

The Impact of a Community Development and Poverty Reduction Program on Early Childhood Development in Morocco

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Abstract

Participatory community development programs are designed to match government investments with local needs. In Morocco, where issues of inequality and poverty are high on the national agenda, a community development program, the National Initiative for Human Development, targeted high-poverty areas for additional investments. This paper examines whether, in addition to reducing poverty, such programs can also promote human development, specifically early childhood development. Early childhood development forms a critical foundation for later human development and plays a key role in the intergenerational

transmission of socioeconomic status. Using panel data on communities just above and below the cutoff for National Initiative for Human Development inclusion in rural areas, regression discontinuity and fixed effect models are applied to identify the impact of the program on economic outcomes and early childhood development. Although the analysis finds some transitory impacts of the program on economic outcomes, it finds no impacts on early childhood development. Reducing inequality and promoting human development through early childhood development is likely to require specific, targeted, and sustained initiatives.

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The Impact of a Community Development and Poverty Reduction Program on Early Childhood Development in Morocco

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1 Introduction

Community-driven development (CDD) is an approach that emphasizes the role of the community in planning, decision making, managing, and implementing community-level activities. National governments and development agencies have increasingly been using this model for development assistance. CDD is founded on the idea that the participation of beneficiaries can lead to better identification of communities' needs, more appropriately designed interventions, more inclusion of the poor, and a more efficient use of resources. All of these can contribute to improved development outcomes and poverty reduction (Mansuri & Rao, 2004; Wong, 2012).

Several studies have shown the impacts of CDD programs on poverty reduction. For example, a CDD program in Nepal (the Poverty Alleviation Fund) supporting small-scale village infrastructure and services as well as income-generation activities resulted in a net program impact of 19 percent in real per capita consumption growth. An evaluation of the Indonesia Kecamatan Development Program Phase II, which supported primarily rural infrastructure (roads, bridges, irrigation, and water and sanitation) and some microcredit activities, found an 11 percentage point increase in real per capita consumption among poor households in treatment areas compared to those in control areas (Wong, 2012).

This paper investigates whether, in addition to reducing poverty, CDD programs can also promote human development. We specifically examine whether a CDD program in Morocco, the National Human Development Initiative (*Initiative Nationale pour le Développement Humain*–INDH) (a) improves economic outcomes and (b) has an impact on early childhood development (ECD), the critical foundation of subsequent human development. CDD programs can be well positioned to play a role in improving ECD for several reasons. When CDD programs increase income and consumption and reduce poverty, they are likely to have indirect impacts on ECD since poverty is a major risk factor for poor ECD (Paxson & Schady, 2007; Walker, Wachs, Grantham-McGregor, et al., 2011).

CDD programs may also affect ECD directly. In many cases, CDD programs involve multiple sectors to meet the range of self-identified community needs. This engagement in multiple sectors can help in addressing ECD needs using different channels. For example, improvements in health and nutrition services as well as improved water and sanitation infrastructure can reduce the disease burden on young children, resulting in improved growth and development. Participatory planning processes for CDD programs can allow communities to identify the need for ECD services and make decisions about the kind of ECD services they require (such as nutrition, childcare, and preschool). Once services are defined, communities can provide services themselves (for example, construct school buildings or act as community-based teachers or home visitors for children) or contract them out. This engagement on the part of communities can lead to increased ownership of ECD services and, if accompanied by effective capacity-building and communication strategies, can increase communities' awareness of the benefits of these services for children.

Moreover, because the INDH targeted areas with high poverty, it may play a key role in redressing the substantial deficits and inequalities in ECD for children in Morocco (El-Kogali, Krafft, Abdelkhalek, et al., 2016; El-Kogali & Krafft, 2015; Krafft & El-Kogali, 2014). These deficits and inequalities at the ECD stage are of particular concern for three reasons. First, from a moral and children's rights standpoint, they are unacceptable; children are not responsible for the circumstances into which they are born. Second, these deficits and inequalities function almost automatically as a key mechanism for generating further deficits and inequalities in adulthood

(Victora, Adair, Fall, et al., 2008). In other words, these inequalities tend to persist and even worsen over time. Third, inequalities experienced in early childhood play a crucial role in the intergenerational transmission of poverty and inequality (Case, Lubotsky, & Paxson, 2002; Currie & Moretti, 2007).

The data used to evaluate the impact of the INDH on economic outcomes and on ECD come from three impact evaluation surveys (2008, 2011, and 2013) carried out by the Moroccan National Human Development Observatory (*Observatoire National du Développement Humain*, ONDH). The surveys provide panel data for households in rural communities just above and below the cutoff for inclusion in the INDH. For this reason, this analysis makes it possible for us to examine the levels of and gaps in development within a dynamic framework, in terms of economic development and ECD in these rural areas.

The analysis begins with an evaluation of the impact of the INDH on income, expenditure, and the assets of households for the various communes studied. Previous work evaluating the INDH program's impact on economic and human development using the first two rounds of the survey suggested substantial impacts (Observatoire National du Développement Humain, 2012), and we update those findings adding the 2013 data. Subsequently, indicators for child health, nutrition, and early childhood education are examined. Since the impact evaluation surveys conducted by the ONDH allow us to do so (they are in fact designed for this purpose), we use a method known as Regression Discontinuity Design (RDD or simply RD) to identify program impact. We also exploit the panel data to estimate fixed effects models.

We begin the paper with a discussion of the general framework for the INDH and its operations, especially in terms of ECD. Next, we describe the ONDH surveys that we have used in this study. Before presenting the results of the various analyses, we discuss the econometric methods used to estimate the impact of the INDH. The findings are then presented in detail. We conclude with a discussion of the implications of our findings for CDD policy and enhancing ECD.

2 Background: National Human Development Initiative

The intention of the INDH is to combat poverty, decrease inequality, and improve levels of human development for Morocco under an approach based on good local governance (World Bank, 2012a). His Majesty the King of Morocco in a speech delivered on May 18, 2005, officially launched the INDH. The primary INDH program was launched in September 2005. The first phase of the program covered 2005–2010. The INDH was designed to be implemented across the country based on a platform comprising four programs. The element of the program we evaluate was designed to combat poverty in rural areas. It covers 403 rural communes where the poverty rate, as estimated in the 2004 poverty map, is greater than or equal to 30 percent. The second phase of the program (2011–2015) was officially launched on June 4, 2011 (World Bank, 2012a) and targeted additional areas.

2.1 Budget and Activities

The INDH projects and activities were initially funded by DH 14 billion for Phase I (US\$1.7 billion). Phase I included approximately 700 local participatory plans, 22,000 activities, and 5.2 million beneficiaries. The second phase will invest an additional DH 17.1 billion (US\$2.1 billion) and additional phases are expected in the future. This makes the program a major countrywide initiative of substantial importance toward the development of Morocco (World Bank, 2012a).

The projects and activities supported by the INDH are varied (Coordination Nationale de l'INDH, 2011). In the field of education, classrooms, schools, housing for pupils, after-school care facilities, crèches, preschools, and accommodation for teaching staff were some elements of the INDH. In the field of health, the INDH helped fund the acquisition of ambulances and mobile units, building of health centers and dispensaries, purchase of medical equipment and materials, and building of maternity centers. The INDH targets basic infrastructure and services, including water, roads, electricity, and large-scale public infrastructure works. It has contributed to cultural and sporting activities as well. With regard to income-generating activities, the INDH has been involved with projects targeting crops, livestock and fisheries, traditional trades and crafts, small businesses, and tourism. Hostels, women's shelters, multipurpose centers, support and counseling centers, sociocultural and sports facilities, homes for the elderly, child protection centers, charitable homes, and centers for abandoned children have all benefited from the INDH. Consequently, a number of activities covered by the INDH affect ECD, either directly or indirectly, across the areas of education, health, and living conditions.

3 ONDH Impact Evaluation Panel Survey Data

3.1 The Surveys

The ONDH undertook data collection to assess the impact of the INDH on areas targeted by the initiative. Surveys covered targeted (the treatment group) and nontargeted areas (the control group) in both rural and urban areas. The survey observed the sample households over three rounds. The first round of observations took place in 2008, which was after program initiation. There was a second round in 2011 (right after the end of the first phase of the INDH). A third round took place in 2013. These are the data we use, focusing on the rural sample since the program was targeted based on poverty rates in rural areas but not in urban areas. As a result, identification of the impact using RDD is possible only in rural areas (Observatoire National du Développement Humain, 2012).

In rural areas, data were collected from approximately 1,500 households living in 124 rural communes (half of which were targeted by INDH Phase I). These communes were selected based on their poverty rate. The INDH was targeted in rural areas to communes which a 2004 poverty mapping report had identified as having poverty rates greater than 30 percent (High Commission on Planning Morocco, 2004).⁸ Since we expect communes with poverty rates that are just below and just above 30 percent to be quite similar, the control group consists of rural communes not targeted by the INDH with poverty rates less than 30 percent and more than 27 percent, while the treatment group consists of communes with poverty rates between 30 percent and 32 percent. This data collection method was designed to facilitate RDD. A post-hoc method was required because the launch of the INDH in 2005/2006 preceded plans to evaluate the program. A RDD using the commune targeting rule was identified as the optimal approach for rural areas and was for this reason incorporated into the impact evaluation survey design (Observatoire National du Développement Humain, 2012).

A further complication with identification in the 2013 round is that around 71 percent of the control areas—with poverty rates based on the 2004 poverty map of 27 percent to less than 30 percent—were treated in Phase II of the INDH (Initiative Nationale pour le Développement Humain, 2014). The second phase was launched in the summer of 2011, targeting 299 additional

⁸ The poverty map was based on the 2000/2001 household consumption and expenditure survey and the 2004 census (High Commission on Planning Morocco, 2004).

rural areas with (updated) poverty rates above 14 percent while continuing in the 403 initially targeted communes (World Bank, 2012a). We measure the 2013 impact of the INDH in terms of how those communes that were treated starting in Phase I compare to the communes not treated in Phase I. However, with the majority of the control areas starting to receive Phase II, we are essentially measuring whether the five years of Phase I treatment has a durable or additional effect.

The surveys collected data on a variety of areas likely to be affected by the INDH as well as ancillary information useful for an analysis of the outcomes. The data collected include geographic identifiers and socio-demographic characteristics of household members, including their level of education, employment status, and health. The data also include details on children, including anthropometric measurements (weight and height). At the household level, there is information on type and characteristics of housing; access to basic services (such as water, electricity, sanitation); assets; household income; and consumption expenditures. For comparability, the questionnaires were identical for all the survey rounds.

