

# The Impact of Three Mexican Nutritional Programs: The Case of Dif-Puebla

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# THE IMPACT OF THREE MEXICAN NUTRITIONAL PROGRAMS: THE CASE OF DIF-PUEBLA

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#### ABSTRACT

This paper presents an impact evaluation of three nutritional programs implemented in Puebla, Mexico, run by SEDIF, a social assistance institution. The present study uses both a propensity score matching and weighting in order to balance the treatment and the control groups in terms of observable characteristics, and to estimate, later on, the causal effect of the programs on different areas: food support, food orientation, education, and health. This investigation adds strong empirical evidence about the beneficial effects of nutritional programs on growth indicators (i.e. on anthropometric variables). In addition, it provides some evidence about the favorable impact of this kind of programs on food orientation outcomes, such as eating habit changes or diet diversity, variety, and quality. However, this study unveils only marginal effects on food security and detrimental effects on educational outcomes (specifically on student's marks). Finally, it does not provide conclusive effects on health.

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# I. Introduction

The purpose of this paper is to present the impact evaluation of the following three nutritional programs of the DIF Institution (*Desarrollo Integral de la Familia*) located in Puebla, Mexico: i) Hot School Breakfast (DEC by its acronym in Spanish), ii) Cold School Breakfast (DEF), and iii) Starting a Correct Nutrition (INC). DIF is a governmental agency in charge of conducting social assistance policies directed at strengthening family ties.

First, this study examines the methodological framework in which the impact evaluations are situated with the purpose of comparing the different evaluation tools currently available. The impact evaluation methods can be divided into two broad groups: the experimental group and the observational group. After analyzing the former, which it cannot be implemented due to the absence of an *ex-ante* random sample, the observational methods will be explored: i) matching and the propensity score; ii) instrumental variables; iii) RDD (Regression Discontinuity Design); iv) DID (difference-in-difference); and v) quantile regressions.

Second, a brief description of the three programs is offered, highlighting their main features and the variables to be evaluated. Based on the preceding sections, this study provides a justification for the quasi-experimental methods selected. Afterwards, some technical particularities of the estimations are pointed out: i) type of standard errors; ii) the need for fixed effects; and iii) some practical considerations for the implementation of the impact evaluation. Then, the results will be presented for each program.

Finally, the conclusions are presented, together with the policy implications and the recommendations for DIF-policy makers. At the same time, the results of the three programs are horizontally compared.

#### **II.** Methodological Framework

In the last few years, impact evaluations have received a remarkable attention in the public policy atmosphere. On the one hand, civil society participation in the public arena has led to a higher demand for more efficient public policies and for concrete and measurable results. On the other hand, governments have attempted to be perceived as more credible and accountable in order to increase public support.

These factors naturally derive in considering impact evaluations as a paramount tool for evaluating social programs, through which: i) policy makers are able to examine whether their programs generate the expected results; ii) government accountability is fostered; and iii) it could be unveiled which programs work and which is the magnitude of the impact attributable to the program (Khandker et al, 2010).

Impact evaluations represent a paradigm change with respect to the usual public policy analysis, which basically describes program budgets or only mentions the amount of beneficiaries covered by the program. By contrary, impact evaluations attempt to examine whether the program has reached its goal of enhancing wellbeing conditions, increasing income, improving education or decreasing diseases (Gertler et al, 2011).

Having said that, what do we mean by impact evaluations? What do they attempt to measure? Which are the difficulties for their implementation? Which methods can be utilized? These questions will be tackled in the following paragraphs of this section.

## **II.1. Some Precisions**

Impact evaluation consists in determining the *causal effect* of an intervention on certain characteristics of a group of beneficiaries. Correspondingly, impact evaluation examines whether changes in some characteristics of the program's beneficiaries can be attributed to the intervention *per se* or to other factors. This paper will start by

defining some key concepts of this literature: i) causal effect indicators; ii) definition of the counterfactual; iii) selection bias; iv) endogeneity bias; and v) selection of the counterfactual.

# **II.1.1. Causal Effect Indicators**

In individual terms, the effect of an intervention is equivalent to the response variable for the treated unit  $(Y_{il})$  minus the same unit's variable value without intervention  $(Y_{il})$ ; i.e.,

$$\boldsymbol{\beta}_{i} = \mathbf{Y}_{i1} - \mathbf{Y}_{i0} \tag{1}$$

In population terms, the **average treatment effect (ATE)** is given by the difference between the average of a treated group and the average of the same units had not received the intervention:

$$\beta = E[Y_1 - Y_0] = \sum_{i=1}^{N} (Y_{i1} - Y_{i0}) * 1/N = E[Y_1] - E[Y_0]$$
(2)

The ATE can be easily obtained from the basic econometric model of ordinary least squares, which departs from:

$$Y = \alpha + \beta T + \varepsilon \tag{3.1}$$

where *T* is a binary variable equal to 1 if under the program (and thus situated in the treatment group) or 0 if the intervention was not received (control group),  $\alpha$  is a constant,  $\beta$  is the causal effect of the program and  $\varepsilon$  is the standard error with mean zero and constant variance. Then, if we calculate the expectation of *Y* given T=1, the expectation of *Y* given T=0, and their difference for achieving the ATE, the following is obtained:

$$E(Y|T=1) = \alpha + \beta T + E(\varepsilon|T=1) = \alpha + \beta;$$

$$E(Y|T=0) = \alpha + E(\varepsilon|T=0) = \alpha;$$
  
==> $\beta = E(Y|T=1) - E(Y|T=0) = ATE$  (3.2)

Generally, another indicator is used for measuring the causal effect: the **Average Treatment Effect on the Treated (ATT).** This indicator measures the average treatment effect given that the individual is participating in the program; i.e. the units from the treatment group are compared with similar units in the control group, instead of considering the whole population as in the ATE. In formal terms,

$$ATT = E[(Y_{i1} - Y_{i0})|T=1] = E[Y_{i1}|T=1] - E[Y_{i0}|T=1]$$
(4)

Having described the main causal effect indicators, now I turn to tackle the fundamental evaluation problem, which consists in the fact that each individual only faces one outcome -i.e. whether to participate in the program or not (Holland, 1986). In terms of equation 1, the beneficiary *i* observes  $Y_{i1}$  (outcome variable if participating), but cannot observe  $Y_{i0}$  (outcome variable without participation)<sup>1</sup>. This highlights the importance of the counterfactual term, which will be explained next.

# **II.1.2.** Definition of the Counterfactual

A key question for the causal effect estimation can be summarized as: what would have happened had the individual not participated in the program? For obtaining the answer,  $Y_{i0}$  should be obtained for the beneficiary *i* (i.e.  $Y_{i0}|T=1$ ). Since this cannot be observed, it turns into a missing data problem.

This term ( $Y_0|T=1$ ), which is called the counterfactual, is estimated with the control group. Hence, finding an adequate control group becomes one of the main challenges in the impact evaluation arena. In practical terms, the treatment and the control group: i) should be, on average, statistically identical in the absence of the

<sup>&</sup>lt;sup>1</sup> Seemingly, the individual *i* of the control group observes  $Y_{i0}$  (outcome variable if not participating), but not  $Y_{i1}$  (outcome variable if participating).

program; ii) should react in the same way if the program were implemented; and iii) could not be differentially exposed to other programs during the evaluation period (Gertler et al, 2011).

