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The welfare impact of Vietnam's national target programme 'building a new countryside'

A quasi-experimental evaluation

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Abstract: We evaluate the impact on household income of Vietnam's national target programme to build a new countryside for the period from 2010 to 2015. The purpose of the programme is to modernize rural Vietnam. Given the universal implementation of the programme, we use a quasi-experimental approach whereby we employ three evaluation techniques which each have their own strengths and weaknesses: an income growth model (ordinary least squares), differences-in-differences, and propensity score matching. We exploit the fact that not all rural communes graduated by the end of the period as 'new rural communes' and consider the unsuccessful communes as our comparison group. We find that the programme was responsible for an increase in household income of between 16 and 28 per cent, depending on the evaluation method used. As the comparison communes have also benefited to some extent from the programme, these percentages are an underestimate of the true effect. We also find that the programme was pro-poor and that it raised non-farm income in particular.

Figure and tables: Provided at the end of the paper.

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1   Introduction

Poverty reduction programmes and their evaluation are high on the agenda of policy makers and economists worldwide. The impact evaluation community wants to find out 'what works' and what does not work but has been heavily criticized for addressing only marginal improvements in welfare and not being able to answer the 'big' question of development, namely, how to improve the lives of large chunks of the population in a durable way (Rosenzweig 2012). The piecemeal approach to poverty reduction as witnessed in many African countries contrasts with the massive escape from poverty witnessed in mostly Asian countries. Viet Nam is an interesting case study as it has managed to achieve strong economic growth as well as a strong reduction in poverty. Viet Nam started its economic reform in 1986 and successfully transformed itself from one of the world's poorest countries to a lower/middle-income one. Viet Nam's economic growth helped millions of Vietnamese out of poverty in the last two decades (see Table 1).

In this paper we evaluate the impact of the first phase (2010–15) of Viet Nam's national target programme on the welfare of rural households. The programme can be regarded as an example of a massive attack on poverty, only or mostly witnessed in heavily centralized countries. We address the research question of whether or not the implementation of the programme (and its eventual achievement) at the commune level led to a statistically significant impact at the household level.

Importantly, this government policy applied to all rural communes in Viet Nam, making it impossible for the evaluator to perform a randomized controlled trial (RCT), not even as a phased-in design. As of 2010, all rural communes had entered the programme. As researchers, we therefore developed an evaluation design that is appropriate to such universal and non-random implementation. We will exploit the fact that by 2015 not all rural communes met all of the 19 criteria set by the Vietnamese government. In 2015, nationwide, only 20 per cent of all rural communes reached the programme target and were allowed to call themselves a 'new rural commune'. In this paper we present results from income growth models, differences-in-differences analysis, as well as propensity score matching to shed light on the impact of the programme on household welfare. We find that the programme increased household welfare by 16 to 28 per cent, depending on the method and specification. Since the comparison communes—those that did not fulfil all 19 criteria—also benefited to some degree from the programme, these estimates are a lower bound of the real impact of the programme.

The contributions of the paper to research on poverty reduction in general and in Viet Nam in particular are threefold: (i) we evaluate Viet Nam's national target programme with a quasi-experimental approach; (ii) we are able to quantify the impact of a non-randomized programme; and (iii) using detailed data on the sources of income over time, we are able to pinpoint the channels by which income increased.

In the remainder of the paper, we first discuss selected literature on poverty reduction programmes, followed by the history of poverty reduction in Viet Nam as well the main axes around which poverty manifests itself. We then describe the programme that we evaluate in this paper, the 'national target programme to build a new countryside'. The paper continues with a description of the data used and the estimation methods. We then present our results and conclude.

2   Selected literature on poverty reduction

2.1   Anti-poverty programmes worldwide

Poverty reduction programmes have been initiated and evaluated worldwide. In western countries, governments implement various programmes, such as the Temporary Assistance for Needy Families (TANF) programme, or the Supplemental Nutrition Assistance Program (SNAP) in the US, providing assistance to poor families or families in special need. Ben-Shalom et al. (2011) give an overview of and summarize the poverty reduction programmes in the US and conclude that, despite their contribution to specific groups, the aggregate impact is marginal. Almond et al. (2011) evaluate the Food Stamp Program (FSP) which provides US$34 billion to 13 million of the poorest households and find that the FSP improved infant outcomes, for newborns in particular (increase in birth weight), and also gestation length and neonatal mortality.

In a developing country setting, Daly and Fane (2002) evaluate Indonesia's 'Social Safety Net' (SSN) poverty reduction programme. The programme spanned the Asian financial crisis, witnessing a sharp increase in poverty. Their findings show that education and health care programmes are relatively more successful than programmes like rice subsidies, job creation, and loan schemes. However, there is a problem with targeting as substantial amounts flow to the non-poor. Jha et al. (2009) compare the outcome of National Rural Employment Guarantee Programme (NRUGP) in India in the states of Andhra Pradesh and Rajasthan. In the former, poverty/landlessness is positively correlated with the NRUGP participation rate, while in the latter the relationship reverses, implying that the poor are better targeted in Rajasthan. This also reflects how regional inequality of landholding is translated to the outcomes of NRUGP. The same programme was also studied by Ravi and Engler (2015) who find that it significantly increased the monthly per capita expenditure on both food and non-food items, had a negligible impact on their physical health outcomes, and improved mental health

Further on, in Bangladesh, the Food-for Education (FFE) programme aims at keeping children from poor families in school (Galasso and Ravallion 2005). The results show that the FFE targets the poor well, as they receive a higher proportion than the non-poor both within and between villages. Also, unequal distribution of land within the village is translated into unequal benefits for the poor from the programme and extra effort was needed to complement it. Jalan and Ravallion (2003) study the anti-poverty Trabajar Program in Argentina. The objective of this programme was to provide short-run work at low wages and locate projects in poor areas to repair and develop local infrastructure. They show that the programme participants tend to be poorer, less educated, and more associated with political parties than non-participants, and sizeable gains are found through the programme, especially for younger workers.

2.2   Poverty reduction in Viet Nam: a short history

Viet Nam's poverty reduction policies need to be discussed in view of the two different approaches used in Viet Nam to calculate the poverty measure. One approach is used by the Ministry of Labour, Invalids and Social Affairs (MOLISA) to generate a classification on income to determine eligibility for the national anti-poverty programme and to monitor poverty in the short run (this is the poverty measure used in this paper as well); the other is used by the General Statistics Office and the World Bank (GSO-WB) to examine poverty evolution based on consumption over the long term. Notably, those two poverty lines are distinct from the international standard poverty lines of $1.25 a day and of $2 a day (Demombynes and Vu 2015). It is worth noting that MOLISA is not revised annually, implying that it does not incorporate the inflation rate on a yearly basis. Instead, the adjustment is only made every five years with the introduction of a new Social

Economic Development Plan (SEDP). Regarding different poverty measures, Nguyen and Tran (2014) argue that the purpose of using the MOLISA approach is to determine beneficiaries of government supported poverty programmes. Households, however, may have an incentive to under-report their true incomes in order to be included in the programmes. Nevertheless, MOLISA is still at the centre of poverty measures in Viet Nam (World Bank 2016a, 2016b).