It is important to note that individuals and households were not themselves carefully tracked over rounds. Although attempts were made to contact the same households, if a household was not found in the commune where it was originally sampled, an alternative household was used in its place.⁹ Households and individuals also cannot be identified across rounds of the survey; the data are essentially a panel of communes. The sample size was also reduced from 15 households per commune to 12 in the last round, and we have limited our sample to 12 households per commune across all three rounds for the sake of consistency. Ultimately, our data consist of 1,488 households in each round. In 2008, this yields 8,986 individuals. In 2011, the sample is 9,002 individuals and in 2013, it is 8,608 individuals.

3.2 *Indicators for Economic Outcomes and ECD*

The outcomes examined in this paper relate to both economic development and ECD. Three different outcomes underlie our analyses of economic development—income, consumption, and assets. For reasons discussed below, all of our outcomes are expressed in per capita terms. Originally in nominal Moroccan dirham, all outcomes are updated into real, 2013 terms using the consumer price index (CPI) (World Bank, 2015). Economic outcomes are analyzed both in terms of annual real 2013 per capita levels and in terms of the log values of the annual real 2013 per capita levels, where coefficients can be interpreted in terms of percentage changes.¹⁰

The value of income was based on questions¹¹ about household income in the past 12 months, where respondents (each member of the household who received any income, in cash or in kind) could list all household sources of income¹² and their amount in daily, weekly, biweekly,

⁹ If possible, the originally sampled household was replaced by the new household that had moved into the same dwelling.

¹⁰ Interpreting coefficients in semi-logarithmic equations as percentage changes is an approximation. Small changes in continuous variables come closest to reflecting percentage changes. Larger changes and using dummy rather than continuous variables causes greater divergence (Halvorsen & Palmquist, 1980).

¹¹ Income source, its regularity, periodicity, and its amount.

¹² Sources of income included (1) sale of family farm products; (2) wages from agricultural activity; (3) salaries from non-agricultural activity; (4) agricultural self-employment; (5) non-agricultural self-employment; (6) being an agricultural employer; (7) being a non-agricultural employer; (8) rental property (real estate, land, transport, and so on); (9) sales of property (real estate, land, transport, and so on); (10) regular transfers from households in Morocco; (11) regular transfers from households abroad; (12) irregular transfers from households in Morocco; (13) irregular

monthly, or annual amounts. These values were summed up to an annual household income, the variable we examine in this paper. For consumption, a series of questions were asked in the household questionnaire about the household's annual spending on 10 different items¹³ and values were summed up to estimate consumption. Household assets were calculated from the household questionnaire as well, based on the sum of the total estimated market value for 37 different items.¹⁴

In examining early childhood development outcomes, we specifically look at whether mothers received prenatal care, whether there was a skilled attendant present at birth, anthropometric outcomes (height-for-age, weight-for-age, and weight-for-height) and pre-primary attendance. Whether or not a woman received prenatal care is based on a question about whether she had prenatal consultations during her last pregnancy with a doctor, nurse, or midwife. This question is asked of ever-married women aged 15–55 years, whose last birth was in the past five years. Skilled delivery was asked of the same group of ever married women aged 15–55 years, whose last birth was in the past five years, in terms of whether their last delivery was in a secure environment. Anthropometric outcomes are standardized to the World Health Organization (WHO) reference for children under 5 years of age (World Health Organization, 2006) based on measured weight in kilograms, height in centimeters, gender, and age in months. Attendance of pre-primary education is examined for children aged 3–6 years, depending on whether or not they were in the pre-primary stage in school.

4 Methods for Evaluating the Impact of the INDH

4.1 Impact Evaluation

The basic problem of impact evaluation is easy to grasp. The challenge is to construct what is known as a counterfactual, that is, what would have happened in the absence of the program (Khandker, Koolwal, & Samad, 2010). If we find, on completion of the program, that children's weight is on average lower than recorded before the start of the program, are we to conclude that the program is adversely affecting the nutritional status of the children? Obviously, the answer is 'no.' It may well be that the nutritional status of the children deteriorated for reasons entirely unrelated to the program being assessed (due to a series of poor harvests, for example). What is missing is the counterfactual, which would consist of a sample of untreated children who are similar to those treated under the program. Subject to certain assumptions, the difference in development between treated and untreated children would provide an estimate of the program's effect on their health. What should be clear from this example is that without a counterfactual, any conclusions as to the effects of the program and whether it should be continued could be erroneous. With respect to the impact evaluation of the INDH, as is described in detail, the sampling method

transfers from households abroad; (14) transfers from an agency in Morocco; (15) transfers from an agency abroad; (16) retirement pensions; or (17) other sources.

¹³ The categories were (1) food; (2) housing, electricity, and water; (3) clothing; (4) health expenditures; (5) spending on education; (6) capital expenditures (furniture and other durable goods); (7) transportation expenditures; (8) cultural and recreation expenses; (9) exceptional expenses; and (10) other expenses.

¹⁴ (1) Agricultural land, (2) lots of land for building, (3) cattle and goats, (4) sheep, (5) fruit trees, (6) chickens/turkeys/pigeons/rabbits, (7) horse-cart, (8) tractor, (9) truck, (10) housing, (11) car, (12) moped, (13) sewing machine, (14) gas heating, (15) electric heating, (16) vacuum, (17) refrigerator, (18) freezer, (19) gas cooker, (20) electric cooker, (21) washer, (22) dishwasher, (23) gas oven, (24) electric oven, (25) fixed computer, (26) laptop, (27) landline, (28) mobile phone, (29) TV, (30) DVD or VCD, (31) recorder video player, (32) VCR or video camera, (33) satellite receiver, (34) air conditioner, (35) financial capital, (36) jewelry, and (37) other.

used by the ONDH for its surveys in the rural areas was specifically designed to provide a valid counterfactual. This was done by sampling communities (households and children) that had only slightly different poverty rates. In this manner, they can be expected to be otherwise similar *except* for the fact that those with poverty rates above 30 percent were treated with the INDH program. Exploiting this counterfactual as well as the panel nature of the data, we use a variety of models to estimate a robust range of potential INDH impacts on economic outcomes and ECD.

4.2 *Regression Models*

The first method we use is regression on the impact evaluation panel data to compare outcomes in INDH and non-INDH communities just above and below the 30 percent poverty cutoff for participation while controlling for the poverty rate. We also estimate quantile (median) regression models in case the impact on the median is different from that on the mean and to control for outliers. Several early childhood outcome variables are captured by looking at whether there is access to certain services. These are binary variables, such as whether or not a child attends pre-primary education. To study the impact of the INDH on such variables, discrete choice models (logistic regressions) are used.

4.3 *Regression Discontinuity Design*

The impact evaluation leverages the fact that the sample was designed to undertake RDD. The basic idea of RDD is that treatment status, W_i , is determined, either entirely or in part, by some ‘forcing variable,’ X_i (in our case, the poverty rate), being on one side or the other of a treatment threshold (in our case, a commune level poverty rate of 30 percent from the 2004 poverty map) (Imbens & Lemieux, 2008). For lower poverty rates than the critical threshold of 30 percent, communes are not treated, while for higher poverty rates they are. The difference or jump in an outcome, Y_i , at the treatment threshold can be attributed to the program, assuming a ‘smooth’ (continuous) relationship between the outcome variable and the forcing variable in the absence of the program. For example, we expect that household incomes tend to be lower in rural communes where poverty rates tend to be higher. If the program did not exist, this relationship should be continuous, whatever the value of the poverty rate in 2004. Now, we know that once the 2004 poverty rate reaches 30 percent, the status of the commune changes from untreated to treated. If, on the basis of these observations, we record a ‘jump’ in the outcome variable at the level of this threshold (and if there is no other program which uses this same threshold as a selection criterion), we may interpret the size of this jump as the effect of INDH treatment.

Statistical methods must be used to estimate the relationship between the forcing variable and the different outcome variables and to determine whether or not any jump can be considered statistically significant. For this reason, in practice, the RDD method consists of performing a regression of the outcome variable on the effect of the program and on a function (whether linear or not, parametric or not) of the selection variable on which the participation threshold is identified. The regression models discussed above are essentially an RDD model with the assumption of a linear relationship between the poverty rate and outcomes. What we present as the regression discontinuity results below allow for a more flexible functional form, using local linear regressions based on kernel-weighting.¹⁵

Although the RDD method is not—in econometric terms—fundamentally an experimental

¹⁵ Estimates are implemented using the program ‘rd’ version 2.8 in STATA 12 (Nichols, 2007).

method, it is practically equivalent to a random assignment locally around the cutoff, particularly when the discontinuity is ‘sharp’ (deterministic) (Khandker, Koolwal, & Samad, 2010). In our case, this requires assuming the communes situated just above or just below the participation threshold are similar in terms of observable and non-observable characteristics. They can only be distinguished by their community poverty rates and the effect of the program. This local aspect of the RDD method does constitute a limitation, in that the effect identified is valid for individuals in the immediate neighborhood of the cutoff and not necessarily generalizable (Imbens & Lemieux, 2008). In our sample of 124 communes, there are two with poverty rates above 30 percent (one 30.2 percent and one 30.4 percent) that were not treated and should have been. This leads to a very slight divergence from a sharp or deterministic approach and requires the use of ‘fuzzy’ estimation. While ‘sharp’ RDD allows for estimates of the treatment effect based entirely on the jump at the cutoff, with fuzzy RDD, the ratio of the jump in the outcome to the jump in the probability of treatment is used as the estimate of the treatment effect (Imbens & Lemieux, 2008).

A critical issue in implementing RDD estimation is the question of the bandwidth to use in smoothing local estimates. Bandwidths determine how observations are weighted along the forcing variable. Sensitivity analysis to different bandwidths is a critical part of RDD. If results are sensitive to the bandwidth chosen, they are substantially less credible (Imbens & Lemieux, 2008). We begin with the ‘optimal’ bandwidth estimator of Imbens and Kalyanaraman (2012), designed to minimize the mean squared error. We refer to this as the 100 percent bandwidth. We then test 50 percent and 200 percent of this bandwidth.