In experimental methods, this problem theoretically disappears since both groups have been randomly selected and thus their characteristics are statistically similar, obtaining unbiased estimations of the causal effect. The problem mostly arises when observational methods are used in the sense that various biases may be generated; particularly, the selection bias and endogeneity bias, which will be discussed in the following sub-sections.

# **II.1.3. Selection Bias**

As already mentioned, a treatment and a control group should be selected, thereby a potential bias arises from the fact that the probability of being selected may be different for individuals of both groups. Hence, the challenge in impact evaluations is to select an adequate counterfactual; i.e. both groups should be identical in observable and non-observable terms, before the intervention.

What happens if the composition of the groups differs with respect to characteristics related to the outcome variable (Y)? For example, the beneficiaries may be more educated (observable characteristic) or motivated (unobservable characteristic) than the control group, thereby we may wrongly conclude that the program has beneficial results, whereas their real determinant is the differential composition of the groups. This situation is very common in impact evaluations, where the individuals: i) are self-selected into treatment; or ii) are selected on a geographical base. This pre-intervention difference in the composition of both groups, called *selection bias*, makes impossible to isolate the causal effect of the program.

If the difference between groups is based on *observable characteristics*, comparing similar units of both groups can solve the problem (either by matching or by the propensity score). However, the difficulty arises when both groups differ in

*unobservable features*. There are various quasi-experimental methods for mitigating the selection bias problem that this paper will revise soon, such as RDD and DID.

In formal terms, if we were to evaluate the effect of a nutritional program on student's marks, we could examine the simple difference in the average marks between the treatment and control schools:

$$DIF = E[Y_1|T=treated school] - E[Y_0|T=control school] = E[Y_1|T=1] - E[Y_0|T=0]$$

If we add and subtract  $E[Y_0|T=1]$ , we obtain:

$$DIF = E[Y_1|T=1] - E[Y_0|T=0] + E[Y_0|T=1] - E[Y_0|T=1]$$
$$DIF = E[Y_1|T=1] - E[Y_0|T=1] + E[Y_0|T=1] - E[Y_0|T=0]$$
$$DIF = E[(Y_{i1} - Y_{i0})|T=1] + \{E[Y_0|T=1] - E[Y_0|T=0]\}$$
$$DIF = ATT + \{E[Y_0|T=1] - E[Y_0|T=0]\}$$
(5)

Equation 5 shows that the difference between groups is equivalent to the ATT plus a term, which is equal to the selection bias. This last term refers to the difference between groups had the program not been implemented. The purpose of every impact evaluation, thus, is to identify situations where we can assume that the selection bias is inexistent or where we can find strategies to correct for it (Duflo et al, 2006).

#### II.1.4. Endogeneity

Impact evaluations aim at comparing the outcome variable *Y* between individuals of the treatment and the control groups. By adding the control variables *X*, equation 3.1 becomes:

$$Y_i = \alpha X_i + \beta T_i + \varepsilon i \tag{6}$$

One of the basic assumptions of the OLS method, which generates efficient and unbiased estimates, is that the explanatory variables (X and T) cannot be associated with e; i.e. they should be exogenous.

However, in the impact evaluation context, there could be unobservable variables in  $\varepsilon$  correlated with the probability of participation (*T*), which, in turn, determines the outcome variable *Y*. This **problem of omitted variables** is called *endogeneity* (Wooldridge, 2002), where OLS estimates turn biased and inconsistent. In formal terms:

$$\operatorname{cov}(\mathrm{T},\mathrm{e}) \neq 0$$
 (7)

Endogeneity bias may arise if: i) the selection rules are not clear; ii) program participation is not compulsory; or iii) individuals find the way to skip their assigned status. Thus, *T* becomes endogenous. There are two solutions for this problem.

First, in a panel data context, this problem is solved by adding **individual fixed effects**, assuming that unobservable characteristics are time-invariant. Briefly speaking, this model transforms each variable in its difference with respect to the average over time for each individual, and OLS is applied later over the transformed variables. In this way, the time-invariant variables (both observed and unobserved) are wiped-out, thus the causal effect is cleansed from individual heterogeneity<sup>2</sup>.

Second, when data is structured in a cross-section manner and the unobservable characteristics vary over time, the **instrumental variable approach** may be implemented. This strategy will be analyzed in the following sections.

 $<sup>^{2}</sup>$  When there are two periods of time, the results from this model are equivalent to DID results, as it will be analyzed soon.

# **II.1.5.** Selection of the Counterfactual

The program causal effect is obtained by comparing the outcome variable between the treatment and the control group (counterfactual), both with statistically similar characteristics. Therefore, the selection of the counterfactual plays a crucial role in the impact evaluation scenario.

Various methods may be used to create valid control groups. Though this will be explained in detail in the next sub-sections, it is interesting to mention two simple or *naïve* methods that are clearly biased, with the purpose of unveiling common estimation errors. Gertler et al (2011) define these methods as: i) *before-and-after* comparison; and ii) *with-and-without* comparison.

The **before-and-after method** compares the outcome variable for the beneficiary after (Y|T=1) and before (Y|T=0) the treatment, assuming that the outcome variable would be constant had the beneficiary not exposed to the treatment. In a more sophisticated scheme, control variables may be included in the estimations for controlling for observables. However, considering a control group is not included into the evaluation, beneficiaries' unobservables may be driving the results, thus leading to debatable conclusions.

The **with-and-without comparison** method differentiates a treatment and control group in a pretty unsophisticated way. For example, the government may offer a nutritional program to the whole spectrum of schools in a specific community; i.e. this method would compare the schools that voluntary accepted to be part of the program with all the rest of schools. The problem of this strategy can be easily observed in equation 5, where selection bias may be rooted in both observable and unobservable variables.

Having in mind the clear drawbacks of these two simplistic methodologies, we move on to the *main methods for creating the counterfactual* in impact evaluations. These methods depart from different *set of rules* for the selection process of both groups. Briefly speaking, the selection process (i.e. the determinants of T for each i) depends on three factors: i) observable variables (X); ii) unobservable variables (U);

or iii) a random sample (Z); i.e. the selection process may be summarized as: T=T(X,U,Z).

First, we will analyze the randomized controlled trials (RCTs), where T=T(Z). Afterwards, we will continue with the quasi-experimental methods in the following order: i) matching and the propensity score where T=T(X,U) and *U* is independent from *Y*, given *X*; ii) instrumental variables where T=T(X,U,Z); iii) regression discontinuity design (RDD) where T=T(X); iv) difference-in-difference (DID) where T=T(X,U) and *U* is independent from the variation of *Y* over time; and v) quantile regressions where *T* may be a function of any of those factors.

It is important to point out that these methods can be combined. For example, it is of usual practice to use RCTs or the propensity score matching together with the DID method in order to generate more robust results.

# **II.2.** Different Methodologies

The experimental methods (or RCTs) are considered the "golden rule" in the evaluation literature, since, if well designed and implemented, it may lead to unbiased results (Sefton et al, 2002). Nevertheless, different circumstances may derive in the need for observational methods, where several biases can arise. This fact has given birth to a large debate about the suitability of each method.

Lalonde (1986) has initiated this debate. He estimated the effect of an employment program in which individuals were randomly selected into the treatment and control group. He compared these results with those obtained from non-experimental methods and concluded that the different methodologies provide divergent results. After that influential paper, various authors carried out similar comparisons and some of them challenge Lalonde's results. For example, Glazerman, Levy and Myers (2003) compare both methodologies by the analysis of twelve programs, finding similar results across both methodologies in *only* some occasions.

