plots	2.89	3.04	-0.15
	(0.12)	(0.11)	(0.16)
Land size (m^2)	57979.59	17913.55	40066.03**
	(18164.02)	(1822.04)	(18256.73)
Irrigation	0.51	0.52	-0.01
	(0.04)	(0.04)	(0.05)
Share plots irrigated	0.26	0.32	-0.05
	(0.02)	(0.03)	(0.04)
Aspersion	0.11	0.19	-0.08**
	(0.03)	(0.03)	(0.04)
Ag wages	76.89	251.61	-174.72**
	(29.90)	(71.66)	(77.64)
Non ag wages	1003.70	1160.90	-157.20
	(170.09)	(200.48)	(262.91)
Crop income	351.38	332.06	19.32
	(65.48)	(213.30)	(223.11)
Livestock income	218.09	592.13	-374.04**
	(90.79)	(119.82)	(150.33)
Transfers	618.70	498.44	120.26
	(77.62)	(55.46)	(95.40)
Self employment	16.33	124.95	-108.62
	(34.28)	(58.78)	(68.04)
Tot hh income	2285.09	2960.09	-675.00*
	(216.44)	(342.47)	(405.11)
N	246	226	472
Joint F-Stat			10.97
P-value			0.000

Notes: * $p < .10$,** $p < .05$, *** $p < .01$.

Table 5: Balance Checks - Extensive Model

	Roads: treated	Roads: control	(1) vs. (2)
	(1)	(2)	(3)
HH head female	0.12	0.09	0.03
	(0.04)	(0.03)	(0.05)
HH head age	51.49	50.11	1.38
	(1.56)	(1.82)	(2.39)
HH head indigenous	0.89	0.89	0.00
	(0.05)	(0.03)	(0.05)
HH head education (years)	3.24	3.16	0.08
	(0.26)	(0.28)	(0.38)
HH size	4.15	4.35	-0.20
	(0.19)	(0.24)	(0.31)
N adults	2.26	2.35	-0.08
	(0.14)	(0.16)	(0.22)
N plots	3.18	2.91	0.28
	(0.38)	(0.18)	(0.42)
Land size (m^2)	27453.45	28035.11	-581.67
	(2905.48)	(6108.91)	(6762.13)
Irrigation	0.53	0.54	-0.01
	(0.05)	(0.06)	(0.08)
Share plots irrigated	0.28	0.32	-0.04
	(0.03)	(0.04)	(0.05)
Aspersion	0.11	0.16	-0.06
	(0.03)	(0.05)	(0.06)
Ag wages	61.68	53.25	8.44
	(37.88)	(30.90)	(48.89)
Non ag wages	1289.33	1087.71	201.62
	(291.47)	(273.57)	(399.73)
Crop income	200.42	153.01	47.42
	(49.30)	(59.73)	(77.44)
Livestock income	390.48	476.49	-86.01
	(111.48)	(130.64)	(171.71)
Transfers	575.03	529.05	45.98
	(136.63)	(150.88)	(203.53)
Self employment	37.21	47.48	-10.27
	(34.63)	(41.88)	(54.34)
Tot hh income	2554.17	2346.99	207.17
	(274.12)	(417.60)	(499.40)
N	150	116	266
Joint F-Stat			0.37
P-value			0.990

Notes: * $p < .10$,** $p < .05$, *** $p < .01$.

Table 6: Attrition Checks

	Probability of Completing Endline
	(1)
Treated	-0.009
	(0.021)
Mean Control	0.939
Observations	564

Notes: $^{*}\ p < .10$, $^{**}\ p < .05$, $^{***}\ p < .01$.

Table 7: Access to Education Services - Community Level (DD)

	Sec School		Bachillerato		University	
	Cost	Time	Cost	Time	Cost	Time
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.038	0.679	-0.175*	16.786	1.326***	75.481***
	(0.047)	(7.813)	(0.092)	(10.564)	(0.204)	(15.746)
Post	0.156***	9.125	0.056	4.375	-0.369	6.250
	(0.052)	(8.814)	(0.102)	(11.917)	(0.227)	(17.520)
Treated*Post	-0.156**	-2.982	-0.056	-7.589	0.734**	-8.558
	(0.066)	(11.049)	(0.130)	(14.939)	(0.288)	(22.268)
Mean Control Baseline	0.037	15.250	0.175	20.000	0.713	53.750
Observations	42	44	42	44	42	42

Notes: $^{*}\ p < .10$, $^{**}\ p < .05$, $^{***}\ p < .01$.