4.4 *Community Fixed Effects*

As an alternative to the regression and RDD models, we estimate commune fixed effect models to account for any potential unobservable differences on the community level that might bias results as well as to look at changes over time (Khandker, Koolwal, & Samad, 2010). These models not only capture the effect of the year or wave of the survey but also the interactions between those elements and treatment status. This approach is conservative in treating 2008 (when some activities had already begun) as the baseline. The fixed effect model has three dimensions—the individual or the child (i), the commune (c), and the year or wave (t). The estimated model incorporating interactions is,

$$y_{ict} = \beta_0 + \gamma_2 V_{ic2011} + \gamma_3 V_{ic2013} + \delta_2 V_{ic2011} T_{ic} + \delta_3 V_{ic2013} T_{ic} + a_c + e_{ict},$$

where β_0 is the model intercept, V_{ic2011} is a binary variable for the 2011 wave; V_{ic2013} is a binary variable for the 2013 wave (2008 being the reference); T_{ic} is a binary variable for whether the individual i is located in a commune c , which is INDH targeted; a_c is the fixed unobservable effect of the commune; e_{ict} is the error term linked to the observation i in commune c at time t ; and β_0 , γ_2 , γ_3 , δ_2 , and δ_3 are the parameters to be estimated. Of particular interest are the δ_2 and δ_3 parameters, which indicate whether the INDH program had any impact beyond 2008, that is, whether treated communities had differential outcomes in 2011 or 2013, after controlling for time trends.

5 Findings

5.1 Sample Characteristics

The characteristics of the sample are described in Table 1 along with tests for the equality of means across rounds. The rural communes in the sample have a poverty rate in 2004 (based on poverty mapping) between 27 percent and 32 percent. This rate, which is the forcing variable, is 29.6 percent on average for all the communes. For the INDH-treated communes, the average is 30.9 percent, compared to 28.6 percent for the control communes. The mean difference between the areas is significant and since the poverty rate estimate is based on the 2004 poverty map, it remains the same for all three waves.

The average household size rose from 6.0 in 2008 to 6.5 in 2011, and then fell to 5.8 in 2013. Treated communes had higher household sizes in all rounds, with significant differences in 2011 and 2013. This result is driven in part by more children (individuals under 18 years of age) per household in the target communes, with significant differences in 2011 and 2013. The number of adults is also higher in treatment communes in all rounds, and increasingly so, with significant differences in 2013. Due to the differences in household size, we present all our outcomes in per capita terms. The age of the head of the household tends to rise slightly over time, with a significantly lower figure in INDH communes in 2011 and 2013. Women-headed households represent 6–9 percent of the sample and there is no difference by treatment status. In terms of the marital status of the head of the household, almost 9 out of 10 are married, with no significant differences by treatment. Nearly 68 percent of heads of household in the sample are illiterate. There are a few significant differences between the treated and the nontreated communes with regard to educational level of the head of the household, specifically a slightly greater share of heads with less than complete primary in control regions. Since we are using a $p < 0.10$ level of significance for testing, the few significant differences across gender, marital status, and education could be due to chance.

Table 1. Mean Characteristics of Households and Tests for Differences by Round and INDH

	<u>2008</u>			<u>2011</u>			<u>2013</u>		
	Control	Treatment	Total	Control	Treatment	Total	Control	Treatment	Total
Poverty rate	28.37***	30.91***	29.64	28.37***	30.91***	29.64	28.37***	30.91***	29.64
Household size	5.93	6.15	6.04	5.81***	6.29***	6.05	5.53***	6.03***	5.78
Number of children	2.17	2.32	2.24	1.93***	2.29***	2.11	1.84***	2.18***	2.01
Number of adults	3.77	3.83	3.80	3.88	4.00	3.94	3.70*	3.86*	3.78
Age of head	54.04	53.17	53.61	56.17**	54.65**	55.41	57.51*	56.12*	56.82
Sex of head									
Male	0.94	0.94	0.94	0.92	0.93	0.93	0.90	0.92	0.91
Female	0.06	0.06	0.06	0.08	0.07	0.07	0.10	0.08	0.09
Marital status of head									
Single	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Married	0.92	0.89	0.90	0.90	0.90	0.90	0.89	0.90	0.89
Widowed	0.07	0.08	0.07	0.08	0.08	0.08	0.10	0.09	0.09
Education of head									
None, illiterate	0.67	0.69	0.68	0.66	0.69	0.67	0.69	0.69	0.69
None, literate	0.06	0.06	0.06	0.11*	0.08*	0.10	0.11	0.12	0.11
Less than complete primary	0.20**	0.16**	0.18	0.18*	0.15*	0.16	0.14**	0.11**	0.12
Complete primary	0.03	0.04	0.03	0.03	0.04	0.03	0.02	0.04	0.03
Complete lower secondary	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.02
Complete upper secondary	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01
Higher education	0.00	0.01	0.00	0.00	0.00	0.00	0.00**	0.01**	0.00
N (observations)	744	743	1,487	744	744	1,488	744	744	1,488

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: Tests for equality of means across treatment and control estimated in each round with *p < 0.1; **p < 0.05; ***p < 0.01.

5.2 *Economic Outcome Descriptives*

Three outcome variables are used to study the economic impact of the INDH on households: income, consumption, and the total value of assets (wealth) of households. These are also presented in log terms. The outcomes are shown by round and INDH in Table 3. It is important to note that the areas treated with the INDH intervention had a higher poverty rate according to the poverty map estimates. Consequently, it is likely that in the absence of any intervention, the treatment areas would be worse off and so there may be offsetting effects. The regressions will control for the poverty rate and thus this should be addressed in other analyses. For almost all the economic outcome variables used in this study for the 2008 round, no statistically significant difference has been recorded. This may be due to the offsetting effect of the program against a higher poverty rate in treatment areas. Beginning with the 2011 wave, significant differences are apparent with better economic outcomes in treatment communes. When the outcomes achieved by 2013 are compared, the differences between communes targeted for INDH Phase I and those not targeted are significant, except for mean per capita expenditure. It is also notable that there are mixed trends over time across the different outcome variables.

Table 2. Mean Economic Outcomes (in 2013 Dirhams) by Round and INDH

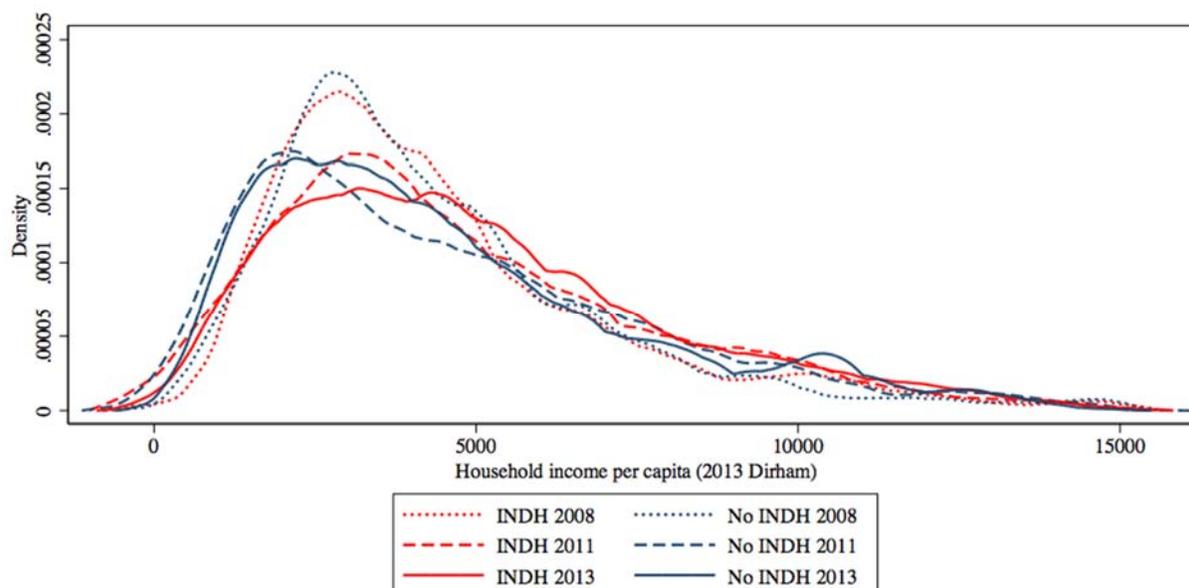
	<u>2008</u>			<u>2011</u>			<u>2013</u>		
	Control	Treatment	Total	Control	Treatment	Total	Control	Treatment	Total
Income per capita	4,778.63	4,798.42	4,788.7	5,134.98**	5,479.03**	5,313.89	5,068.43***	5,577.44***	5,333.93
Log income per capita	8.26	8.27	8.27	8.23***	8.34***	8.29	8.27***	8.37***	8.32
Consumption per capita	3,925.43	3,976.68	3,951.5	3,555.93***	4,045.50***	3,810.45	3,241.24	3,204.57	3,222.11
Log consumption per capita	8.26	8.27	8.27	8.23***	8.34***	8.29	8.27***	8.37***	8.32
Household wealth per capita	12,888.57*	11,784.68*	12,327.05	21,110.58***	27,028.18***	24,187.05	23,445.85***	28,067.55***	25,856.56
Log household wealth per capita	8.42**	8.47**	8.45	9.22***	9.32***	9.27	9.60***	9.71***	9.66
N (observations)	4,415	4,571	8,986	4,322	4,680	9,002	4,118	4,490	8,608

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: Tests for equality of means across treatment and control estimated in each round with *p < 0.1; **p < 0.05; ***p < 0.01.

As an additional descriptive assessment of differences and trends, we present density functions of the distribution of per capita income, expenditure, and assets of households (Figure 1, Figure 2, Figure 3). Whenever densities shift over time, it is due to the dynamics occurring between the two survey dates. These variations may not necessarily be due to the INDH. The two density curves representing the year 2008 are very close. Density curves for the year 2011 show substantial gaps. This indicates that in 2011, substantial differences were already apparent at almost all levels of the three variables, especially for income and consumption. In 2013, the gaps observed between the different variables are sometimes clear and sometimes less apparent according to the variables and their levels. There is no clear dominance. Overall, the observations made earlier with respect to the comparison of means also apply to the distributions.