It is worth mentioning, however, that several differences exist within the observational methods. As we will revise soon, RDD is considered as the most precise strategy in quasi-experimental methods since its results are unbiased under certain circumstances (Cook, Shadish and Wong, 2006; DiNardo and Lee, 2010; Buddelmeyer and Skoufias, 2004).

Summing up, there is no single ideal method in impact evaluations. The selection of the most appropriate tool would depend on the economic model, data availability, and the questions to be solved (Heckman, Lalonde and Smith, 1999).

## **II.2.1.** Experimental Methods

In the impact evaluation context, if treatment and control group characteristics were not associated with the outcome variable, the optimal "laboratory" solution would be to randomly assign the eligible units to each group. Under this context, each unit has the same probability to be selected to treatment, considering a large number of potential units to apply randomization.

In formal terms, the set of rules of this method is represented by T=T(Z), thus selection bias is mitigated. This is equivalent to say that both groups are balanced by observables (X) and unobservables (U), as a consequence of the selection process (DiNardo and Lee, 2010). In other words,  $E[Y_0|T=1]$  is equal to  $E[Y_0|T=0]$  in equation 5, since the likelihood of participation is equal for every unit and, thereby, the difference in the outcome variable between the groups (i.e. DIF) is the ATT, equivalent to ATE.

The experimental methods also offer some advantages for program administrators, because they cannot be accused of favoring some individuals, taking into account that the selection process is random and, therefore, difficult to manipulate (Gertler et al, 2011).

On the contrary, this method presents some disadvantages. First, there is an ethical issue, since not all the individuals participating in the evaluation receive a benefit from the program -see Dobash et al (1999) for an example. Second, this method can be considerably expensive with respect to quasi-experiments -e.g. see Olken (2005). Third, it is not always viable to perform an RCT. In particular, Jalan and Ravallion (2003) highlight that some programs need to be quickly implemented as a response to an economic crisis. In those cases, a pre-intervention randomization is not feasible. Lastly, and related with the last point, impact evaluations carried out with experimental methods may take a long time, thus they are not necessarily policy-oriented.

Finally, it is important to differentiate two concepts: **internal and external validity**. The former refers to the potential bias in the causal effect estimation<sup>3</sup>, whereas the latter is related to the fact that the impact found may be generalized to the whole eligible population. Since RCTs are unbiased as a consequence of the randomization process, this method is internally valid. This is an important characteristic to consider when comparing it with the other methods. The external validity of RCTs depends on the eligible population facing randomization, which is not necessarily the whole population; e.g. randomization may be conditioned by certain observable variables, such as vulnerability levels or individual income.

For assuring external validity, randomization can be performed in two steps: i) randomization is done over the whole eligible population in a representative way (assuring external validity); and ii) over that sample, randomization is applied again for determining the units assigned to each group (keeping internal validity).

# II.2.2. Quasi-Experimental or Observational Methods

When the analyst cannot manipulate the selection process, or whenever it is unethical to do so, other strategies may be found to carry out an impact evaluation. The purpose of the quasi-experimental methods is to find the most similar counterfactual to the one

<sup>&</sup>lt;sup>3</sup> DiNardo and Lee (2010) define internal validity as the degree of correspondence between what is known about the selection process and the statistical model of the analyst.

obtained from RCTs. In this part of the research, the following methods will be presented: i) matching and the propensity score; ii) instrumental variables; iii) RDD; iv) DID; and v) quantile regressions.

#### **II.2.2.1.** Matching and the Propensity Score

The matching procedure allows the analyst to design a counterfactual based on observable characteristics. Individuals of both groups should be similar in terms of observational variables not affected by the program (baseline data or time-invariant conditions). In practical terms, each beneficiary should be matched with a nonbeneficiary and, afterwards, the difference of the average of both groups is taken to obtain the causal effect.

The key condition of this method is that unobservable features associated with the outcome variable should be statistically similar between groups. Otherwise, these estimations would be biased<sup>4</sup>. Therefore, under this method, the analyst should acquire a large number of observable characteristics (X), with the purpose of reducing the potential selection bias. Practically speaking, it is difficult for the analyst to match a great quantity of individuals with the same X's. This problem has been called the "curse of dimensionality".

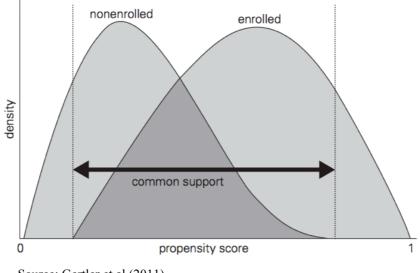
Thus, the propensity score (PS) appears as a natural replacement for matching. The PS is a *balancing score*, since the distribution of the observable characteristics is similar between groups, given the PS (Rosenbaum and Rubin, 1983), reducing the multidimensional problem of matching to a one-dimensional. In formal terms, the PS creates a counterfactual based on the likelihood of participation, given the observable variables, where the selection process is T=T(X,U) and U is independent from Y, given X.

Rosenbaum and Rubin (1983), and Heckman, Lalonde and Smith (1999) sustain that some assumptions should be done under the PS calculation. First, the treatment on individual i should not affect the individual j (i.e. SUTVA: *Stable Unit*-

<sup>&</sup>lt;sup>4</sup> That is way matching is usually combined with other methods of evaluation, such as DID.

*Treatment Value Assumption*). Second, the outcome variable *Y* should be independent from *T*, given *X*, what is called the *Ignorable Treatment Assignment* or the *Conditional Independence Assumption*. In technical terminologies,  $(Y_{i1}, Y_{i0}) \perp T_i \mid$  $P(X_i)$ , where  $P(X_i)=P(D=1|X_i)^5$ . Lastly, the common support assumption should be conformed; i.e. treated units should have comparable units in the distribution of the PS; i.e.  $0 < P(T_i = 1|X_i) < 1$ . Rosenbaum and Rubin (1983) call *strong ignorability* when these last two assumptions are achieved.

The last assumption generally leads to the "problem of common support", which arises when a large proportion of individuals need to be eliminated from the analysis for assuring group comparability. This is a usual problem, since the treated group may not contain individuals with low PS; seemingly, the control group may not include units with high PS. These two possibilities can be visualized in the tails of the PS distributions in Figure 1. In sum, external validity is rather problematic under this methodology of evaluation.





Source: Gertler et al (2011).

In addition, the internal validity of this method would be only satisfied if the three preceding assumptions were valid (Khandker et al, 2010).

<sup>&</sup>lt;sup>5</sup> The practical problem of these first two assumptions is that they cannot be tested.

Briefly speaking, there are three methods under the umbrella of the PS. The first one is the use of the PS as a covariate. The problem of this methodology is that it is based on the strong assumption that the relationship between the PS and the outcome variable has been correctly modeled (Austin, 2011). Thus, in the following sub-sections, we are going to analyze in detail the other two options: i) the Propensity Score Matching or PSM; and ii) the Propensity Score Weighting or PSW.