Despite the complexity of measurement in Viet Nam, the decline of the poverty rate can be seen clearly. From respective calculations by MOLISA and GSO-WB, headcount poverty decreased from 26 per cent in 1993 to 7.8 per cent in 2013 for the former, and from 58.1 per cent in 1993 to 17.2 per cent in 2012 for the latter. According to the international standards of $1.25 a day and $2 a day, the percentages of extremely poor people and of poor people dropped from 63.8 per cent in 1993 to 2.4 per cent in 2012, and from 85.7 per cent to12.5 per cent during the same time period, respectively. By any account, this is a very strong performance.

We can distinguish three axes around which poverty crystalizes: urban–rural, ethnicity, and regional. Firstly, the poverty rates (WB-GSO) are approximately 6 per cent in urban areas but 27 per cent in rural areas. The empirical work shows that an internal motivation of self-employment and non-farm activity and an external transition of urbanization all effectively reduce poverty rates in rural areas in Viet Nam. However, the vulnerability of being exposed to poverty, namely the risk of falling back into poverty, for those who have already escaped, is positive due to natural disasters and idiosyncratic shocks, etc. Those who are self-employed in non-farm activities cannot be guaranteed a poverty decline in remote rural regions because of their relative geographical isolation, limited assets, poor health status, and low levels of education. The poverty is quite persistent (Arouri et al. 2017; Hoang et al. 2014; Sohns and Diez 2017).

Secondly, with regard to the ethnic majority–minority gap, the poverty of ethnic minority groups is also less responsive to economic growth. In 2010, 66.3 per cent of minorities (most of whom were located in remote rural areas) were classified as poor compared to only 12.9 per cent of the Kinh majority (World Bank 2012). Over the last two decades (between 1993 and 2014), the ethnic gap persisted and even widened at one point due to a mismatch between the central government's intentions and the recipients' needs (Fujii 2017; Kang and Imai 2012).

Thirdly, with regard to regional divergence, Minot and Baulch (2012) find that poverty is highest in the remote northern and central highlands and lowest in the south-east regions in Viet Nam. Intuitively, the quality of infrastructure, the proximity to markets, and the degree of industrialization, etc. are all decisive factors in poverty reduction. More developed regions are better equipped than less developed regions. In some uplands, over 90 per cent of the population live below the poverty line compared to those who are near south-east urban centres; less than 5 per cent of the population is poor. However, when mapping poverty density (the number of poor people per unit of area), the poorest people live in the Mekong Delta and the Red River Delta due to high population density.

Challenges still lie ahead on the road of poverty reduction in Viet Nam. When ranking 80 developing countries over a period from the early-1990s to 2000s (Fosu 2017) by deciles in terms of gross domestic product (GDP), Viet Nam is in the top deciles on both GDP per capita and income growth. However, in rankings based on poverty reduction using the $1.25-a-day and $2.50-a-day levels, Viet Nam is situated in the fourth decile, implying that, at least for that period the high speed of GDP per capita growth and income growth is not efficiently translated into poverty reduction.

At the turn of the millennium, the most important poverty reduction programme in Viet Nam was the 'Socio-economic Development for the Communes Facing Greatest Hardships in the Ethnic

Minority and Mountainous Areas', which is also simply referred to as Program 135 (P135). The first phase was implemented between 2001 and 2005 and the second phase was implemented during 2006–10 in order to reduce the poverty of minority groups in the most remote and difficult areas. Cuong et al. (2015) conducted a differences-in-differences analysis of this programme with a baseline survey in 2007 and an endline survey in 2012. Their findings show that ownership of productive assets and household durables as well as rice productivity are affected positively by the programme, and there are large and statistically significant effects on total income, per capita household income, and poverty status for households belonging to ethnic minorities. Additionally, school enrolment improved amongst households in both the treatment and comparison communes. The former increased more than the latter, but not in a statistically significant way. Cuong (2011) also evaluated the impact of rural roads on household welfare in Viet Nam in a more general way rather than focusing on a specific road project. The results show that there is a positive impact on household income in rural areas but a statistically insignificant effect on per capita expenditure, non-farm activities, and the level of education.

3   The national target programme on building a new countryside

The National Target Programme on New Rural Development (NTP-NRD) was proposed by the Ministry of Agriculture and Rural Development (MARD) and approved by the Prime Minister of Viet Nam in 2010. This programme aims at gradually building a new countryside with the general objectives of building up new rural areas with modern socio economic infrastructure; establishing proper economic structure and production arrangements with a strong connection between agriculture and rapid development of industries and services, as well as a strong linkage between rural development and planned urban development; ensuring a stable democratic rural society with national cultural richness; and ensuring that the ecological environment is well protected, security is maintained, and the physical and spiritual life of people is increasingly improved under a socialist orientation.

The NTP-NRD lasts from 2010 to 2020 and is being implemented in the rural areas nationwide. The programme is divided into two phases: 20 per cent of communes are supposed to meet new countryside standards by 2015 and 50 per cent by 2020. The new countryside standards consist of 19 criteria related to: planning and implementation of planning; road systems; irrigation; electricity; schools; cultural facilities; rural markets; post office; residential housing; income per capita/year; the poverty rate; the labour structure; form of production; education; health; culture; environment; political and social systems; and security. In order to achieve the designed objectives, other ministries such as the Ministry of Natural Resources and Environment and the Ministry of Construction, etc. cooperate and coordinate with the MARD in the management and implementation whenever relevant and specific issues are concerned (Decision No. 800/QD-TTg 2010—Prime Minister 2009–2010). In Figure 1 we present the programme's theory of change, reconstructed by the authors from the official documents.

As the programme was implemented nationwide, all rural communes—including the rural communes of the 12 provinces covered by the Viet Nam Access to Resources Household Survey (VARHS) programme (see section 4.1)—not all rural communes met the 19 criteria by 2015. This means that on some of these criteria, implementation of the programme was late, incomplete, partial, or did not occur at all. At the start of 2016, some 20 per cent of all communes nationwide had met the new-style rural area criteria. On average, communes met 12.9 criteria compared to only 4.7 criteria in 2010. Viet Nam aims to have 50 per cent of all communes meet all the requirements by the end of 2020.