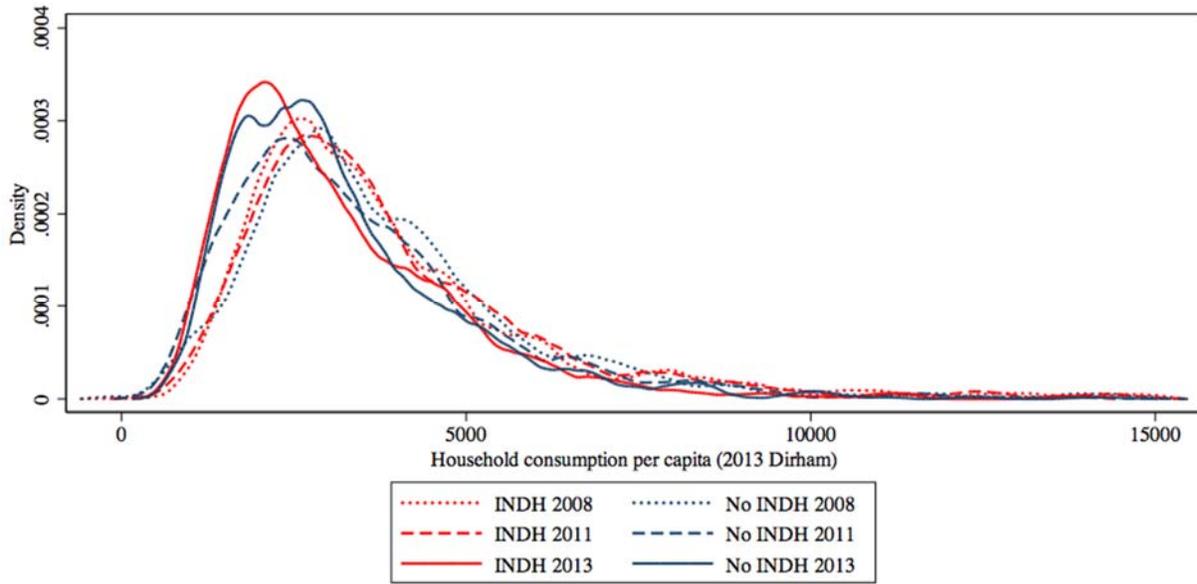
Figure 1. Per Capita Household Income Distribution (2013 Dirham)



Source: Authors' calculations based on ONDH impact evaluation panel survey.

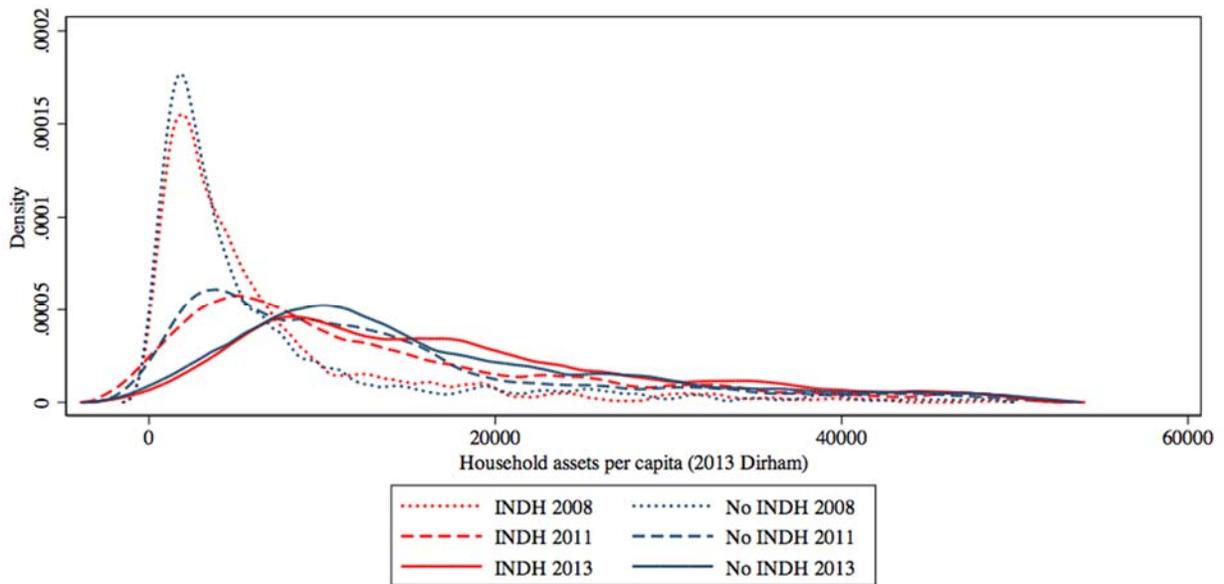
Note: Epanechnikov kernel.

Figure 2. Per Capita Household Consumption Distribution (2013 Dirham)



Source: Authors' calculations based on ONDH impact evaluation panel survey.
Note: Epanechnikov kernel.

Figure 3. Per Capita Household Assets Distribution (2013 Dirham)



Source: Authors' calculations based on ONDH impact evaluation panel survey.
Note: Epanechnikov kernel.

5.3 *ECD Outcome Descriptives*

As an initial assessment of the impact of the INDH on ECD, we compare mean ECD outcomes between the treatment and control groups in each year. Simply comparing the means, there are no statistically significant systematic patterns of differences. ECD outcomes in 2008 are worse, although similar, to those in control areas, with no significant differences. In 2011 there are mixed differences; skilled delivery is significantly lower in treatment areas, but given that this pattern is transitory and we are essentially performing multiple tests, this is unlikely to be a meaningful result. Likewise, in 2013, height-for-age z-scores are significantly higher among children in treatment communities, but this was not the case in either of the preceding years.

Table 3. Mean ECD Outcomes by Round and INDH

	<u>2008</u>			<u>2011</u>			<u>2013</u>		
	Control	Treatment	Total	Control	Treatment	Total	Control	Treatment	Total
Prenatal	54.72	54.44	54.57	64.93	65.77	65.40	65.22	63.55	64.31
Delivery	52.52	47.78	50.00	77.99**	70.83**	74.01	74.28	68.67	71.22
Height-for-age	-1.76	-1.85	-1.81	-1.94	-2.15	-2.05	-2.55**	-1.86**	-2.20
Weight-for-age	-0.15	-0.34	-0.25	0.87	0.82	0.84	0.52	0.64	0.58
Weight-for-height	1.26	1.05	1.15	2.22	2.73	2.51	2.79	2.80	2.80
Preschool	10.67	7.69	9.09	4.18	3.10	3.58	5.88	4.08	4.87

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: Tests for equality of means across treatment and control estimated in each round with *p < 0.1; **p < 0.05; ***p < 0.01.

5.4 *Impact of the INDH on Income, Consumption, and Wealth*

5.4.1 OLS and Quantile (Median) Regression Results

The estimates of OLS models for income, consumption, and wealth in level variables and then in logarithms are presented in Table 4. A binary variable for whether the household is in one of the INDH target communes is included in each of the models. The poverty rate in 2004 for the commune is also included in these regressions. These are essentially RDD models using the full sample and assuming a linear effect of community poverty rates as well as a uniform effect of INDH across the sample.

First, with regard to the income variable, the INDH effect was positive for the three periods surveyed. The INDH effect was DH 714 in 2008, but was not statistically significant. The effect was larger (DH 880) in 2011, though still not statistically significant. This figure was halved in 2013, amounting to only DH 443 and was statistically insignificant. The relationship between income and the 2004 rate of poverty variable showed a decrease in income as poverty rates increased for 2008 and 2011 but the opposite in 2013. However, the parameter associated with this variable is statistically insignificant for all three rounds of observations. One must remember that in view of the chosen identification and sampling strategy, the range of this variable was, by design, very limited (between 27 percent and 32 percent). When we consider the quantile regression results for income, we find the same overall trend. The INDH likewise has a positive effect on log income, 12.5 percent in 2008, 16.5 percent in 2011, and 18.4 percent in 2013, but these coefficients are not statistically significant.

Turning now to consumption, the INDH effect varied substantially across rounds. It was DH 584 in 2008, statistically significant at the 10 percent level. The same average gap almost doubled in 2011 (DH 932), and became significant at 5 percent. However, the coefficient in 2013 is only DH 75 and statistically insignificant. As expected, the relationship between consumption and the 2004 poverty rate is negative. The parameter associated with this same variable is, however, statistically insignificant for two of the three survey waves (2011 and 2013). In the quantile regressions, the effect of the INDH is positive and significant in 2008 (at 10 percent) and 2011 (at 10 percent) but not in 2013. Examining the impact on log consumption, the INDH effect is 12.5 percent in 2008, 20.7 percent in 2011, but 2.9 percent in 2013. These figures are statistically significant only for 2008 and 2011.

Almost all the parameters in the wealth regressions are not statistically significant. The sign of the effect of the INDH on this variable was positive for the three rounds. It amounted to an average of DH 5,215 for households in targeted rural communities in 2008, DH 2,962 in 2011, and DH 458 in 2013 but remains statistically zero. The relationship between the wealth level and the 2004 poverty rate is decreasing and significant only in 2008 (at 10 percent). It is increasing and statistically insignificant for the other two years. The same pattern of insignificant INDH effects is observed using the median, quantile regression, and log wealth. Overall, across the outcomes, we find, at most, weak economic impacts of Phase I that do not persist over time, as effects tend to dissipate by 2013 and are statistically insignificant.

Table 4. Economic Outcomes OLS and Quantile (Median) Regression Results by Outcome and Round

	<u>Income</u>								
	<u>OLS</u>			<u>Median</u>					
	2008	2011	2013	2008	2011	2013			
INDH	714 (544)	880 (727)	443 (714)	556 (349)	491 (549)	928 (713)			
Community poverty rate	-268 (179)	-209 (287)	6 (231)	-198 (127)	-96 (216)	-121 (228)			
Constant	12,385** (5,081)	11,058 (8,249)	4,900 (6,501)	9,375*** (3,611)	6,656 (6,292)	7,405 (6,455)			
N (Observations)	8,986	9,000	8,604	8,986	9,000	8,604			
	<u>Consumption</u>								
	<u>OLS</u>			<u>Median</u>					
	2008	2011	2013	2008	2011	2013			
INDH	584* (332)	932** (453)	75 (352)	424* (239)	664** (310)	68 (316)			
Community poverty rate	-206* (105)	-172 (145)	-44 (113)	-165** (83)	-149 (120)	-45 (97)			
Constant	9,758*** (2,979)	8,442** (4,125)	4,484 (3,204)	7,975*** (2,367)	7,276** (3,433)	4,046 (2,743)			
N (Observations)	8,986	9,002	8,608	8,986	9,002	8,608			
	<u>Wealth</u>								
	<u>OLS</u>			<u>Median</u>					
	2008	2011	2013	2008	2011	2013			
INDH	5,215 (3,849)	2,962 (5,846)	458 (5,689)	928 (731)	-2,502 (3,085)	928 (732)			
Community poverty rate	-2,442* (1,331)	625 (1,802)	1,098 (1,907)	-187 (251)	1,152 (903)	-121 (229)			
Constant	82,096** (38,102)	1,252 (50,827)	-7,684 (54,298)	9,118 (7,178)	-2,2933 (25,276)	7,405 (6,468)			
N (Observations)	8,986	8,966	8,600	8,986	8,966	8,604			
	<u>Log Income</u>			<u>Log Consumption</u>			<u>Log Wealth</u>		
	<u>OLS</u>			<u>OLS</u>					
	2008	2011	2013	2008	2011	2013	2008	2011	2013
INDH	0.125 (0.094)	0.165 (0.128)	0.184 (0.134)	0.125* (0.069)	0.207** (0.103)	0.029 (0.098)	0.324 (0.219)	0.273 (0.283)	0.040 (0.146)
Community poverty rate	-0.042 (0.033)	-0.020 (0.046)	-0.033 (0.044)	-0.043* (0.022)	-0.029 (0.035)	-0.019 (0.033)	-0.103 (0.075)	-0.073 (0.093)	0.026 (0.048)
Constant	9.448*** (0.928)	8.812*** (1.322)	9.196*** (1.250)	9.338*** (0.625)	8.837*** (1.004)	8.499*** (0.940)	11.348*** (2.122)	11.267*** (2.612)	8.875*** (1.359)
N (Observations)	8,966	8,919	8,604	8,977	9,002	8,608	8,979	8,966	8,598

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: *p < 0.1; **p < 0.05; ***p < 0.01.