#### II.2.2.1.a. PSM

After obtaining the PS of each unit, the PSM calculates the causal effect as the difference in the outcome variable between the treatment and the control group, weighted by the distribution of the PS, based on a matching technique. The PSM may determine both the ATE and the ATT. When the method is not externally valid, because some units are not included in the analysis, only the ATT can be calculated. In a cross-section data structure, Smith and Todd (1995) define the ATT as:

$$ATT = \frac{1}{Nt} \left[ \sum_{i \in T} Y_i^T - w(_{i,j}) Y_j^C \right]$$
(8)

where  $N_t$  is the total number of beneficiaries *i*, while  $w(_{i,j})$  is the weighting used over the control group.

In brief, the PSM estimations are valid if the control and treatment groups: i) have the same distribution of unobservable characteristics (which cannot be tested); ii) have the same distribution of observable characteristics; iii) answer the same questionnaire; and iv) reside in the same economic environment, thereby facing the same economic incentives that may define their participation into the program (Jalan and Ravallion, 2003; Heckman, Ichimura, and Todd, 1997; Ravallion, 2008).

There is a debate over the number of variables to include in the model in order to determine the PS. Heckman, Ichimura, and Todd (1997) suggest that the omission of relevant variables may significantly increase the bias of the results, implying that all pre-treatment and time-invariant variables should be added into the model, if they are related to T and Y. On the other hand, Bryson, Dorsett and Purdon (2002) conclude that models should not be over-parameterized, since the inclusion of non-relevant variables may exacerbate the common support problem, and may increase the variance of the results. Finally, Rubin and Thomas (1996) propose a practical advice: if there were uncertainty whether to include or not a variable, it would be better to leave it in the model.

The last topic related to the PSM is associated with the fact that the likelihood of finding exactly the same PS between both groups is zero, given that Pr(T=1|X) is a continuous variable. Therefore, a matching criterion should be selected. We will revise four techniques: *Stratification Matching*, *Nearest-Neighbor Matching*, *Radius Matching*, and *Kernel Matching*. There is no *ex ante* preferred matching method; rather, this would be selected depending on the particular situation of each evaluation.

The *Stratification Matching* divides the distribution of the PS in blocks, having in mind that each of them should have individuals from both groups with a similar PS average. Afterwards, ATT is calculated for each block, and then, the final ATT is obtained as the ATT mean among blocks, weighted by the share of participants in each interval. The problem of this technique is that it eliminates those individuals without match, thereby putting into question its internal and external validity.

The *Nearest-Neighbor Matching* (or *NN Matching*) is a technique that matches individuals from the treatment group with those individuals from the other group with the closest PS. The non-participants may become a unique match (*without replacement*) or may be matched with more than one participant (*with replacement*). The advantage of this technique is that all the units can be matched, depending on the selected range. However, the drawback is that it may match individuals with a considerable long distance between their PS, hence leading to inaccurate estimations of the causal effects.

The *Radius or Caliper Matching* consists in matching those individuals located in the same PS radius. The larger the radius, the less precise the results. The shorter the radius, more units should be eliminated from the analysis.

Finally, *Kernel Matching* is a non-parametric method that matches each individual of the treatment group with the weighted average of all the units of the control group. Weights are inversely proportional to the distance between the PS of the matched units. The higher the distance between the PS, the less weight for the ATT calculation.

As a summary of this sub-section, the researcher should follow the next steps in order to carry out the PSM: i) to estimate the PS (which can be simplified to a *logit* or *probit* estimation if no unit were discarded for keeping the common support); ii) to define the common support region and to perform the balancing tests; iii) to decide the matching technique; and iv) to estimate the causal effect (Khandker et al, 2010)<sup>6</sup>.

#### II.2.2.1.b. PSW

We have seen in equations 3.1. and 3.2. how to obtain  $\beta$  = ATE from Y =  $\alpha$  +  $\beta$ T +  $\varepsilon$ . Under the same logic, the PS can be utilized as a weight for the calculation of the causal effect, with the purpose of balancing the treatment and the control groups. Replacing Y<sub>0</sub> for  $\alpha$ , we depart from:

$$Y = Y_0 + \beta T + \varepsilon \tag{9}$$

Now, we replace  $\beta$  for Y<sub>1</sub>-Y<sub>0</sub>, based on equation 1; weighting the treated group by 1/PS and the control group by 1/(1-PS), the following equation is obtained:

$$Y = \frac{Y_{1T}}{PS} + \frac{Y_{0}(1-T)}{(1-PS)}$$
(9.1)

We take expectations for both groups and their differences:

$$E(Y|T=1) = \frac{Y_1T}{PS};$$

<sup>&</sup>lt;sup>6</sup> Caliendo and Kopeinig (2005) offer a more comprehensive version of the PSM steps.

==>

$$E(Y|T=0) = \frac{Y_0(1-T)}{(1-PS)};$$

E(Y|T=1) - E(Y|T=0) = E[
$$\frac{Y_{1T}}{PS} - \frac{Y_{0}(1-T)}{(1-PS)}$$
] = ATE =  $\beta$ 

This estimator weights both groups to a common distribution of observable variables; i.e. the marginal distribution of X for the whole population. Hence, the ATE can be estimated as a weighted average, through the inverse probability of treatment weights (IPTW). These weights balance, in expected terms, the distribution of observable variables between groups. In addition, PSW determines consistent, unbiased (Imbens, 2004), and, under some circumstances, efficient estimators.

Hirano and Imbens (2001) suggest two variations for the ATT estimation with PSW. First, weights could change to 1 for the treated group and to PS/(1-PS) for the control group<sup>7</sup>. Second, they propose to add the interaction between the treatment variable (*T*) and the difference between each control variable (X) and its mean for the treated units ( $\overline{X}$ ) -i.e. (X- $\overline{X}$ )\*T<sub>1</sub>- in order to control for non-additive associations.

One possible inconvenient of the PSW is that weights can be unstable in the tails of the distribution of T, increasing the variation of the estimated causal effect (Austin, 2011). As a potential solution, those individuals can be eliminated in order to find an appropriate common support, avoiding the inclusion of outliers.

A particular PSW estimator is the parametric double-robust (DR) estimator, applied in both the PS (first step) and the causal effect (second step) estimations, conceived by Robins, Rotnitzky and Zhao (1995)<sup>8</sup>. The name of this estimator is related to the large sample property, which determines that  $\hat{\beta}$  is a consistent estimator of  $\beta$  if either the first or the second step is correctly specified (Imbens, 2004). Nevertheless, the DR: i) is no longer efficient if only one step is correctly specified

<sup>&</sup>lt;sup>7</sup> These weights are not the only ones used in PSW (Imbens, 2004); however, they are the most frequent.

<sup>&</sup>lt;sup>8</sup> Robins et al (1995) show that the use of the estimated weight (*vis-á-vis* the real weight) increases the efficiency of the estimators in the parametric models.

(Lunceford and Davidian, 2004); ii) should include the same variables in the two estimation steps; iii) can only be implemented in large samples; and iv) does not provide any hint about how to know if the models are correctly specified.

#### II.2.2.1.c. Comparison of the PS Methods

Austin (2011) suggests that the PSM (except with *Stratification Matching*) and the PSW offer a better sample selection correction than using the PS as a covariate. Rubin (2004) highlights that PSW and the PS as a covariate are more sensitive than the PSM. However, Rubin (2001) points out that the PSM and the PSW are more desirable than the PS as a covariate, since they differentiate between the design and the analysis of the study. That is, first, the PSM and the PSW estimate the PS in order to satisfy the balancing conditions; afterwards, they estimate the causal effect; however, in the remaining case, the same regression includes *Y*, *T* and the *PS* estimated, thus the analyst may be tempted to find the PS that leads to the *Y* that he or she expects.