From 2014 onwards, the NTP-NRD became an internationally supported national programme through the support of four United Nations agencies: the United Nations Industrial Development Organization (UNIDO), Food and Agriculture Organization (FAO), International Organization for Migration (IOM), and United Nations Educational, Scientific and Cultural Organization (UNESCO). The first stage of the NTP-NRD has already finished. Over the 2010–15 period, a total of 1,526 communes and 15 districts achieved the government's set criteria and were recognized as successful models of new rural development.[1] The four UN agencies committed to continuing to support the NTP-NRD over the next period from 2016 to 2020. In addition, in view of its phase-based success, the World Bank Group is giving Viet Nam a loan of US$153 million with a 25-year maturity and five-year grace period as assistance for the second phase.[2]

4   Data and methodology

4.1   The VARHS household panel

The quality and availability of data has become an international priority, highlighted by the call for a data revolution in the 2030 Agenda for Sustainable Development. Researchers, and policy makers have responded to this call in the Vietnamese context through the Viet Nam Access to Resources Household Survey (VARHS), which provides deep insights into how rural households are doing and how they coped through major economic transition from 2008 to 2016.

The VARHS has been carried out every two years for approximately 2,600 rural households in 12 provinces of Viet Nam (Tarp 2017). These surveys have been conducted in collaboration with two Vietnamese partners: the Central Institute for Economic Management (CIEM) of the Ministry of Planning and Investment of Vietnam (MPI), and the Institute of Labour Science and Social Affairs (ILSSA) of the Ministry of Labour, Invalids, and Social Affairs of Vietnam (MOLISA).

The VARHS programme is well suited to analysing the impact on household outcomes of this large rural development programme, as it has collected household and commune level data prior to the start, during, and at the end of the (first phase of) the programme. In economic terminology, the VARHS represents a truly unique balanced panel survey of the changing life and work of rural families across the country. In this way, it provides a strong tool for gaining detailed and policy-relevant information about the economy and society of rural Viet Nam. This includes an extensive number of ethnic and poor rural households that have been relatively excluded from traditional growth processes.

Out of 469 rural communes in the dataset, 69 (15 per cent) were named as 'new rural communes' in 2016. To obtain households whose living conditions could be fruitfully compared, we first deleted communes from the comparison group where the average household income was far below or far above that of the treated communes. From the overall group of 399 communes that could be included in the comparison group, we deleted 100. In the 299 remaining comparison communes and the 69 treated communes, we have a total of 1,785 households in the area of common support (households in both groups with similar propensity scores, see section 4). For 1,729 of these households, we have complete (i.e. non-missing) data on all covariates. It is this group that forms our sample for all of our subsequent analysis.

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[1] See United Nations (2016) for detailed information.

[2] See World Bank (2017) for detailed information.

Of these households, 291 resided in communes that appear on our list of those that won the status of 'new rural commune', and 1,438 households resided in communes that are not on the list. We term this list the 'conservative' sample, as we are sure of the treatment and comparison status of each commune. This means that for every household residing in a treated commune, we have an average of five households in a comparison commune, an element that we will later use in one of our estimations. For a number of communes, we also obtained their real scores, and we found that 31 communes who are considered comparison communes in our 'conservative' sample, nevertheless obtained a score of 19 on this second list. We call this second sample, whereby these 31 are transferred to the treatment group, our 'fuzzy' sample, and we re-run the analysis for this second sample.

4.2 Descriptive table

A first description of the data can give a glimpse of the final outcome when looking at Figure 2. This depicts household income per survey wave, divided over treatment and comparison communes, using the conservative sample. It is clear that a sharp increase occurred in both groups in 2014 and more so in the treated group than the comparison group. We will come back to the timing of that increase later on. The statistical description of the key variables used in this paper is summarized in Table 2, and Table 3 presents a t-test for differences in the mean between treated and comparison communes at baseline. It can be seen that our treatment group and comparison group are similar for most variables, meaning the differences in the mean are statistically insignificant, except for the total area of land owned by the household and the percentage of households who belong to an ethnic minority. The comparison group has significantly more land compared to the treatment group and counts significantly more minority members.

4.3 Estimation strategy

As the national target programme is applied to all rural communes, we are not dealing with a random assignment of treatment and comparison communes. Equally, we do not have an encouragement design, as the government of Viet Nam did not use a randomly assigned incentive to encourage some communes to participate. We do have household panel data from before the start of the national programme, in essence the first two waves of the survey (2008 and 2010), as well as from the end of the programme. Our estimation strategy exploits the fact that many communes did not meet the target set by the new policy, i.e. did not reach the threshold for the 19 criteria and hence were not given the title of new rural commune.

By 2016, i.e. at the end of the programme and at the time of the last wave of our panel, only 20 per cent of communes had met all targets. We therefore compare the welfare outcomes for households residing in communes that fully complied with the policy to those who reside in communes that did not or only partly complied with it. This means we do not have a 'pure' comparison group of communes that did not benefit at all from the implementation of the policy. As a result, any difference we may observe between our treated group of successful implementers compared to our comparison group of unsuccessful implementers is an underestimation of the true impact, as households in the unsuccessful communes have also benefited to a smaller or larger degree.

We present three estimators: income growth regressions using ordinary least squares (OLS), differences-in-differences, and propensity score matching, each with their own merits and limitations. In our first analysis, we present a simple OLS estimation inspired by the growth literature:

$$Ln\ Income_{ij16} - Ln\ Income_{ij10} = \alpha_0 + \beta_1 T_j + \beta_2 Ln\ Income_{ij10} + \beta_3 \sum Z_{ij10} + \gamma_0 + \varepsilon_{ij}$$

(1)

The dependent variable here is the change in household income (in logarithmic terms) between 2016 and 2010. The coefficient of interest is β_1, which captures the effect of residence in a commune that fully implemented the programme compared to those that did not complete the programme. In the analysis, we control for income at baseline as well as a series of household characteristic measures at baseline such as age, gender, marital status, and level of education of the head of the household, as well as household size, land size, value of livestock, and a dummy variable which captures whether or not the household is a member of an ethnic minority. We include province fixed effects γ and a random idiosyncratic error term ε, and we cluster the estimation at the level of the commune.

The second analysis uses a differences-in-differences framework where time invariable characteristics are cancelled out in a household fixed effect model of the form:

$$Ln\ Income_{ijt} = \alpha_0 + \beta_1 T_{jt} + \beta_2 \sum Z_{ijt} + \theta_0 + \varepsilon_{ijt}$$

(2)

We use two waves of the data, for 2010 and 2016 and θ is the household fixed effect. In this type of analysis, it is important to check that treatment and comparison communes are on a common trend prior to the onset of the programme, which we will do.

The third estimation approach uses propensity score matching. This approach has been used before to evaluate earlier poverty reduction programs in Viet Nam (Cuong 2003). The matching approach originated from the statistical literature and shows a close link to the experimental context. Its basic idea is to find a large enough group of non-participants (in our case households residing in communes that have not fully met the targets) who are similar to the participants in all relevant pre-treatment characteristics X. That being done, differences in outcomes between this comparison group and those of the participants can be attributed to the 'treatment', in our case the full implementation of the national target programme (we refer to Caliendo and Kopeinig (2008) for full treatment of this method). Since conditioning on all relevant covariates is limited in the case of a high-dimensional vector X, Rosenbaum and Rubin (1983) suggest the use of balancing scores b(X), that is, functions of the relevant observed covariates X such that the conditional distribution of X, given b(X) is independent of assignment into treatment. One possible balancing score is the propensity score, that is, the probability of full participation in a programme given observed characteristics X, which we will use.