Standard errors (in parentheses) clustered on commune level. Quantile regression standard errors are bootstrapped with re-sampling at the commune and household levels.

5.4.2 RDD Results

In this section, we examine the RDD estimates of the impact of the INDH on economic outcomes, allowing for a more flexible relationship than in the regressions above. Estimates are presented for a number of different bandwidths in Table 5. Figure 4 and Figure 5 show the RDD graphs for the 50 percent bandwidth (those for larger bandwidths are essentially more smoothed versions of the 50 percent estimates). Impact estimates are generally positive, but they are not consistently statistically significant and are very sensitive to the bandwidth used. Higher estimated impacts typically occur for smaller bandwidths. Although it is plausible that the relationship between the poverty rate (the forcing variable) is nonlinear, in a range of 27–32 percent, it seems unlikely that there is a radically different relationship right at the 30 percent mark. For this reason, estimates should be interpreted with caution, particularly for smaller bandwidths. As Figure 4 and Figure 5 show, substantial fluctuations by poverty rate are estimated at the 50 percent bandwidth that do not have any apparent explanation. Those fluctuations at the discontinuity do not appear to be substantially different from those fluctuations elsewhere.

In 2008, for the 50 percent and 100 percent bandwidths, there are significant differences in income, log income, and log consumption. Consumption itself is also significantly higher in 2008 with the 50 percent bandwidth. However, only the log income result persists at the 200 percent bandwidth, where log incomes in treatment areas are predicted to be 22.9 percent higher. Significant differences in log income do not persist in 2013; by 2013, values for the difference in levels have also dropped substantially. The differences in log income fall in 2011 and rise in 2013 but are only statistically significant at the 50 percent bandwidth, where they are a rather improbable 56.1 percent higher. Differences in wealth and log wealth remain insignificant. Although there are significant consumption and log-consumption differences in 2011, these fall with increasing bandwidth to a 23.9 percent higher consumption rate, significant only at the 10 percent level for the 200 percent bandwidth in 2011. In 2013, impacts of Phase I have dissipated to near zero differences in consumption and log consumption for the 100 percent and 200 percent bandwidths, although there are significant differences in consumption at the 50 percent bandwidth. Overall, although the RDD results suggest that there may have been positive effects, the results are not consistently statistically significant. In addition, differences have largely faded by 2013, although this may be in part due to the rollout of Phase II. The results are also very sensitive to the bandwidth used.

Table 5. Economic Outcomes RDD Results by Outcome and Round

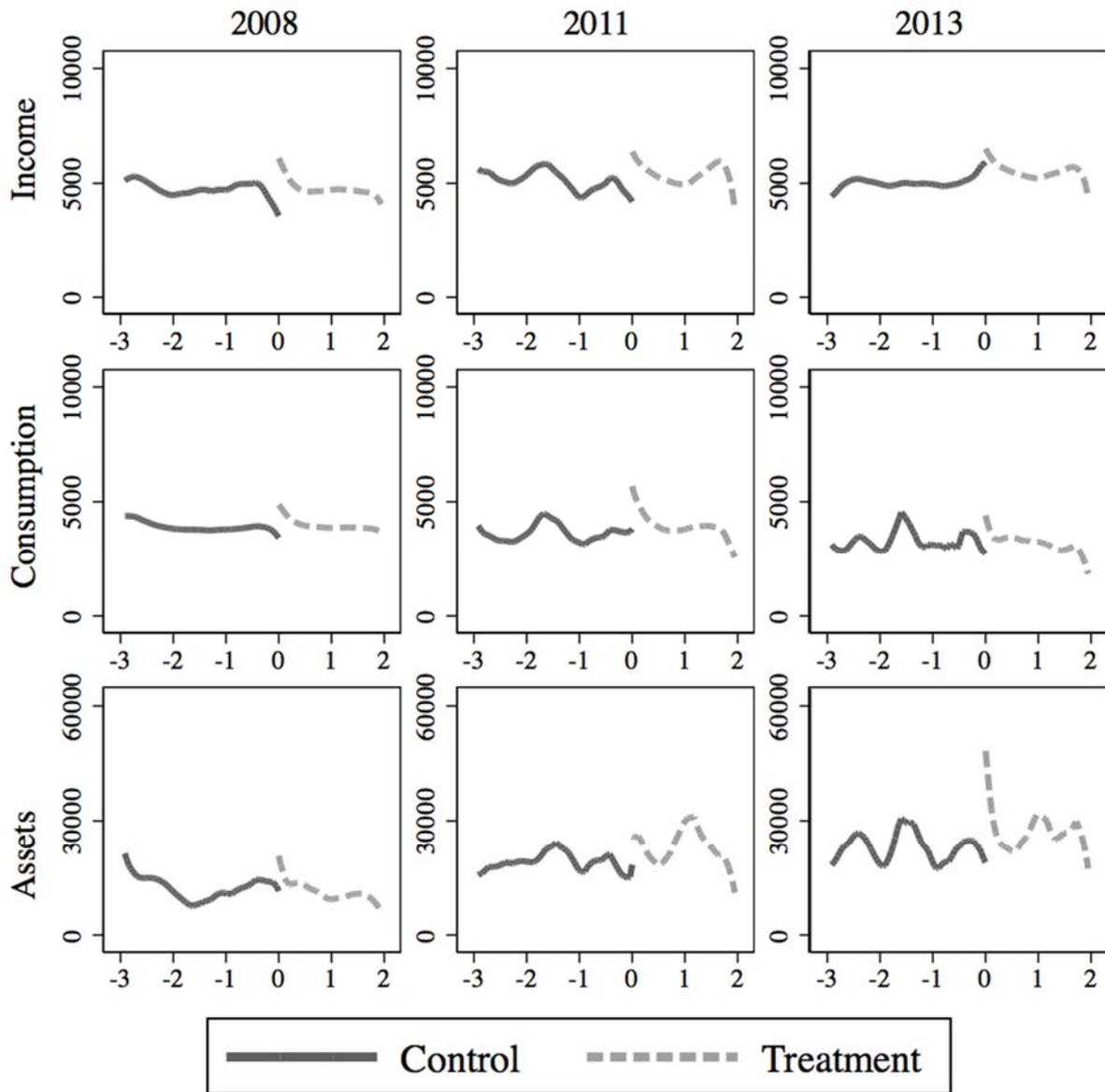
	Income	Log Income	Wealth	Log Wealth	Consumption	Log Consumption
2008						
50% bandwidth	2,526***	0.337*	10,259	0.125	1,529***	0.383***
100% bandwidth	1,347**	0.383***	3,511	0.068	556	0.283***
200% bandwidth	519	0.229*	106	-0.061	524	0.129
2011						
50% bandwidth	2,189	0.182	9,243	-0.257	2,190**	0.439**
100% bandwidth	1,488	0.281	13,220	0.727	1,730**	0.294*
200% bandwidth	882	0.170	5,930	0.608	1,002*	0.239*
2013						
50% bandwidth	597	0.561**	30,816	0.395	1,740**	0.345
100% bandwidth	618	0.278	13,900	0.185	702	0.107
200% bandwidth	754	0.322	3,718	-0.058	276	0.056

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: *p < 0.1; **p < 0.05; ***p < 0.01.

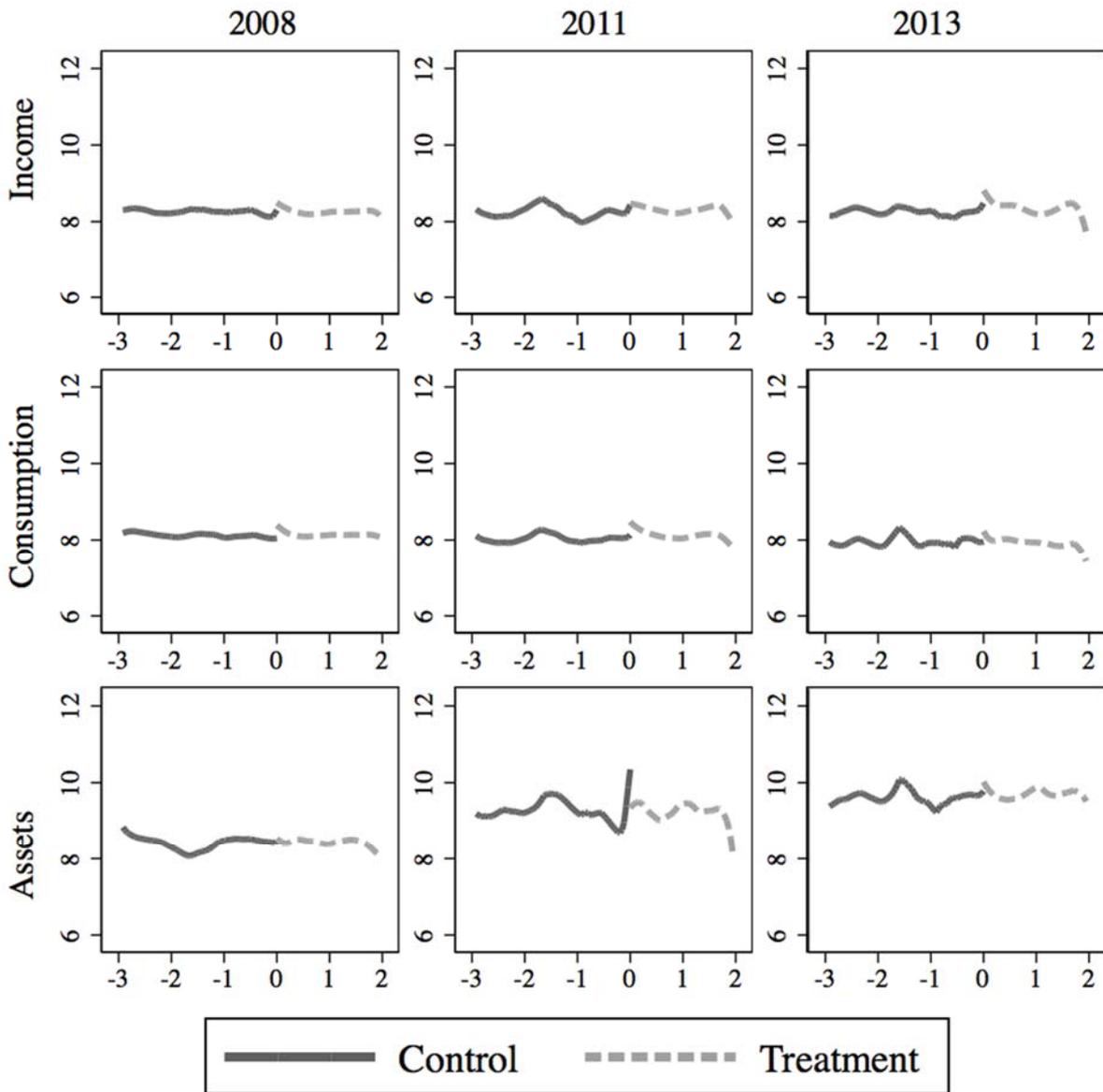
Standard errors clustered on commune level.