In sum, the debate about the most suitable PS estimator is still on going without conclusive agreements (Imbens, 2004). However, there is some consensus about the potential drawbacks of using the PS as a covariate. In any case, the selection of the appropriate PS method would depend on the specific circumstances of each research.

#### **II.2.2.2.** Instrumental Variables

As commented in sub-section II.1.4., T is generally endogenous, specifically in quasiexperimental methods, thus OLS estimators become biased and inconsistent. The instrumental variable (henceforth IV) method, which may solve the problem, seeks a variable Z (the IV) that fulfills the following requirements: i) it should be significantly associated with the participation variable T; and ii) the only association between Z and the outcome variable Y should be channeled through T; i.e., Z cannot be associated with Y through the error term (which comprises all the unobservables that the model is not able to capture) of the structural equation, what is called the *exclusion* restriction.

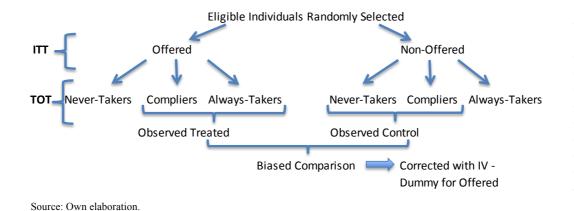
In the impact evaluation literature, the random selection of individuals -in the first step- has been generally used as the most preferred IV. Since not all the individuals comply with their assigned state (whether to participate or not), three types of individuals may arise: i) the *compliers* (those accepting their assigned state); ii) the *never-takers* (those never participating); and iii) the *always-takers* (those always located in the treatment group).

Hence, first, the causal effect between the selected and the non-selected individuals is estimated -called the **ITT** or the *intent to treat estimate*. This estimator is important for policy-making, since individuals may be offered, but not forced, to accept their assigned state (Gertler et al, 2011). However, if the purpose of the evaluation would be to examine the effect on those individuals who effectively receive the program, another indicator would be pursued: the **TOT** or *treatment on the treated*. This estimator is obtained comparing the groups that effectively participate and non-participate (note that *Z* and *T* differ). Since a direct comparison between the observed groups would determine a biased estimation (since *T* is endogenous), *Z* (the eligibility criterion, which is random) is used as the IV for *T* (the effective participation), which in turn, determines *Y*.

It is important to highlight that Z fulfills the *exclusion restriction*, since the selection process is random and, thus, it could not be systematically associated with unobservables determining the outcome variable. Figure 2 illustrates this evaluation methodology, called *Random Offering*.

In sum, the set of rules that determines the selection process is represented by T=T(X,Z,U), where *T* differs from *Z*, and *U* is correlated with *Y*<sub>0</sub>, so sample selection arises.

#### FIGURE 2: Random Offering



In formal terms, the causal effect of the program  $\beta_{IV}$  can be calculated as the ratio between  $cov(Y_i, Z_i)$  and  $cov(T_i, Z_i)$ , which can be intuitively seen as the relationship between *Y* and *Z*, minus the portion of *Z* that explains T. Starting from  $Y_i = \beta T_i + e_i$ , and considering that the *exclusion restriction* is complied (i.e. cov(Z,e)=0), we obtain:

$$cov(Y_i, Z_i) = cov[(\beta T_i + e_i), Z_i] = \beta cov(T_i, Z_i)$$
$$\Rightarrow \frac{cov(Y_i, Z_i)}{cov(T_i, Z_i)} = \beta$$
(10)

The coefficient  $\beta$  determines the causal effect of the program for the compliers. Angrist and Imbens (1994) describes this result as a local ATE (LATE), defined as the average treatment effect for those individuals with a treatment status affected by a change in exogenous regressors that satisfy the exclusion restriction. From the estimation of  $\beta$ , the ITT estimator can be easily obtained; i.e. E(Y|Z=1) - E(Y|Z=0).

Unlike other quasi-experimental methods (such as the PSM or the DID), an important benefit of this strategy is that it does not need to make assumptions over sample selection. This means that by finding a strong instrument (i.e. Z highly associated with T) not related to unobservable characteristics determining Y, the

endogeneity problem is mitigated. Therefore, if the IV requirements are fulfilled, the causal effect is internally valid; however, the external validity is reduced to only the eligible population (ITT) or the compliers (TOT).

Other instrumental variables have been used in the impact evaluation literature. Arcand and Bassole (2006) used an IV estimation, among other methodologies, in their impact evaluation of PNUR -a community driven development program- in Senegal. They used community leader opinions and projections (as a proxy for their commitment with the community) as IVs, with the presumption that those communities with more active and participative government heads would have a higher probability of participating in the program. In another study, Glewwe and Jacoby (1995) examine the effect of nutrition and health on education in Ghana. Their identification strategy consists in using the distance from health facilities and mother weights as IVs for child health. This study reveals the difficulty in finding a valid instrument that satisfies the *exclusion restriction*, considering that it is highly unlikely that these IVs were unrelated to unobservables associated with education.

Summing up, the IV method is a valid tool for determining a program causal effect when the IV requirements are complied. Nevertheless, its results are not externally valid and its implementation is highly dependent on data availability.

#### **II.2.2.3. Regression Discontinuity Design**

The regression discontinuity design (RDD) is considered as the most robust strategy within the observational methods, since its causal inference is the most closely linked to randomization (Cook, Shadish and Wong, 2006; DiNardo and Lee, 2010; Buddelmeyer and Skoufias, 2004).

RDD is an estimation strategy where treatment is realized when an observed, forcing or running variable S exceeds a known threshold (s\*); i.e., the selection process is given by T=T(X), where T=1 if  $S \ge s^*$  and  $S \in X$ . One condition of this

strategy is that the probability of treatment assignment should be a discontinuous function of one or more variables.

The theoretical background of this strategy sustains that individuals surrounding the threshold s\* have very similar characteristics. Accordingly, a treatment and a control group can be identified if individuals were located "just" over/under the threshold<sup>9</sup>. In this way, selection bias is mitigated. This characteristic of RDDs is similar to a local randomization; therefore the estimate, which is called LATE or local ATE, is internally valid. However, RDDs are only externally valid for sub-populations close to the threshold; i.e. when S tends to s\* (Imbens and Lemieux, 2008).

The fact that this method is internally valid represents a substantial advantage for RDDs compared to the rest of the observational methods, which generally require that the unobservable characteristics be independent from program participation. However, it is completely different if independency is an assumption of the method, rather than a consequence of the process of data generation (Lee, 2008).

As regards the causal effect indicator, Imbens and Lemieux (2009) define the ATE for a sharp RDD as:

$$ATE = \lim_{S \downarrow_{S^*}} E[Yi|Si = s] - \lim_{S \uparrow_{S^*}} E[Yi|Si = s] = E[Yi(1) - Yi(0)|Si = s^*]$$
(11)

Equation 11 shows that ATE is calculated as the difference in the average of the outcome variable between those individuals just over the threshold and those just under it. This definition reveals some uncertainty about the distance from S to  $s^*$  since the shorter the distance, the higher similarity among individuals, but the smaller the sample size and the power of the estimation -which is zero in the limit, when S=s\* (Lee and Lemieux, 2010).