The matching estimation procedure is adequate when certain observables have an effect on the outcome of interest (in our case household income) and on selection into treatment but are unaffected by the participation into treatment (Imbens 2015). Whereas in a linear regression framework this will bias the estimator of the variable of interest, in matching it is possible to match on variables that are correlated with the error term in the outcome equation (Blundell and Dias 2009; Imbens and Wooldridge 2009). Using a balance score (for example, propensity score) based on observable characteristics from before the treatment to match similar treated with non-treated households, allows us to infer the causal effect of the treatment on our outcome of interest.

5   Results

Table 4 presents the results of the OLS estimation using specifications with and without province fixed effects and with and without household level control variables. We include these specifications to see if our finding on the coefficient of interest is robust to changes in the specification. The treatment variable in Table 4 is a binary indicator (0/1), which tells us whether or not the commune is mentioned as a 'new rural commune' in the list we obtained from the Government of Viet Nam.

Since our dependent variable is measured in terms of the changes in log household income, we can interpret the coefficient of interest, β_1, which we find to be 16.0 in column 1 as the percentage increase in household income in the treatment group compared to the comparison group. This coefficient is statistically different from zero at the 1 per cent level, and its magnitude and statistical significance remain at this level in the specifications presented in the other columns. In terms of the covariates that we control for, we find expected (based on the literature) statistically significant effects on changes in income from household level and head of household: households with an older or female head grow slower, which is also the case for ethnic minority households. Households with more members have higher income growth. The negative sign of the income at baseline is the convergence effect, well known in the growth literature. The covariates, of course, also affect changes in income in the comparison communes. We remember that these comparison communes have also benefited—to some extent—from the national target programme and that the 16.0 per cent increase is thus an underestimate of the true effect of the programme.

Continuing our discussion of the findings, we now look at Table 5 where we present the same analysis as in Table 4, but now we take into account that we obtained a second list of communes, limited in number, with the scores the communes received in the national target programme. Recall that the maximum score of 19 was given when the commune fulfilled all 19 criteria. When studying this list, we noticed that 31 communes which obtained a score of 19 did not appear in our original list of new rural communes. We therefore call this expanded list a 'fuzzy' list since there is some uncertainty about whether or not these 31 communes are allowed to call themselves 'new rural communes', as compared to the 'conservative' list used in Table 4. This expanded list results in 122 additional households that are now regarded as part of the treatment group. The reverse did not occur: none of the communes that were listed as 'new rural communes' in the first list scored lower than 19 in the second list. Implementing two regressions, one with and one without household level and household head comparisons, we find that the coefficient of interest, β_1 remains statistically significant at the 5 per cent level, and that the magnitude of the effect has decreased to 12 per cent. One can regard this as a robustness test of the result of the income growth regressions.

In the remainder of Table 5, notably in columns 3 and 4, we only work with the limited number of communes for which we obtained scores. This step reduces the sample size considerably. Since, here, we use the score obtained as a continuous measure of treatment, we only have 475 households who resided in communes for which we obtained the scores. Columns 3 and 4 present the results of the regressions. In column 3, which employs province fixed effects and clustering, but without household level and head of household comparisons, we find a statistically significant effect (5 per cent level) of the continuous treatment variable: for each extra point scored we find an increase in household income of 2.3 per cent. When introducing all comparisons used in the previous regressions (nine comparisons in total), the magnitude of the effect decreases to 1.5 per cent per additional point, but the effect is no more statistically significant at the usual thresholds. When we introduce eight of the nine comparison variables, leaving out the education level of the household head, the magnitude increases again to 1.7 per cent and the effect is statistically

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significant at the 10 per cent level, indicating that in this small sample education is picking up part of the treatment effects.

In Table 6 we present the results of the differences-in-differences estimation. Since the data here are in long panel format, the dependent variable is log household income per year for the years 2010 and 2016. The coefficient of interest here is again the treatment dummy, which is 0 for all communes in 2010, takes the value of 1 for the treated communes in 2016, and remains 0 for the comparison communes in 2016. The magnitude of the coefficient of interest, depending on specification is 18 per cent, statistically significant at the 5 per cent level. The findings for the covariates are similar to the OLS results. Of interest, and as a demonstration of the overall growth of the Vietnamese economy, is that household income has increased by 36 per cent on average between the survey waves (including the comparison communes). We arrive at similar results when repeating this analysis for the 'fuzzy' indication of treatment and comparison communes in columns 3 and 4, even when the magnitude of the coefficient of interest is decreased to 13 per cent.

In a differences-in-differences analysis, we need to make sure that, prior to the baseline survey, comparison and treated communes are on the same time trend. We do that by using the VARHS data for 2008 and regressing the difference in household income (in logs) between 2010 and 2008 on the treatment dummy. In other words, we perform the following regression:

$$Ln\ Income_{10} - Ln\ Income_8 = \alpha_0 + \beta_1 T_j + \beta_2 Ln\ Income_8 + \beta_2 \sum Z_{ij} + \gamma_0 + \varepsilon_{ij}$$

(3)

The results presented in Table 7 indicate that households who reside in communes that have fully implemented the national target programme were not on a different trend to the comparison communes before the national target programme started (treatment dummy statistically insignificant in all specifications).

The third set of results stems from our propensity score matching, presented in Table 8. In order to use a set of covariates that affect the outcome and selection into treatment but that are not affected by the treatment, the estimation only uses the baseline values of age, gender, marital status, and level of education of the household head, total area of land owned, ethnic affiliation, and province fixed effects (FE). We first calculate the propensity score, i.e. the probability of fully participating in the programme, and we subsequently match treated households with comparison households with similar propensity scores. We find an estimated 28 per cent increase in household income for the conservative sample and 21 per cent for the fuzzy sample. Both are statistically significant at the 1 per cent threshold. Excluding the province FE from the computation decreases the Average Treatment Effect (ATT) to 25 per cent in the conservative case and to 14 per cent in the fuzzy case.

Importantly, for a propensity score matching estimation, we want to be sure there is adequate common support (an adequate number of households in treated as well as comparison communes with similar propensity scores). We have 1,633 households under common support, of which all but five reside in the treated communes. We demonstrate this graphically in Figure 3.