Figure 4. Economic Outcomes RDD Results by Outcome and Round, 50 percent Bandwidth



Source: Authors' calculations based on ONDH impact evaluation panel survey.

Figure 5. Economic Outcomes (Log) RDD Results by Outcome and Round, 50 Percent Bandwidth



Source: Authors' calculations based on ONDH impact evaluation panel survey.

5.4.3 Community Fixed Effects Results

In this section, we present the estimates based on community fixed effects. The estimates are presented in Table 6. For income, the effects of the survey rounds, as well as the effects of the interactions between the rounds and INDH are statistically insignificant. For household consumption, there is a significant interaction between 2011 and the INDH of some DH 444 (0.122 percent) but also significant decrements in consumption in the main effects for 2011 and 2013.

For household wealth, the positive gains arising from interaction between the INDH and the survey round are not statistically significant. Other improvements over time are more likely linked to the survey rounds and consequently to measurement issues across rounds, differences in the survey dates, and prevailing economic conditions, not necessarily to the INDH. Overall, there do not appear to be significant or persistent gains in these economic measures after accounting for community fixed effects and any existing impact in 2008.

Table 6. Economic Outcomes Community Fixed Effects OLS Results by Outcome

	<u>In 2013 Moroccan Dirham</u>			<u>As Log (Percentages)</u>		
	HH income	HH wealth	HH consumption	HH income	HH wealth	HH consumption
Round (2008 omitted)						
2011	347 (320)	6,051*** (2,176)	-383** (172)	-0.032 (0.053)	0.782*** (0.118)	-0.116** (0.047)
2013	238 (252)	10,308*** (2,009)	-719*** (142)	-0.003 (0.050)	1.170*** (0.096)	-0.184*** (0.039)
INDH and round interactions						
2011 and INDH	326 (410)	5,747 (3,961)	444* (238)	0.103 (0.069)	0.046 (0.179)	0.122** (0.061)
2013 and INDH	478 (363)	4,657 (3,579)	-56 (211)	0.095 (0.072)	0.068 (0.144)	-0.023 (0.060)
Constant	4,801*** (110)	12,348*** (1,158)	3,961*** (65)	8.269*** (0.020)	8.449*** (0.050)	8.136*** (0.018)
N (Observations)	26,590	26,552	26,596	26,489	26,543	26,587

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: *p < 0.1; **p < 0.05; ***p < 0.01.

Standard errors clustered on commune level.

In conclusion, by using regression, RDD, and fixed effects approaches to measure the impact of the INDH on three economic outcome variables (income, consumption, and household wealth), we find limited evidence of a positive economic impact due to the INDH program. Although the estimated effect of the INDH is generally positive, it is moderate in size and often statistically insignificant. This is particularly notable given that we are essentially implementing multiple tests over multiple methods. There may have been some greater impact in 2011 but only on certain economic measures, and effects did not clearly persist into 2013. While the RDD models suggest larger impacts, given their sensitivity to the bandwidth chosen and the observed fluctuations along the forcing variable, these larger impacts are not robust.

5.5 Impact of the INDH on ECD

5.5.1 OLS and Logit Regression Results

We turn now to the impact of the INDH on ECD. It may be the case that the impact of the INDH on this dimension of human development is greater than the economic impact (since ECD could be improved both directly through ECD interventions and indirectly through economic channels). The first results with respect to prenatal care, skilled delivery, and preschooling are derived from a logit model. We present marginal effects for the probability of receiving a service in Table 7 below. These results show that for the two health indicators, the INDH had near zero, insignificant effects in 2008 and 2011 and negative effects, which may be spurious, in 2013. It should also be noted that the relationship between the poverty rate and the likelihood of accessing health care services, which ought to be negative, was certainly negative in 2008 and 2011 but not in 2013, when it became positive and significant. This suggests some challenges in estimation with respect to this particular wave and the two indicators. With regard to preschooling, all the INDH parameters are small negatives but statistically insignificant for all the waves.

Table 7. ECD Outcomes Logit (Marginal Effects) Regression Results by Outcome and Round

	<u>Prenatal</u>			<u>Delivery</u>			<u>Preschool</u>		
	2008	2011	2013	2008	2011	2013	2008	2011	2013
INDH	0.020 (0.093)	0.103 (0.096)	-0.300*** (0.100)	-0.014 (0.093)	0.058 (0.082)	-0.244** (0.101)	-0.042 (0.046)	-0.036 (0.039)	-0.021 (0.031)
Community poverty rate	-0.009 (0.029)	-0.037 (0.032)	0.109*** (0.030)	-0.013 (0.031)	-0.051** (0.025)	0.072** (0.032)	0.005 (0.015)	0.010 (0.011)	0.001 (0.010)
N (Observations)	678	604	608	678	604	608	638	642	657

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Notes: *p < 0.1; **p < 0.05; ***p < 0.01.

Standard errors clustered on commune level. Quantile regression standard errors are bootstrapped with re-sampling at the commune and household levels.

Logit marginal effects estimated with observed values for all other characteristics.

The results with respect to nutrition and anthropomorphic measurements are shown in Table 8. It should be noted that (almost) all the coefficients are statistically insignificant. Consequently, the INDH appears to have had no significantly positive impact on the anthropomorphic measurements or on the nutritional status of the children studied. The only parameter that emerges as significant and positive is the height-for-age parameter in the 2013 wave. It should also be noted that the relationship between the poverty rate of the rural commune where the household is located and the anthropomorphic measurements are not all negative as they ought to be. Given these results, the INDH has not had any positive impacts, either directly or indirectly, on the nutritional status of children living in INDH-targeted communes.

Table 8. ECD Anthropometric Outcomes OLS Regression Results by Outcome and Round

	<u>Height-for-age (z-score)</u>			<u>Weight-for-age (z-score)</u>			<u>Weight-for-height (z-score)</u>		
	2008	2011	2013	2008	2011	2013	2008	2011	2013
INDH	-0.325 (0.374)	-0.060 (1.056)	1.331** (0.601)	-0.344 (0.265)	0.252 (0.572)	0.403 (0.878)	-0.101 (0.413)	0.054 (1.119)	0.130 (0.695)
Community poverty rate	0.095 (0.137)	-0.057 (0.296)	-0.273 (0.207)	0.059 (0.094)	-0.121 (0.195)	-0.115 (0.306)	-0.046 (0.121)	0.180 (0.312)	-0.049 (0.227)
Constant	-4.475 (3.940)	-0.344 (8.247)	5.208 (5.854)	-1.827 (2.706)	4.314 (5.558)	3.765 (8.618)	2.582 (3.435)	-2.894 (8.675)	4.188 (6.369)
N (Observations)	470	249	236	526	298	273	465	214	208

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: *p < 0.1; **p < 0.05; ***p < 0.01.

Standard errors clustered on commune level.

5.5.2 RDD Results

Turning now to the RDD results on ECD, the estimates for each year and across different bandwidths are presented in Table 9 and the RDD graphs in Figure 6 and Figure 7. As with the economic outcomes, the figures show results with a bandwidth of 50 percent. Other bandwidths have relatively smoother results. As with economic outcomes, there are substantial fluctuations over the range of poverty rates with differences at the discontinuity being largely comparable to fluctuations. Results are almost all insignificant, a mix of negative and positive estimates that vary substantially by bandwidth. While in 2011 there are positive prenatal and delivery effects that are significant at some bandwidths, in 2013 these have become negative effects significant at some bandwidths. Results are positive and significant for weight-for-height in 2008 but sensitive to bandwidth and likely spurious. Overall, the RDD results for ECD confirm the lack of an INDH program impact on ECD outcomes.