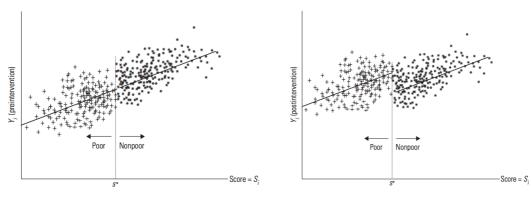
The effect of an intervention can be easily observed through the following figures, considering an example where the vulnerable (and treated) group is defined if

<sup>&</sup>lt;sup>9</sup> This is not an assumption; by contrary, this can be tested.

S<s\*. An intervention may consist in food orientation talks for those households located under the poverty threshold where the outcome variable is household diet diversity (where *S* is the poverty level,  $s^*$  is the poverty threshold and *Y* is diet diversity). Figure 3 illustrates the pre-intervention context where the relation between *S* and *Y* linearly and constantly grows, whereas Figure 4 clearly reflects: i) the discontinuity in their post-treatment relationship; and ii) the jump of the outcome variable in the treatment group, equivalent to the causal effect.







Source: Khandker et al, 2010.

Source: Khandker et al, 2010.

It is important to notice that the discontinuity previously shown was manifested under a linear relationship between S and Y. However, the association between these variables may follow a more complex functional form (e.g. cuadratic). Hence, the analyst should examine the most suitable functional form that reflects the real nature of the data (Gertler et al, 2011).

Two distinctive strategies may be differentiated within the regression discontinuity design. First, the **sharp RDD** is contextualized when the treatment status deterministically follows the selection rule T=1 if S  $\geq$ s\*. Yet, if individuals would manage to change from their assigned group (i.e. *non-compliance*), a **fuzzy RDD** should be implemented, where *Z* differs from *T*. This happens very frequently in social programs where *S* determines eligibility, but not everyone accepts the rule. In this last strategy, *Z* is an IV for *T* and a Wald estimator is obtained. The difference between a sharp and a fuzzy RDD is equal to the difference between randomized

assignment and offering in the context of experimental methods (Lee and Lemiux, 2010).

In brief, taking into account that RDD is considered the "cousin" of randomization (Lee and Lemieux, 2010), if there were a forcing variable determining a discontinuity in the selection process, RDD would represent the most attractive impact evaluation strategy.

## II.2.2.4. Difference-in-Difference

The difference-in-difference (DID) method compares changes over time (between pre- and post-intervention) in the outcome variable between the treatment and the control group. The implementation of DID requires panel data (at least two observations per individual<sup>10</sup>) or repetitive cross-section data if the composition of each group is relatively stable over time.

It is not a pre-requisite to specify the set of rules for the selection process of *units*. That means that both groups are selected without any explicit set of rules. That is why DID is frequently combined with randomization or the propensity score. It should be noticed that the causal effect within the last methods has been analyzed, so far, with a simple difference that only requires cross-section data. Through the combination of different methods, the robustness of the results increases to a large extent.

DID represents a combination of the two previously analyzed simplistic methods, the **before-and-after comparison** and the **with-and-without comparison**. Having two points in time (t=1 and t=0) and two groups (T=1 and T=0),  $Y_t^T$  can be obtained and, consequently, ATT can be calculated through:

$$DID = ATT = E[(Y_1^T - Y_0^T)|T=1] - E[(Y_1^C - Y_0^C)|T=0]^{11}$$
(12)

<sup>&</sup>lt;sup>10</sup> As a result of following the same individual over time, attrition bias may arise.

<sup>&</sup>lt;sup>11</sup> It can be easily shown that DID equals ATT, and that under certain circumstances (such as randomization), equals ATE.

DID estimates may also be obtained in the typical econometric context, where temporal shocks affecting both groups (t) and unobservable characteristics of each group (T) are controlled for, through the following regression:

$$Y_{it} = c + \alpha t + \beta T_{i1} + \gamma (t * T_{i1}) + \varepsilon_{it}$$
(13.a)

DID is obtained as the difference in expectations of each group between postand pre-treatment status, equal to  $\gamma$  (the interaction term between t and T):

$$E[(Y_1^T - Y_0^T)|T=1] = (c + \alpha + \beta + \gamma) - (c + \beta) = \alpha + \gamma$$
(13.b)

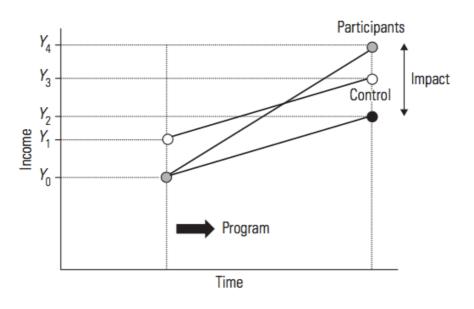
$$E[(Y_1^{C} - Y_0^{C})|T=0] = (c + \alpha) - c = \alpha$$
(13.c)

$$DID = E[(Y_1^T - Y_0^T)|T=1] - E[(Y_1^C - Y_0^C)|T=0] = \gamma$$
(13.d)

What is the main benefit of this evaluation strategy? By differencing the variables over time, individual time-invariant characteristics are wiped-out, not only observables (such as parents' education) but also unobservables (such as motivation or ability). However, time-varying characteristics cannot be balanced between groups. Thus, an important assumption of DID is that these differences do not exit, thereby both groups would be equal in the absence of the program<sup>12</sup>. This is formally called as the *Parallel-Trend Assumption*, which can be easily tested through another DID estimation with two pre-treatment periods.

Even though it does not present a precise set of rules, the DID selection process is formally considered as T=T(X,U) -i.e. not depending on Z- and U is assumed to be correlated with Y but uncorrelated with  $\Delta Y$ , complying with the Parallel-Trend Assumption. This is a key assumption for estimating DID, which is equal to  $(Y_4 - Y_0) - (Y_3 - Y_1)$  in Figure 5. This assumes that  $(Y_3 - Y_2) = (Y_1 - Y_0)$ , and thus DID =  $(Y_4 - Y_2)$ .

<sup>&</sup>lt;sup>12</sup> Ravallion (2008) sustains that this assumption is hardly fulfilled in the poverty program context of developing countries.



#### **FIGURE 5: DID Calculation**

Finally, it is relevant to mention that a two-period DID can be generalized to a fixed-effects model with panel data and numerous periods. This model departs from the premise that  $T_{it}$  is correlated with the unobservable individual time-invariant heterogeneity ( $v_i$ ); i.e., T is endogenous, as previously defined. Hence, equation 13.a. is revised to:

$$Y_{it} = \gamma T_{it} + \beta X_{it} + \nu_i + e_{it}$$
(14)

Differencing each variable over time, we obtain:

$$\Delta Y_{it} = \gamma \Delta T_{it} + \beta \Delta X_{it} + \Delta e_{it}^{13}$$
(15)

After  $v_i$  is removed, OLS can be applied to equation 15, obtaining the DID estimate. In a context of more than two periods of time, DID differs from the results obtained from a fixed effects model (Khandker et al, 2010).

Source: Khandker et al (2010).

<sup>&</sup>lt;sup>13</sup> This equation represents the *first-differencing model*, equivalent to the *fixed effects model* in a panel of two periods. The *fixed effects model* takes the difference of each variable with respect to the average over time for each individual, thus individual time-invariant heterogeneity is eliminated.

#### **II.2.2.5.** Quantile Regression

So far, the methods already analyzed provide estimates of the average effect of the intervention. However, it can be very useful to figure out the effect of a program on different points of the outcome variable distribution, since the causal effect is not necessarily the same along different individuals (Buchinsky, 1998).