6   Was growth under the national target programme pro-poor?

In the previous section, we showed that household income in communes who graduated from the national target programme has increased on average by 16 to 28 per cent. To find out the distributional impact of the programme, we compiled Figure 4. On the horizontal axis of the bar chart we find income quintiles (1 poorest, 5 richest) based on 2010 household income. We present that for comparison as well as treated communes in the conservative sample. On the vertical axis we depict the change in household income between 2016 and 2010. The result is stunning: we see that the poorest households have gained the most and that, for every quintile after the poorest, we see an increase, though a smaller one, compared to the poorest quintile. Moreover, the growth in household income is larger in the treated communes, across all income quintiles. This almost linear decrease in the growth of income can also be observed in Figure 5, which presents the same results, but now using local polynomial smoothing. Finally, the data also allow us to investigate which source of income contributes to income growth in particular. In Figure 6 we observe that income from entrepreneurial (non-farm) activities increased sharply in the period under observation and in particular in the treated communes.

7   Conclusions

In this paper we evaluate the impact of a nationwide poverty reduction programme implemented in Viet Nam between 2010 and 2015. This programme exhibits two features that are not usually present in most impact evaluations discussed in the literature. Firstly, it is a massive programme, involving all rural communes of Viet Nam and targeting domains as varied as health, infrastructure, education, income, culture, environment, and security. It is therefore anything but a project that aims to achieve a marginal change in poverty rates, a criticism that is often voiced about poverty reduction programmes. We consider this an asset for our paper, as it allows us to evaluate a programme that aims to have a truly profound impact in rural Viet Nam. Secondly, since it is targeted at all rural communes in Viet Nam, and implemented at the same time, a randomized evaluation was not possible, indeed that was not even considered by the Government of Viet Nam. Consequently, we leverage the fact that a large number of communes did not meet the required standard at the end of the programme to be able to be called 'new rural communes'. These communes only implemented part of the programme and served as our comparison group. Our estimates are, then, an underestimation of the true programme effect.

Using household income as our variable of interest, we consistently find a positive and statistically significant effect of the programme across estimation methods and empirical specifications. The magnitude of the effect varies between 16 and 28 per cent in the conservative sample and between 12 and 21 per cent in the fuzzy sample. In addition, our analysis shows that poor Vietnamese households have benefited the most from the programme and that an increase in the non-farm part of income seems to explain change in overall income.
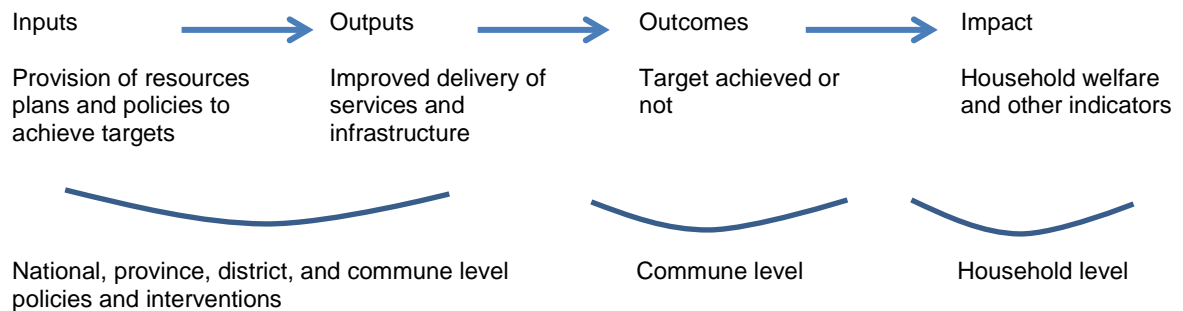
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Figures and tables

Figure 1: Theory of change reconstructed

Inputs	Outputs	Outcomes	Impact
Provision of resources plans and policies to achieve targets	Improved delivery of services and infrastructure	Target achieved or not	Household welfare and other indicators

National, province, district, and commune level policies and interventions	Commune level	Household level

Note: Figure 1 summarizes the theory of change we reconstructed from the document by the Office of the Prime Minister and we add the impact stage. Our identification strategy exploits the non-implementation, late implementation, or partial implementation of policies and interventions in some communes.

Source: Authors' reconstruction based on Prime Minister (2009–2010).

Figure 2: Mean household income per survey wave, 2008–16
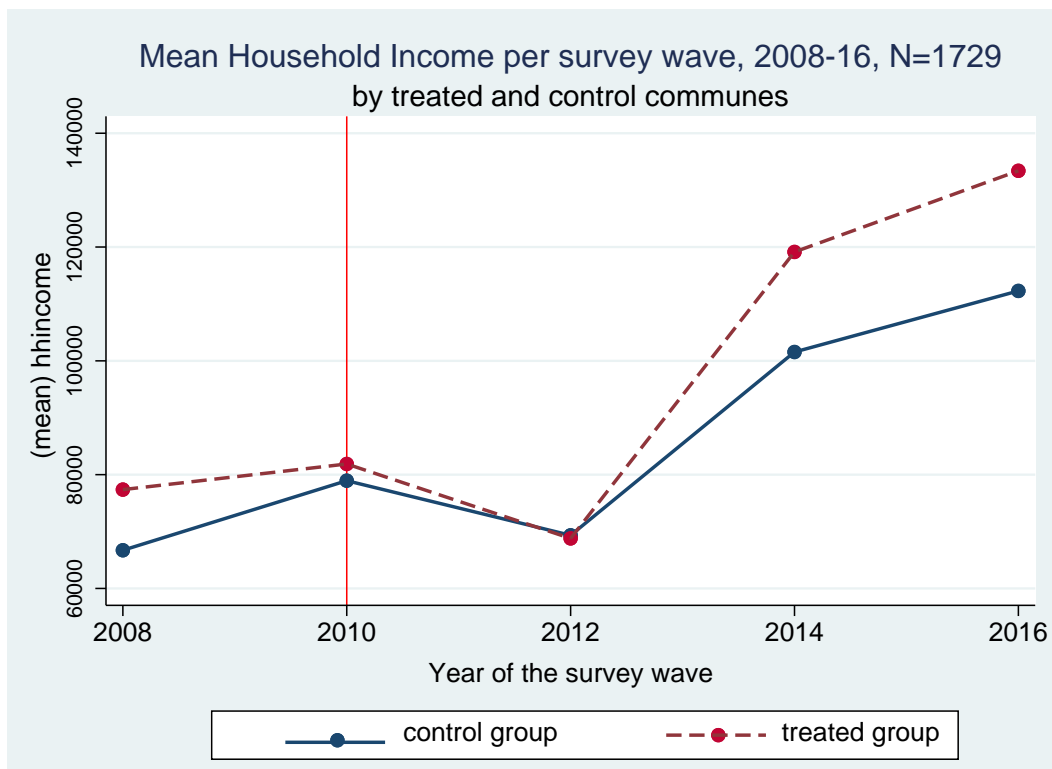
Source: Authors' calculations based on VARHS 2008–16 (CIEM et al. n.d.).