Table 9. ECD Outcomes RDD Results by Outcome and Round

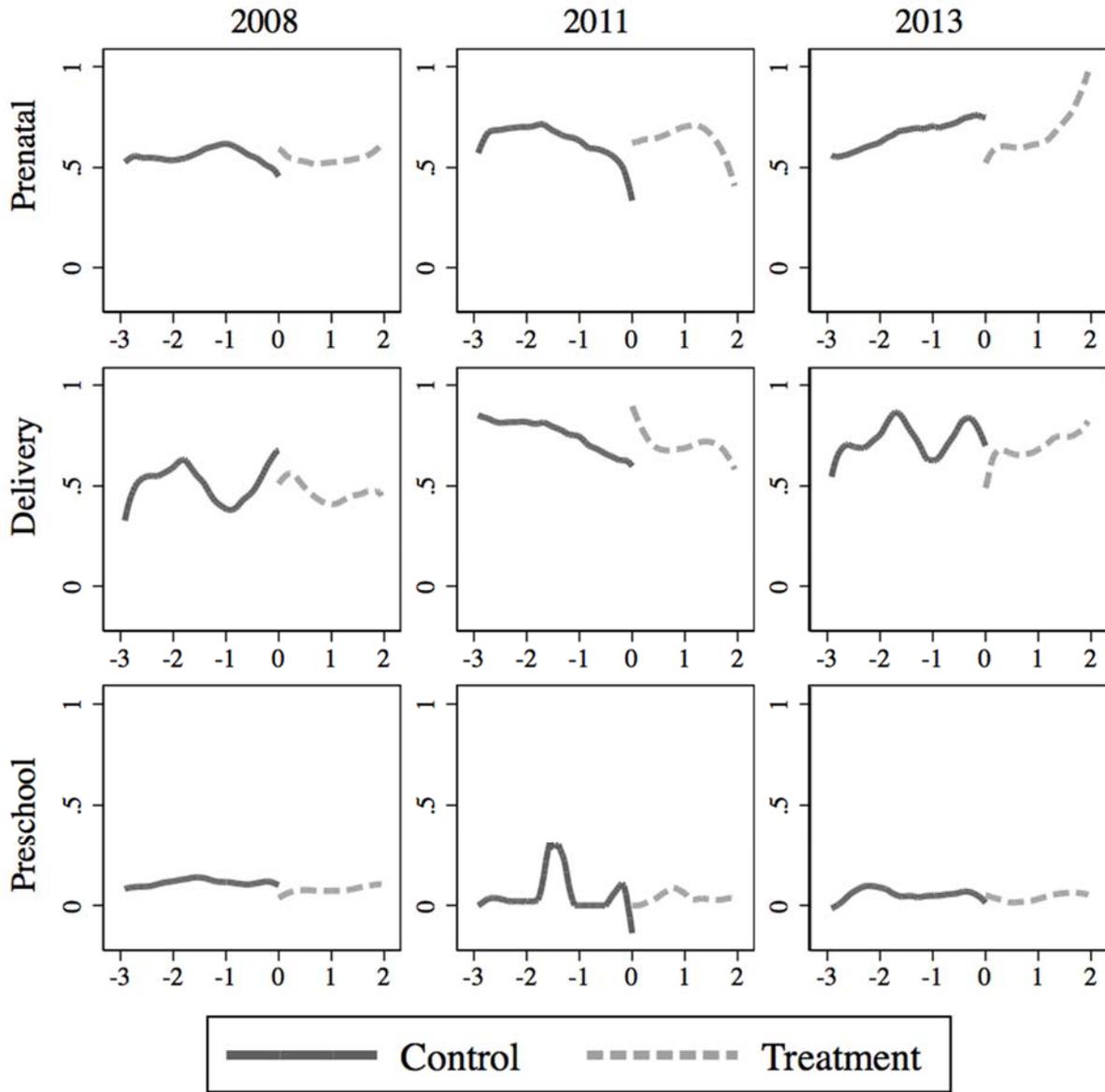
	Prenatal	Delivery	Height for age	Weight for age	Weight for height	Preschool
2008						
50% bandwidth	0.145	-0.158	-0.695	-0.257	1.287***	-0.090
100% bandwidth	0.087	-0.095	-0.688	-0.307	0.874*	-0.031
200% bandwidth	-0.003	0.003	-0.370	-0.327	0.234	-0.056
2011						
50% bandwidth	0.301**	0.304***	0.578	0.307	-0.126	-0.021
100% bandwidth	0.155	0.198**	0.318	-0.265	-0.652	-0.099
200% bandwidth	0.131	0.140*	-0.347	-0.614	0.062	-0.100
2013						
50% bandwidth	-0.262	-0.224	0.654	-2.153	-2.022	0.038
100% bandwidth	-0.206	-0.221*	0.708	-0.372	-0.502	-0.013
200% bandwidth	-0.238**	-0.183*	0.708	-0.479	-0.854	-0.029

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Note: *p < 0.1; **p < 0.05; ***p < 0.01.

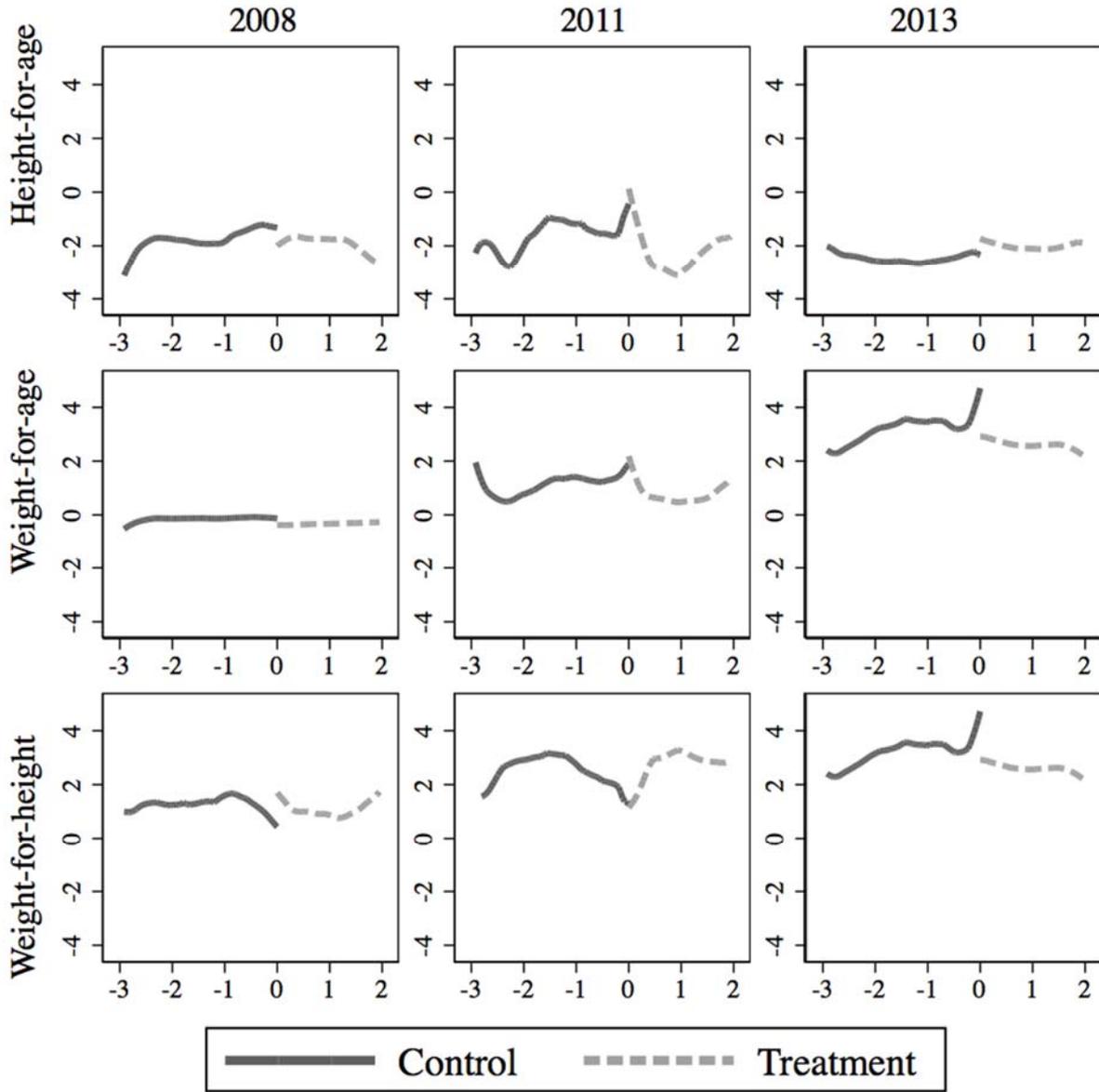
Standard errors clustered on commune level.

Figure 6. ECD Binary Outcome RDD Results by Outcome and Round, 50 Percent Bandwidth



Source: Authors' calculations based on ONDH impact evaluation panel survey.

Figure 7. ECD Anthropometric Outcomes RDD Results by Outcome and Round, 50 Percent Bandwidth



Source: Authors' calculations based on ONDH impact evaluation panel survey.

5.5.3 Community Fixed Effects Results

In addition to the estimates modeled using multiple linear regression and the logit models examined above, models were estimated with commune fixed effects. These models are very similar to those applied to the economic variables; however, three of them are logit models. The results are shown in Table 10. For the two health indicators, some wave effects are noted, which are statistically significant and positive. However, the interactions between the INDH and the survey year show no significant effects on the two health variables. It appears that the INDH on its own did not increase the likelihood of children receiving these two types of health care after 2008.

As for the preschooling indicator, the only parameters that are not statistically zero are those linked to the survey waves. These parameters are all negative; the trend is a reduction in preschooling for all children. The other parameters on the interaction variables between the INDH and the survey year are again statistically insignificant. With regard to the three anthropometric measures, while there are significant time trends, they are negative for height and positive for weight, thereby generating a mixed picture. All the estimates for the parameters linked to the variable for the interaction between the survey wave and the INDH targeting are statistically insignificant.

Table 10. ECD Outcomes OLS and Logit (Odds Ratio) Community Fixed Effects Results by Outcome

	Prenatal	Delivery	Height-for-age	Weight-for-age	Weight-for-height	Preschool
Round (2008 omit.)						
2011	0.492*** (0.181)	1.182*** (0.196)	-0.262 (0.378)	1.206*** (0.234)	1.402*** (0.381)	-1.015*** (0.375)
2013	0.470*** (0.180)	0.939*** (0.191)	-0.869** (0.355)	0.630*** (0.238)	1.846*** (0.310)	-0.619* (0.340)
INDH and round interactions						
2011 and INDH	0.060 (0.246)	-0.063 (0.264)	-0.146 (0.528)	0.015 (0.317)	0.142 (0.553)	-0.213 (0.561)
2013 and INDH	-0.074 (0.245)	-0.036 (0.257)	0.800 (0.493)	0.371 (0.327)	-0.192 (0.399)	-0.115 (0.498)
Constant			-1.766*** (0.095)	-0.282*** (0.092)	1.094*** (0.084)	
N (Observations)	1,839	1,835	955	1,097	887	948

Source: Authors' calculations based on ONDH impact evaluation panel survey.

Notes: *p < 0.1; **p < 0.05; ***p < 0.01.

Standard errors clustered on commune level for the OLS models.

Odds ratios are presented for the fixed effect logit (conditional logit) due to the conditional nature of estimates precluding standard marginal effects for this model.

In conclusion, the INDH did not have significant impacts on children's health, nutrition, or preschooling. It should be noted that even though these areas were not the main targets of the INDH, we would expect some direct and indirect effects on ECD from the INDH activities.