For example, the purpose of a program that supplies books in schools may be to increase not only students' marks averages, but also those of a particular quantile in the distribution. Even more, the program may attempt to compare the effect on different quantiles, more relevant for policy implications.

We have attempted, so far, to obtain the causal effect  $\beta$  that minimizes the mean square error of the estimation through OLS. That is, from  $Y_i = \alpha + \beta X_i + \varepsilon_i$ , where  $T \in X$ , we obtained  $E(Yi|Xi) = \beta Xi$  and, thereby,  $\partial E(Yi|Xi)/\partial Xi = \beta$ , equivalent to the causal effect.

In this case, however, we will get  $Q\tau(Y_i|X_i) = \beta\tau X_i$ , the conditional quantile of *Y*, given X, and thus  $\partial Q\tau(Y_i|X_i)/\partial X_i = \beta\tau$ , equivalent to the causal effect at different values of the distribution of *Y*. In more technical terms, this is equivalent to the partial derivative of the conditional quantile of *Y* with respect to *X*. In sum, the quantile regression is obtained by minimizing the absolute deviations with asymmetric weights (Koenker and Bassett, 1978):

$$\min \beta \left[ \sum_{t \in \{t: y_t \ge x_t b\}} \tau | y_t - x_t b | + \sum_{t \in \{t: y_t < x_t b\}} (1 - \tau) | y_t - x_t b | \right]$$
(16)

In the impact evaluation context using quantile regressions, the relevant causal effect indicator becomes the **QTE** (quantile treatment effect). This is equivalent to the difference in the outcome variable *Y* between the treatment and the control group, located in the quantile  $\tau$  from *Y*, if the units have been *randomly* selected:

$$QTE(\tau) = Y^{t}(\tau) - Y^{c}(\tau)$$
(17)

Yet, this equation should not be applied in quasi-experimental methods, since, among other reasons, it cannot be assured that the counterfactual of the treated individual *i* is located in the same quantile of the control group. In more technical terms, this occurs because the identification of QTE lies on the marginal distribution of  $Y_1$  and  $Y_0$ , which is not achieved in observational methods. Even more, unlike the ATE where the expected value is a linear operator, and thus,  $E[Y_{i1}-Y_{i0}|X_i] = E[Y_{i1}|X_i]$ -  $E[Y_{i0}|X_i]$ , the functional of the difference in the conditional quantiles is not equal to the difference in the functionals of each group and each quantile (Heckman, Smith and Clements, 1997); i.e.:

$$Q\tau(Y_{i1} - Y_{i0}|X_i) \neq Q\tau(Y_{i1}|X_i) - Q\tau(Y_{i0}|X_i)$$

$$(18)$$

In sum, T is endogenous in observational methods, thus conventional quantile regressions are inconsistent and, therefore, inappropriate for estimating the causal effect (Fr*ö*lich and Melly, 2008). Consequently, different strategies have been proposed to overcome this issue.

First, some authors have tried with instrumental variables. Abadie, Angrist and Imbens (2002) implemented an IV estimation under conditional QTE with respect to X in order to solve the endogeneity bias of T, obtaining QTE for the compliers. Frölich and Melly (2008) propose the use of an IV under an unconditional QTE and certain identification conditions (but not under functional form assumptions). Unlike the conditional QTE with respect to X, the QTE is unconditional on the compliers in the Frölich and Melly (2008) context.

Second, Athey and Imbens (2006) have proposed the *Quantile Difference-in-Difference* (QDID). As a consequence of the inequality shown in equation 18, individual heterogeneity cannot be cancelled out with observational methods and panel data, as in a linear DID context (Khandker et al, 2010). Thus, Athey and Imbens (2006) suggest that the counterfactual distribution is equal to the difference in time of Y of the control group plus the pre-treatment Y of the treated group, under the debatable assumption that the counterfactual distribution over time is equal to the treatment group's; i.e.:

$$Y_0^{T}(\tau) + (Y_1^{C}(\tau) - Y_0^{C}(\tau))$$

Thus, Athey and Imbens compares similar individuals between groups and periods for each quantile, and then, they calculate  $QTE(\tau)$ .

Finally, Abrevaya and Dahl (2005) and Khandker et al (2009) propose to identify the fixed effects model under panel data with the Chamberlain (1982) model. They estimate a linear relationship between individual fixed effects and the observable characteristics, and then they estimate a pooled linear quantile regression (thus the fixed effects were eliminated in the first step).

Summing up, the quantile regression method has been used more frequently in the impact evaluation context. However, the difficulty in obtaining adequate identification strategies for its implementation with other observational methods has become a problematic barrier for its use at a widespread level.

# **III.** Description of Programs and Variables

## **III.1. Introduction**

This section illustrates the key characteristics of the three DIF-Puebla programs evaluated in the present investigation and their main outcome variables. This will allow, in the following section, to formulate the justification of the combined evaluation methods selected for each program.

The programs of DIF-Puebla aimed at enhancing the nutritional status of its beneficiaries, complying with the "*nutricia*"<sup>14</sup> quality standard, assuring community development, and fostering a correct nutrition among its beneficiaries and their families. The impact of the programs will be evaluated under four broad areas: food support, food orientation, education, and health. Though the first two areas are explicitly related to the DIF programs' main components, the other two are typically

<sup>&</sup>lt;sup>14</sup> This is a high level standard of nutritional status set by the Mexican government (NOM-043-SSA2-2005). The purpose of this norm is to establish a general criterion for a proper and healthy eating habit.

analyzed outcomes in these kinds of social programs. The following sub-sections describe the programs and the variables to be evaluated.

# **III.2.** Programs

# III.2.1. DEC

The Hot School Breakfast program (DEC by its acronym in Spanish) is focused on children attending kinder, primary, secondary, and high school from public institutions of the 217 *municipios* (municipalities) of Puebla, *preferably* located in indigenous areas, rural areas, or deprived urban areas.

The beneficiaries receive a hot school breakfast every day of the schooling cycle, under "*nutricia*" standards, comprised by: 250 milliliters of skimmed milk or natural water, one hot dish of vegetables, raw cereal, legumes or meat, and at least 30 grams of fruit (fresh or dehydrated). The requisites of the program are:

- The beneficiaries should be attending a public school affiliated to the SEP (Public Education Ministry, by its acronym in Spanish).
- Their parents should create a committee that holds a constitutive act, which includes the president and vice-president names.
- Their school should be *preferably* located in a locality of high or very high marginalization degree.
- Their school should be *preferably* located in a locality where the majority of the population speaks an indigenous language.
- The beneficiary should not be receiving another nutritional program from the government.
- The school should have a physical space for installing the necessary facilities.

This program also contemplates that the beneficiary should pay a five pesos fee<sup>15</sup> for each meal, while the municipality should pay a maximum of 85 percent of the program expenditure.

# III.2.2. DEF

The Cold School Breakfast program (DEF by its acronym in Spanish) is focused on children and teenagers attending kinder or primary school of a public school at any of the 217 municipalities of Puebla, *preferably* located in indigenous areas, rural areas or deprived urban areas.