Table 8: Access to Health Services - Community Level (DD)

	Hospital		Health Center		Pharmacy	
	Cost	Time	Cost	Time	Cost	Time
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.230	60.923	0.479**	37.063***	0.487***	40.625***
	(0.920)	(43.487)	(0.189)	(10.512)	(0.145)	(10.062)
Post	1.130	7.000	-0.033	2.000	-0.281*	10.625
	(0.978)	(46.236)	(0.206)	(11.598)	(0.159)	(11.022)
Treated*Post	-0.495	-48.923	-0.121	-15.571	0.531**	-30.208**
	(1.301)	(61.499)	(0.267)	(14.866)	(0.205)	(14.230)
Mean Control Baseline	1.335	54.500	0.139	18.222	0.372	27.188
Observations	46	46	44	46	40	40

Notes: $^{*}\ p < .10$, $^{**}\ p < .05$, $^{***}\ p < .01$.

Table 9: Access to Market - Community Level (DD)

	Agrovet		Local mkt		Regional mkt	
	Cost	Time	Cost	Time	Cost	Time
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.543***	94.167**	0.432***	40.357***	0.680***	42.857***
	(0.179)	(46.496)	(0.140)	(10.801)	(0.193)	(14.029)
Post	-0.050	19.556	-0.321*	12.857	-0.479**	5.000
	(0.191)	(49.706)	(0.161)	(12.472)	(0.220)	(16.199)
Treated*Post	0.362	-96.222	0.518**	-34.643**	0.286	-53.571**
	(0.253)	(65.755)	(0.197)	(15.275)	(0.273)	(19.840)
Mean Control Baseline	0.394	23.333	0.586	25.000	0.743	49.286
Observations	42	42	42	42	40	42

Notes: * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 10: School Enrollment - Individual Level (DD)

Age	12	13	14	15	16	17	18	19	20
Treated	-0.037	-0.111*	0.051	0.103	0.096	0.073	-0.148	-0.000	0.087
	(0.048)	(0.054)	(0.077)	(0.091)	(0.095)	(0.155)	(0.143)	(0.189)	(0.128)
Post	-0.000	-0.091	0.077	0.034	0.095	0.117	-0.314***	0.026	-0.081
	(0.065)	(0.059)	(0.079)	(0.094)	(0.100)	(0.176)	(0.111)	(0.205)	(0.088)
Treated*Post	-0.018	0.202**	-0.062	-0.113	-0.247*	-0.147	0.334**	-0.124	0.017
	(0.074)	(0.080)	(0.089)	(0.121)	(0.136)	(0.211)	(0.154)	(0.250)	(0.132)
Mean Control Baseline	1.000	1.000	0.880	0.792	0.800	0.586	0.600	0.444	0.235
Observations	143	144	161	134	126	149	130	88	92

Notes: Robust standard errors in parenthesis, clustered at the community level, with the exception of the column corresponding to age 12 where we report non-robust standard errors as there is no variation in control group enrollment. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 11: Use of Health Services

	Was sick (1)	Preventive (2)	Any visit (3)	Saw doctor (4)	Hospital (5)	N visits (6)
Panel A: First difference - OLS						
Treated	-0.036	0.029	0.092*	0.111**	0.006	0.125
	(0.051)	(0.022)	(0.049)	(0.047)	(0.020)	(0.113)
Observations	527	527	527	527	527	527
Panel B: First difference - PSM - Basic Model						
Treated	-0.064	0.033	0.078	0.101	0.014	0.111
	(0.058)	(0.027)	(0.064)	(0.061)	(0.024)	(0.146)
Observations	472	472	472	472	472	472
Panel C: First difference - PSM - Extensive Model						
Treated	-0.047	0.025	0.060	0.082	0.056	-0.008
	(0.076)	(0.044)	(0.095)	(0.090)	(0.036)	(0.237)
Observations	264	264	264	264	264	264

Notes: Results are expressed in terms of share of household members who report being sick or using health care. In column (6) the depend variable measured the average number of visits at the household level. Robust standard errors in parenthesis, clustered at the community level. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 12: Investment & Machinery

	Plot investment (1)	N equipment (2)
Panel A: First difference - OLS		
Treated	-0.051**	0.658
	(0.022)	(0.696)
Observations	527	527
Panel B: First difference - PSM - Basic Model		
Treated	-0.056**	0.845
	(0.024)	(0.793)
Observations	472	472
Panel C: First difference - PSM - Extensive Model		
Treated	-0.021	-0.754
	(0.024)	(0.932)
Observations	266	266

Notes: Robust standard errors in parenthesis, clustered at the community level. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 13: Inputs

	Paid Seeds (1)	Hired Labor (2)	Paid Fertilizer (3)	Paid Chemicals (4)
Panel A: First difference - OLS				
Treated	-0.101	0.012	0.051	-0.054
	(0.061)	(0.088)	(0.064)	(0.070)
Observations	527	527	527	527
Panel B: First difference - PSM - Basic Model				
Treated	-0.096	0.056	0.104	-0.022
	(0.080)	(0.084)	(0.072)	(0.083)
Observations	472	472	472	472
Panel C: First difference - PSM - Extensive Model				
Treated	-0.057	-0.016	0.114	0.092
	(0.079)	(0.078)	(0.109)	(0.109)
Observations	264	264	264	264