6 Discussion

6.1 Implications of the Study

This study has assessed (a) the impact of the INDH on economic outcomes and (b) if the INDH has enhanced ECD, a critical phase of human development and the transmission of socioeconomic status, inequality, and poverty across generations. Previous work on the impact of the INDH, using the 2008 and 2011 data and an RDD approach, had identified substantial economic development and human development impacts (Observatoire National du Développement Humain, 2012).¹⁶ Using regression models, RDD, and fixed effects models we find somewhat smaller economic impacts, particularly by 2013, when program effects seem to have dissipated. It is important to keep in mind that by 2013, many of the Phase I control areas had received Phase II (as had the Phase I treatment areas). The lack of an impact in 2013 suggests that there may be some initial high-return projects that boost outcomes in treated communities but that the 2005–2011 investments in the INDH Phase I communities made them no better off than if they had just received the 2011–2013 investments, as did the Phase II communities.

Although our findings suggest that the INDH may offer an initial economic benefit but not have long-term, ongoing, transformative effects, rough calculations suggest benefits exceeded costs during Phase I. Since Phase I of the project from 2006 to 2010 cost DH 14 billion

¹⁶ That different results from the previous evaluation (Observatoire National du Développement Humain, 2012) were generated in this impact evaluation for 2008 and 2011 is due to not only the different mix of methods used but also the fact that the previous evaluation estimated impacts on a household rather than on a per capita basis.

and benefited 5.2 million individuals (World Bank, 2012a), average costs per beneficiary were approximately DH 2,700, or DH 540 per beneficiary per year for each of the five years. For the projects we focus on in rural areas, the economic benefits are similar in magnitude to the costs, assuming benefits occur over the five years from 2007 to 2011 in line with the 2008 and 2011 impacts. Impacts on income, although insignificant, fall near DH 540 (DH 478–880 for impacts across 2008 and 2011, in 2013 dirham, in the regression and fixed effects models). Consumption results, which are typically significant, likewise fall in a similar range (DH 444–932 for impacts across 2008 and 2011, in 2013 dirham). In this manner, the economic benefits appear equivalent to the costs, although not durable, making further investments in Phase II of uncertain and potentially limited value, at least in terms of economic outcomes, poverty reduction, and income generation.

An important point to keep in mind is that the INDH is a diverse program; certain investments are likely to have higher returns than others. An assessment of 14 different income-generating projects found that half had insufficient returns to justify their costs, three had been abandoned, and the remaining seven had internal rates of return from 12 percent to 14 percent. Although focusing on only a narrow subset of activities, estimates of the INDH project impacts in terms of electrification, rural roads, drinking water, and urban upgrading showed a wide range of rates of return, from costs exceeding benefits to returns as high as 50 percent (World Bank, 2012a). Likewise, it is unclear whether the participatory aspect of the program is shifting social norms; there are mixed results—nil, positive, and negative—for the impact of the INDH on social capital (Nguyen & Rieger, 2014).

Certain areas are not being addressed by the INDH, including, as we demonstrated, ECD, where there was neither a direct effect from improved economic outcomes nor an effect through social service activities that might enhance ECD. It may be worthwhile to shift the INDH program's activities to improve ECD outcomes, given the high rates of return to ECD investments and the consistently positive impacts of ECD interventions (Heckman, 2006; Nores & Barnett, 2010). We discuss below how ECD has been prioritized in other CDD programs and how the INDH might implement similar efforts. Although the initial phase of the INDH may be justified by its economic benefits, given that these benefits have dissipated, it will be critical to target high-return areas of development, such as ECD, for the program's benefits to justify its costs in the future. This is especially needed for the program to have lasting effects on human development, poverty, and inequality.

6.2 *Limitations of the Study*

While this study provides important evidence on the role community development programs can play in economic and human development, it is important to keep in mind a number of limitations of the study. First, the treatment was not randomly assigned to individuals or communities. Rather, those communities above a certain threshold of predicted poverty rates were given the INDH program. While compliance with the treatment rule was good in rural areas, it was poor in urban areas. For this reason, we have focused our analyses on rural areas only. Unfortunately, data collection to enable impact evaluation was only implemented after the project had been under way for two years. As a result, it is difficult to say if differences in outcomes are caused by treatment. While the regression discontinuity design can overcome this challenge, under the assumption that (after accounting for poverty rates) communities were otherwise similar near the cutoff of a 30 percent poverty rate, we find results that are quite sensitive to the bandwidth used and the year examined. Additionally, there is not a very consistent pattern across different economic outcomes (income, consumption, and assets) nor do

the economic differences appear to persist into 2013, although this may be due to many control areas from Phase I being treated in Phase II. One challenge in detecting economic impacts is the relatively small sample size, which is clustered in communes, such that standard errors are imprecisely estimated.

For early childhood development outcomes, we do not see INDH program impacts. It may take even longer than the number of years from program implementation to 2013 for additional economic impacts and infrastructure to affect human development, but the fairly substantial time span covered makes this unlikely. We are, however, limited in the outcomes we can assess given the available impact evaluation data. We are also limited by the relatively small sample size of children within the survey. Additionally, as is discussed below, challenges in implementing the INDH program may limit the generalizability of these findings to contexts with similar challenges in implementation; greater impacts might be observed with alternative program designs and organization.

6.3 Challenges in Implementation of the INDH

Actual program implementation helped us identify certain obstacles at the local level; coordination between the local and national level may have limited the program's impact. There is not much decentralization of decision making in the various public sector departments in Morocco, which led to redundancies in investments (World Bank, 2012b). This situation poses two major challenges to improving the impact of the INDH. The first involves the need for rapid, flexible coordination between the local and central authorities in each government department. The second has to do with intersectoral coordination on local projects. Additionally, elite capture may be a problem with the CDD design of the INDH (Bergh, 2012; Economic Social and Environmental Council, 2013; World Bank, 2012b). The sustainability of the INDH projects is often mentioned as one of the challenges to be overcome and may be why we see fade-out of program effects in the results (World Bank, 2012b). This challenge should be fully considered in the selection and approval stage of future projects.

6.4 ECD in Community Development

The evaluation demonstrated that the INDH had no impact on ECD outcomes. However, there are CDD programs that have had positive impacts on ECD that could serve as models for modifying the INDH. For instance, Indonesia's incentivized community block grant program, PNPM Generasi, began as an experiment to adapt a CDD program to focus on education and health targets that were not being addressed sufficiently in the existing program. Each year participating communities received a block grant, which had to be used to reach 12 education and health targets related to maternal and child health and education. To determine the use of the grant, communities, with support from trained program facilitators and service delivery workers, conducted social mapping and participatory planning. They chose from a list of service options (such as health centers, playgroups, formal kindergartens, and community centers with integrated ECD services, and outreach such as home visits, community-based teachers, and advocacy activities to sensitize the community about the benefits of ECD). To incentivize communities to focus on the most effective options, the size of the block grant for the subsequent year was based partly on the communities' performance on the targeted indicators (Olken, Junko, & Wong, 2011).

Findings from an evaluation conducted between 2007 and 2010 show that Generasi had positive impacts on all the 12 indicators it targeted, particularly those related to the utilization of

health services (such as weight checks for young children and prenatal care). There was also a significant (10 percent) reduction in chronic malnutrition. The evaluation found that making the grants conditional on performance improved health outcomes but not education outcomes. There are several hypotheses to explain this. First, improvements in health indicators could be easier to achieve than those in education, perhaps because health indicators were lower at baseline than education indicators. Second, education gains may require more people and long-term efforts (regular attendance at school). It is also possible that perhaps the fact that communities provided education support to almost all children, instead of just those out of school, minimized the effect of the program (Olken, Junko, & Wong, 2011).

A number of lessons from *Generasi* may apply to the INDH. Having the established architecture and machinery of a CDD approach provided a strong foundation for *Generasi*. The program was more effective where baseline levels were low, so priority areas should be selected based on low indicators. In addition, performance incentives worked better to affect health indicators. It is important to ensure that the incentive scheme is easy for communities to understand. Furthermore, targets should regularly be reviewed and updated to reflect priority areas for improvement. Given the results and lessons learned from Indonesia, the following design modifications could enhance the impact of the INDH on ECD outcomes for the poorest Moroccan children.

First, in addition to targeting poor areas using the *Haut Commissariat au Plan* (Higher Planning Commission, HCP) poverty map, the INDH could also target using a nutrition map showing anthropometric data at a commune or other disaggregated level.

Second, the INDH could create a specific program focused on ECD and include a menu of options for community-level ECD services, especially those related to nutrition (for pregnant women and children who are under the age of two) and early childhood care and education services (for children under six years of age). These could include building or revamping health centers, creating community child development groups or playgroups, supporting community preschools or community centers with integrated ECD services and outreach such as home visits, and advocacy activities to sensitize the community about benefits of ECD. They could also include construction grants for pre-primary classrooms that include classrooms, school furniture suitable for pre-primary classrooms, playground materials, and sanitation facilities.

Third, the INDH could provide incentives for performance on ECD outcomes, specifically related to nutrition and early childhood care and education.

Finally, to complement these modifications, raising awareness and sensitizing parents and caretakers so they can make better decisions about ECD (for example, assessing the menu of services) and improve ECD outcomes at home could further enhance impact. This could be done through mass media and technology (such as cell phones, radio, TV) and through reaching key leaders (for example, imams).

7 Conclusions

This study examined whether the INDH, a national community-driven human development program in Morocco, had an impact on economic outcomes and human development, focusing specifically on ECD as the foundation of human development and when cycles of poverty begin. The study used three rounds of panel data on rural communities near the cutoff for program targeting to assess program impact. The analysis showed that while the INDH had an impact on economic outcomes during Phase I, the effects had dissipated by 2013. Additionally, the INDH did not have either direct or indirect effects on ECD. Although it did not explicitly target ECD, the focus on improving economic outcomes and social services could have generated

improvements in ECD. The absence of ECD targets will limit the INDH's long-term impact on poverty and human development. The INDH could be more effective at addressing ECD, with targets for ECD potentially incorporated into the INDH. Other studies have similarly found that economic development alone is insufficient for improving ECD outcomes (Vollmer, Harttgen, Subramanyam, et al., 2014).

Overall, this study makes important contributions to understanding economic and human development. It also shows how policies can promote these important outcomes. The findings add to the growing body of evidence that CDD programs can be effective. Still, their effectiveness may be contingent on program design and is not necessarily sustainable (Mansuri & Rao, 2004; Olken, Junko, & Wong, 2011; Wong, 2012). Additionally, CDD programs will not necessarily invest in high-return activities, such as ECD, in the absence of specific ECD targets. In countries like Morocco, in working toward reducing poverty and inequality, more needs to be done to address high-priority challenges such as ECD.

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