Figure 3: Common support, kernel density of the propensity score
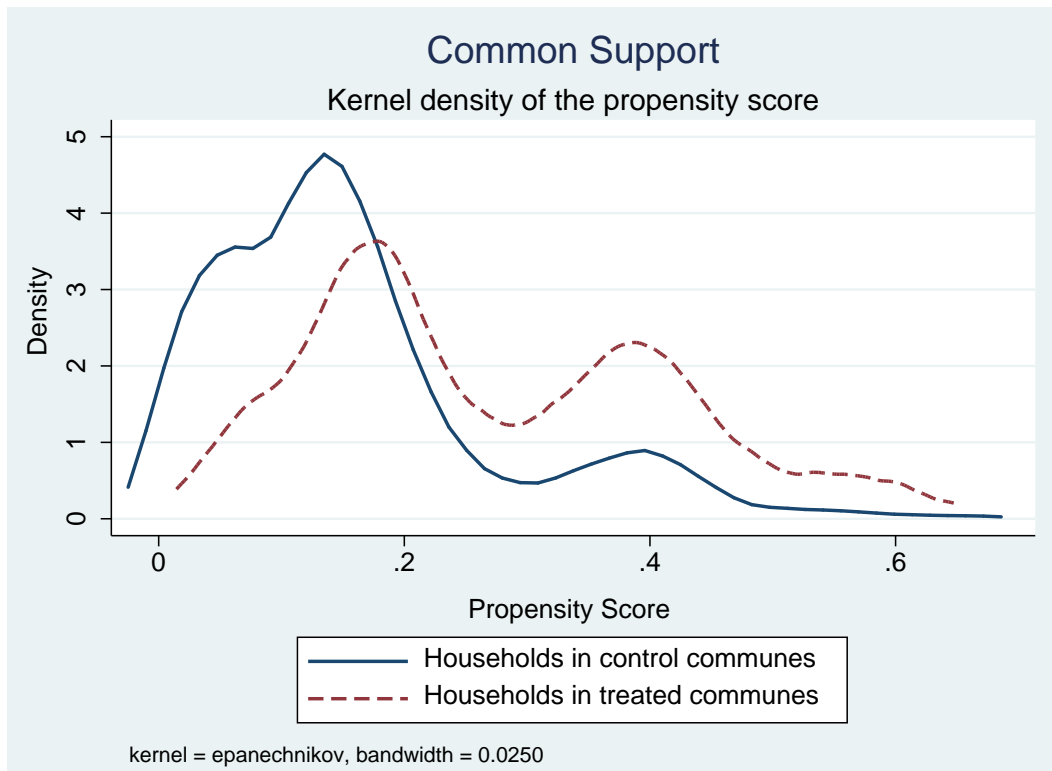
Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Figure 4: Growth of household income 2016–10, by income quintile
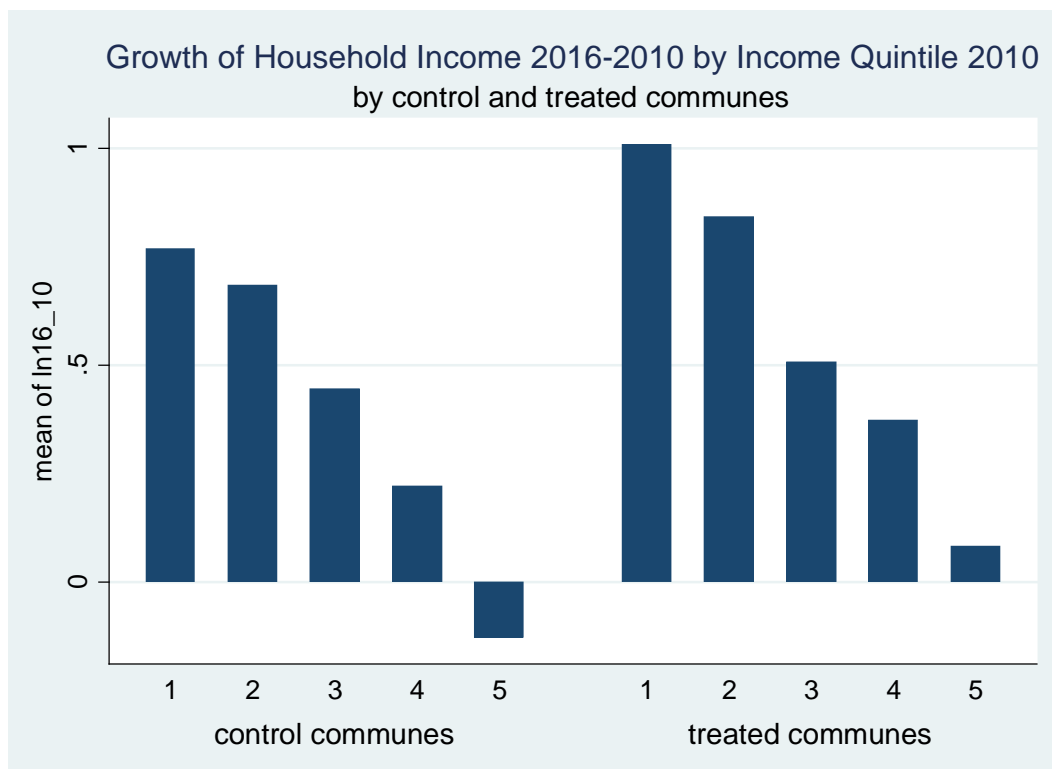
Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Figure 5: Change in household income 2016–10, by income status in 2010

change in household income 2016 - 2010 by income status in 2010
Local polynomial smooth for treated and control communes

kernel = epanechnikov, degree = 0, bandwidth = 40.11
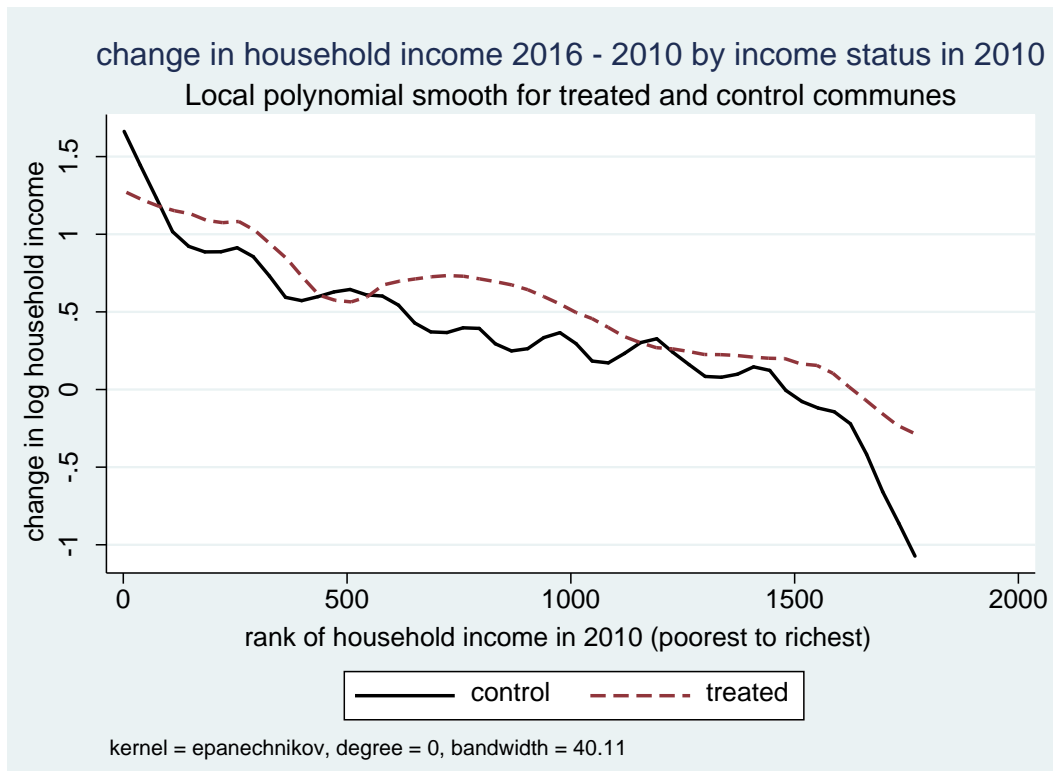
Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Figure 6: Income from household enterprises, per survey wave, by control and treated communes