Notes: Robust standard errors in parenthesis, clustered at the community level. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 14: Agricultural Productivity & Sales

	Potatoes t/ha (1)	Value Harvest (2)	Val Harv $/m^2$ (3)	Crop sales (4)	Lvst sales (5)	Lvst prod sales (6)
Panel A: First difference - OLS						
Treated	-1.580*	81.143	-0.004	48.527	67.030	14.687
	(0.829)	(79.419)	(0.028)	(53.103)	(42.215)	(79.666)
Observations	152	500	308	511	508	509
Panel B: First difference - PSM - Basic Model						
Treated	-0.614	121.993	-0.020	84.728	61.805	18.215
	(0.909)	(94.342)	(0.035)	(66.408)	(36.718)	(84.298)
Observations	134	446	275	457	457	454
Panel C: First difference - PSM - Extensive Model						
Treated	-0.959	110.354	-0.019	75.548	-88.427**	-131.157
	(1.192)	(106.858)	(0.034)	(75.903)	(37.397)	(166.397)
Observations	77	252	155	257	259	251

Notes: Robust standard errors in parenthesis, clustered at the community level. * $p < .10$, ** $p < .05$, *** $p < .01$. All values are expressed in USD except for column (1) where the outcome is expressed in terms of tonnes per hectare. Households with values above 95th percentile (and also below the 5th percentile in columns (1) and (3)) at either baseline or endline are dropped. In column (1) the sample is restricted to households that planted potatoes at both baseline and endline, in column (3) the sample is restricted to households that have non-zero harvest values at both baseline and endline.

Table 15: Household Income

	Wage ag	Wage non ag	Crop	Livestock	Transfers	Self emp	Tot	Tot PC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: First difference - OLS								
Treated	-223.066*	163.522	45.742	233.255	-111.238	0.966	109.181	52.397
	(109.802)	(252.694)	(78.349)	(194.015)	(122.838)	(78.740)	(379.016)	(95.439)
Observations	458	458	458	458	458	458	458	458
Panel B: First difference - PSM - Basic Model								
Treated	-344.065**	-66.629	58.125	308.888	-69.418	11.240	-101.858	-27.485
	(157.650)	(314.567)	(70.448)	(214.907)	(107.697)	(84.262)	(453.251)	(113.872)
Observations	412	412	412	412	412	412	412	412
Panel C: First difference - PSM - Extensive Model								
Treated	-271.704	-322.749	99.853	-230.591	-89.674	-71.085	-885.951	-226.744
	(163.471)	(569.030)	(86.175)	(211.421)	(131.442)	(117.812)	(680.292)	(179.314)
Observations	231	231	231	231	231	231	231	231

Notes: Robust standard errors in parenthesis, clustered at the community level. $^{*}\ p < .10$, $^{**}\ p < .05$, $^{***}\ p < .01$. All values are expressed in USD. Households with “Tot income” above 95th percentile or below the 5th percentile at either baseline or endline are dropped. PC=per capita.

Table 16: Employment by Gender

	Farmer	Employed	Employed non-ag	Farmer	Employed	Employed non-ag
	Women (share)			Men (share)		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: First difference - OLS						
Treated	0.277***	-0.104***	-0.012	0.158***	-0.135**	-0.019
	(0.061)	(0.032)	(0.023)	(0.057)	(0.064)	(0.051)
Observations	410	410	410	367	367	367
Panel B: First difference - PSM - Basic Model						
Treated	0.190**	-0.137***	-0.009	0.228***	-0.168**	-0.043
	(0.076)	(0.041)	(0.029)	(0.074)	(0.081)	(0.066)
Observations	365	365	365	323	323	323
Panel C: First difference - PSM - Extensive Model						
Treated	0.225**	-0.178***	-0.041	0.295***	-0.281**	-0.185**
	(0.108)	(0.063)	(0.029)	(0.095)	(0.115)	(0.088)
Observations	211	211	211	175	175	175

Notes: Robust standard errors in parenthesis, clustered at the community level. $^{*}\ p < .10$, $^{**}\ p < .05$, $^{***}\ p < .01$.

Table 17: Food (In)security

	Any event (1)	N events (2)	Intensity (3)
Panel A: First difference - OLS			
Treated	-0.039	-0.446	-0.402
	(0.057)	(0.441)	(0.971)
Observations	527	527	527
Panel B: First difference - PSM - Basic Model			
Treated	-0.036	-0.858*	-1.421
	(0.060)	(0.492)	(1.087)
Observations	472	472	472
Panel C: First difference - PSM - Extensive Model			
Treated	0.011	0.221	0.922
	(0.104)	(0.660)	(1.544)
Observations	264	264	264

Notes: Robust standard errors in parenthesis, clustered at the community level.* $p < .10$, ** $p < .05$, *** $p < .01$.