Income from Household Enterprises
per survey wave, by control and treated communes
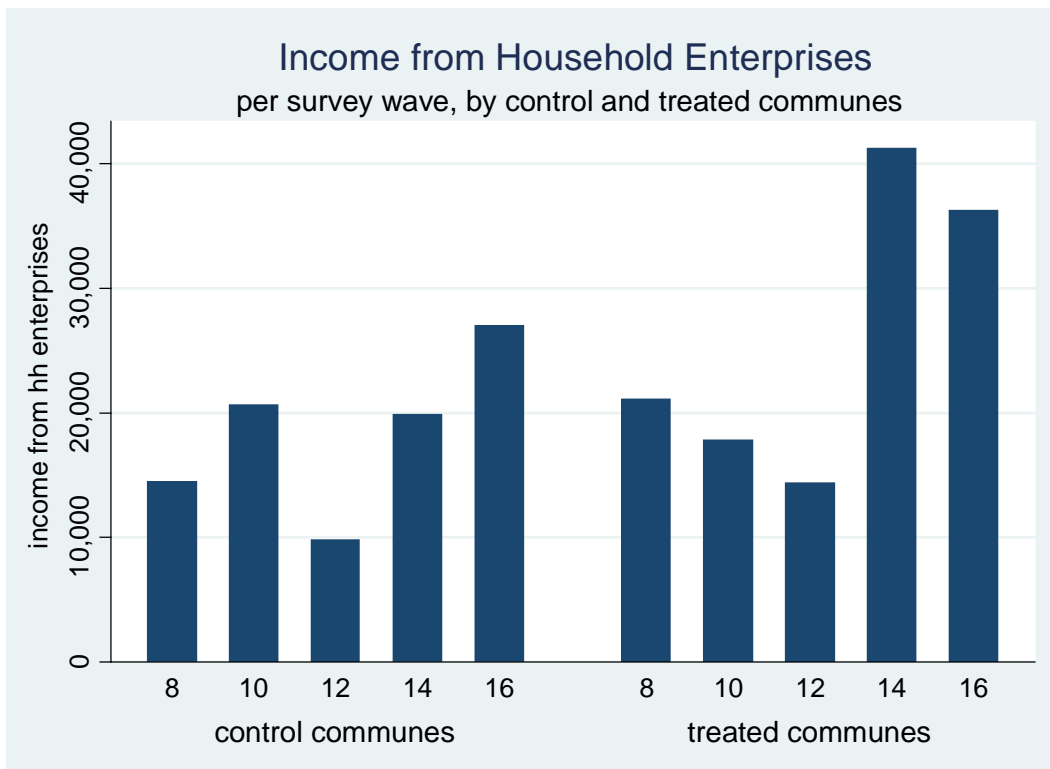
Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Table 1: The poverty rates of the whole country and of 12 provinces

	2010	2012	2013	2014	2015	Pre 2016
National	14.2	11.1	9.8	8.4	7	5.8
Ha Noi	5.3	3.6	2.9	2.3	1.8	1.3
Lao Cai	40	32.9	29.7	25.3	21.4	18.1
Phu Tho	19.2	14.1	12	9.7	8	6.3
Dien Bien	50.8	42.3	38.6	33	29.1	26.1
Lai Chau	50.2	43.5	40.6	35.3	31.5	27.9
Nghe An	24.8	19.8	17.4	14.4	12.3	10.4
Quang Nam	24	18.2	15.8	13	10.6	8.4
Khanh Hoa	9.5	8	7.3	6.2	5	3.8
Dak Lak	21.9	17.3	15.3	12.6	10	7.3
Dak Nong	28.3	23.3	21.6	18.4	15.7	12.8
Lam Dong	13.1	10.4	9.3	7.8	6	4.5
Long An	7.5	6.3	6	5.4	5	4.2

Note: Poverty rate is calculated by monthly average income per capita of household according to the government's poverty line for 2011–16 period, which is updated by consumer price index (CPI) as follows: 2010: 400,000 dongs for rural area and 500,000 dongs for urban area; 2012: 530,000 dongs for rural area and 660,000 dongs for urban area; 2014: 605,000 dongs for rural area and 750,000 dongs for urban area; 2015: 615,000 dongs for rural area and 760,000 dongs for urban area; 2016: 630,000 dongs for rural area and 780,000 dongs for urban area.

Source: General Statistics Office of Vietnam (n.d.).

Table 2: Description of household level variables

Variables	Description	Year	Mean	SD	Min	Max
Sex head	Gender of household head	2010	0.77	0.42	0	1
		2016	0.74	0.37	0	1
Age	Age of household head	2010	53.63	13.08	20	96
		2016	58.47	12.87	18	98
Hhsize	Number of household members	2010	4.21	1.65	1	12
		2016	3.92	1.79	1	12
Married	% of heads who are married	2010	81	39	0	1
		2016	75	43	0	1
Liveval	Today's value of current livestock	2010	0.011	0.024	0	0.615
		2016	0,017	0.081	0	3
Valdur	Monetary value of all durable goods	2010	0.054	0.675	0	27.64
		2016	0.034	0.04	0	1.002
Totareaown	Total land area owned	2010	0.006	0.012	0	0.194
		2016	0.006	0.012	0	0.145
Hhincome	Real, annual household income	2010	79367.92	133783.4	1754.28	3707702
		2016	115834.4	111824.8	228	1149130
Ethnic	% belonging to ethnic minority	2010	12.7	33	0	1
		2016	12.7	33	0	1
Eduhead	The highest education of the household head	2010	2.85	0.88	0	5
		2016	3.02	0.87	1	5

Note: Income is in thousand Vietnamese dong; livestock and durable assets are in billion Vietnamese dong.

Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Table 3: *T-test* for differences in the mean between treatment and comparison groups, conservative sample

Variables	Mean		*t-statistics* for mean difference	p-value
	Treatment group	Comparison group		
Sex head	0.766	0.774	0.29	0.38
Age	53.44	53.57	0.16	0.44
Hhsize	4.37	4.18	−1.82	0.97
Married	82.1	80.7	-0.57	0.56
Liveval	0.011	0.0106	−0.29	0.62
Valdur	0.056	0.054	−0.05	0.52
Totareaown	0.004	0.007	2.85***	0.002
Hhincome	81836.28	79548.08	−0.27	0.61
Ethnic	7.41	13.77	3.0***	0.003
Eduhead	2.85	2.86	0.019	0.49

Source: Authors' calculations based on VARHS 2010 (CIEM et al. n.d.).

Table 4: Income growth model (OLS), conservative sample

Variables	R1	R2	R3	R4
Treatment dummy	0.20***	0.16**	0.19***	0.16**
	(0.07)	(0.07)	(0.06)	(0.06)
Income in 2010	-0.57***	-0.71***	-0.56***	-0.70***
	(0.02)	(0.03)	(0.03)	(0.03)
Head of household characteristic				
Female		-0.13**		− 0.13**
		0.06)		(0.06)
Married		0.18**		0.19***
		(0.07)		(0.076)
Age		− 0.012***		− 0.011***
		(0.002)		(0.002)
Education level dummies [a]		Yes		Yes
Household characteristics				
Household size		0.04***		0.04**
		(0.015)		(0.015)
Land area owned		0.48**		0.29
		(0.19)		(0.18)
Value of livestock		− 0.063		− 0.033
		(0.08)		(0.07)
Value of durable goods		− 0.00		0.01
		(0.00)		(0.01)
Ethnic minority		− 0.35***		− 0.24***
		(0.05)		(0.08)
Constant	6.55***	8.55***	6.55***	8.32***
	(0.26)	(0.28)	(0.30)	(0.27)
N	1729	1729	1729	1729
Province FE	No	No	Yes	Yes
Clustered	Yes	Yes	Yes	Yes

Note: [a] we included 5 education dummies, for each level (not shown in the table). All but one are statistically insignificant. Dependent variable change in household income (in log) between 2016 and 2010.

Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Table 5: Income growth model (OLS), fuzzy sample

Variables	R1 treatment is binary	R2 treatment is binary	R3 treatment as score	R4 treatment as score
Treatment dummy	0.13**	0.12**	0.02**	0.015**
	(0.05)	(0.06)	(0.001)	(0.01)
Income in 2010	-0.56***	-0.70***	-0.44***	-0.72***
	(0.03)	(0.03)	(0.07)	(0.08)
Head of household charact.				
Female		-0.13**		-0.18
		(0.057)		(0.11)
Married		0.19***		0.19
		(0.07)		(0.12)
Age		-0.011^{***}		-0.012^{***}
		(0.002)		(0.003)
Education level dummies [a]		Yes		Yes
Household characteristics				
Household size		0.08***		0.05
		(0.013)		(0.03)
Land area owned		2.84		1.51
		(1.88)		(3.47)
Value of livestock		-0.28		-6.89^{**}
		(0.71)		(2.98)
Value of durable goods		-0.015		1.44***
		(0.016)		(0.45)
Ethnic minority		-0.24^{***}		-0.22
		(0.086)		(0.13)
Constant	6.54***	8.31***	4.94***	8.53***
	(0.30)	(0.28)	(0.71)	(0.88)
N	1729	1729	475	475
Province FE	Yes	Yes	No	Yes
Clustered	Yes	Yes	Yes	Yes

Note: [a] We included 5 education dummies, for each level (not shown in the table). All but one are statistically insignificant. Dependent variable change in household income (in log) between 2016 and 2010.

Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Table 6: Differences-in-differences estimation of the treatment effect

Variables	R1	R2	R3	R4
	Conservative sample		Fuzzy sample	
Treatment dummy	0.18**	0.17**	0.14**	0.13**
	(0.07)	(0.07)	(0.07)	(0.07)
Survey wave dummy	0.36***	0.39***	0.35***	0.39***
	(0.04)	(0.04)	(0.04)	0.04
Head of household[a]				
Age		0.006*		0.006*
		(0.003)		(0.003)
Married		-0.03		− 0.02
		(0.07)		(0.07)
Female		-0.09		-0.08
		(0.09)		(0.09)
Education level dummies [a]		Yes		Yes
Household characteristics				
. Household size		0.10***		0.10***
		(0.02)		(0.02)
Land area owned		1.63		1.73
		(4.32)		(4.33)
Value of Livestock		0.80***		0.80***
		(0.16)		(0.16)
Value of dur. Goods		0.11***		0.11***
		(0.02)		(0.02)
Ethnic minority		-		-
Constant	10.89***	9.80***	10.89***	9.78***
	(0.02)	(0.25)	(0.02)	(0.25)
N obs.	3458	3458	3458	3458
N groups	1729	1729	1729	1729
Household FE	Yes	Yes	Yes	Yes
Clustered	Yes	Yes	Yes	Yes

Note: [a] we included 5 education dummies, for each level (not shown in the table). All but one are statistically insignificant. Dependent variable change in household income (in log) between 2016 and 2010.

Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al. n.d.).

Table 7: Testing for the presence of a common trend

Variables	R1	R2	R3
Treatment dummy	-0.68	-0.02	0.67
	(0.05)	(0.04)	(0.05)
Head of household controls	No	No	Yes
Household level controls	No	No	Yes
Constant	0.11***	0.11**	5.74***
	(0.02)	(0.02)	(0.28)
Province FE	No	Yes	Yes
Clustered	No	Yes	Yes

Note: The vector of head of household characteristics contains controls for age, gender, marital status, and level of education. The vector of household characteristics contains the value of livestock, land size, the value of durable goods, household size, and the ethnic dummy. Dependent variable is the difference in log household income between 2010 and 2008.

Source: Authors' calculations based on VARHS 2008 and 2010 (CIEM et al. n.d.).

Table 8: Estimation of the treatment effect via propensity score matching

Estimator	Conservative treatment	Fuzzy treatment
Income growth model (OLS)	0.16**	0.12**
Differences-in-differences	0.17**	0.13**
Propensity score matching	0.28***	0.21**

Note: In the matching procedure, variables that can be affected by the treatment such as household size, number of active household members, livestock value, and value of assets are not included. Inclusion of these variables decreases the average treatment on the treated (ATT) to 25% in the conservative case and does not change it in the case of the fuzzy sample. ATT: Result from matching methods, and comparison with two other approaches (models with FE and control variables).

Source: Authors' calculations based on VARHS 2010 and 2016 (CIEM et al.).