The meal, which should comply with *nutricia* standards and should be delivered every day of the schooling cycle, comprises: 250 milliliters of semi-skimmed and ultra-pasteurized milk, 30 grams of raw cereal (oat or amaranth cookies, among others), and at least 30 grams of fruit (fresh or dehydrated). The requisites of the program are:

- The beneficiaries should be attending a public school affiliated to the SEP.
- Their parents should create a committee that holds a constitutive act, which includes the president and vice-president names.
- Their school should be *preferably* located in a locality of high or very high marginalization degree.
- Their school should be *preferably* located in a locality where the majority of the population speaks an indigenous language.
- The beneficiary should not be receiving another nutritional program from the government.

Schools are not required to ensure a physical spot to prepare and serve the cold breakfasts, thus schools with more deprived conditions may self-select into this program.

<sup>&</sup>lt;sup>15</sup> Approximately 50 cents of American dollars.

Finally, this program has a recovery fee of three pesos for each meal at the beneficiary level, whereas the municipal recovery fee is the same to the DEC program.

# *III.2.3. INC*

The "Starting a Correct Nutrition" program (INC by its acronym in Spanish) assists children between one and three years old, *preferably* located in indigenous areas, rural areas, or deprived urban areas, within the 217 municipalities of Puebla.

A monthly food package is delivered, under *nutricia* standards, comprised by: fortified milk and basic food products, such as legumes, cereals, and meat, among others. The beneficiaries should comply with the following requirements:

- To be between one and three years old.
- To be *preferably* located in a locality of high or very high marginalization degree.
- To be *preferably* located in a locality where the majority of the population speaks an indigenous language.
- Not to be receiving another nutritional program from the government.
- To comply with an economic profile applied by DIF-Puebla.

# **III.3.** Outcome Variables by Topic and Program

# **III.3.1.** Food Support

Food support, under *nutricia* standards, is a crucial part of the programs. The evaluation of this component is associated with the inner particularities of each program and their incidence over the beneficiaries or their households.

#### **III.3.1.1. DEC and DEF**

The effect of these programs under this topic will be analyzed through a **food insecurity index** at the household level. Martinez and Fernandez (2006) suggest that anthropometric measures are not appropriate variables to consider in impact evaluations of children attending at least primary schools since their growth indicators may reflect specific upward trends of teenagers, independently of the intervention. Considering that a great proportion of the beneficiaries of both programs are at least in the primary school (especially of DEC), we opt for the food insecurity index.

This index is created from the Food Insecurity Questionnaire of the Latin American and Caribbean Food Security Scale (FAO, 2012), which asks 15 questions about the household financial capacity to buy food; e.g. if an adult skips or reduces the breakfast, lunch or dinner size, among other questions.

This questionnaire classifies households by their food insecurity level. Each question ranges from 0 to 3, thus the aggregated index (considering the 15 questions) goes from 0 (more food security) to 45 (more food insecurity). The discrete index varies from 1 (food security) to 4 (severe food insecurity).

## **III.3.1.2. INC**

The impact of the INC program will be evaluated by **anthropometric variables** at the beneficiary level. According to FAO (Latham, 2002), the main anthropometric measures used to evaluate beneficiaries in the range age of the INC are:

- Weight for age: this is a short-term malnutrition measure, also known as *underweight*. This is a typical variable analyzed as a result of emergency situations, such as natural disasters or economic shocks.
- Height for age: this is a long-term malnutrition measure, also known as *stunting*. This variable reflects the impact of repetitive infections or long-term economic changes on the accumulated nutrient ingestion over time.

• Weight for height: also known as *wasting*, this is malnutrition measure that combines the previous measures.

In addition, the INC program will be evaluated with the **Body Mass Index (BMI)** per age, which provides similar conclusions to the weight-for-height indicator.

These anthropometric variables are standardized by WHO 2006 child growth standards, which take well-nourished individuals from Ghana, India, Norway, Oman, Brazil, and the United States as the reference population. A z-score is obtained for each indicator, according to:

 $z-score = \frac{(Observed value) - (Reference population median or mean)}{Reference population standard deviation}$ 

# **III.3.2.** Food Orientation

According to the DIF-Puebla program rules, food orientation is a crucial complement for the food supports, since it attempts to encourage a healthy life style, based on an appropriate diet and physical activity, through four approaches:

- 1. To develop and strengthen certain capacities and attitudes in the beneficiary's households in order to enhance her nutritional situation.
- 2. To identify and reinvigorate regional foods.
- 3. To foster an active participation of both men and women in order to create proper healthy diet habits.
- 4. To support household food security through ecological school farms and community canteens, in order to increase diet variety and to generate additional income sources.

Food orientation can be reflected by an adequate selection, preparation, and consumption of food in the context of an appropriate diet. Thus, food orientation will

be evaluated, independently of the program, by questions regarding the household **diet** and the **habit changes** at both the level of the beneficiaries and their households.

First, food orientation will be examined by **diet diversity**, **variety**, **and quality** at the household level, based on the Healthy Food Index issued by the *Universidad Veracruzana* (2012). In particular, three indicators will be analyzed:

The first one refers to diet **diversity**, which corresponds to the inclusion of different food groups, and it is classified as:

- Diverse/complete
- Some diversity/moderated
- Non-diverse/incomplete

The second indicator refers to diet **variety**, which indicates the inclusion of different food types within the same group, and it is classified as:

- Varied
- Some Variation
- Monotonous

The third indicator agglomerates the preceding ones, obtaining the diet **quality** indicator, which is classified as:

- Complete
- Moderated
- Incomplete

Food orientation will also be evaluated by the **habit change compound index**, at both the **beneficiary** and their **household** level, through questions related to the frequency of *selection*, *preparation*, *and consumption of healthy foods*.

• Habit changes in food selection: these questions will attempt to capture if the orientation talks have affected the acquisition of the three groups of foods (fruits and vegetables, legumes or meat, and cereals), if these foods have been bought in the region, if ecological school farms are used, whether food is low on fat, sugar and salt or not, among others.

- Habit changes in food preparation: these questions will examine if the orientation talks have propitiated hygienic habits during food preparation, which cooking techniques were used, among others.
- Habit changes in food consumption: this part will ask about food portion sizes when eating, if each meal time is respected, if the context for eating is healthy, among others.

Finally, the **habit change compound index** is calculated, which is based on the three preceding sub-indexes.

Each indicator (i.e. **diet diversity, variety, and quality,** and the **habit change compound index, together with its sub-indexes in selection, preparation, and consumption)** will be estimated by a categorical and a continuous variable, with the purpose of obtaining more information about the causal effect of the programs.

### III.3.3. Education

Nutrition and food habits of children attending school may have a direct effect on student performance. Therefore, this study will evaluate the impact on student's marks (only for DEC beneficiaries attending primary school), on school absenteeism (DEC and DEF), and on weekly hours of extra-curricular studies (only for DEC beneficiaries attending primary school).

### III.3.4. Health

Health conditions of program beneficiaries are directly influenced by their nutritional status. Thus, this evaluation will examine the impact of the three DIF-programs on the

likelihood of different diseases, spread through food, associated with the nutritional status of the treated units.

# III.3.5. Summary

The following chart describes the variables to be analyzed by topic and program, as a summary of this section. It also points out whether the level of analysis is at the beneficiary or at the household level.

Topic	Variable	Program	Dimension	Variable Description
	Food Insecurity Index (continuous and discrete)	DEC & DEF	Household	Comprised by 15 questions, each one ranging from 0 to 3, thus going from 0 (more food security) to 45 (more food insecurity) in aggregated terms; i.e. <b>the higher the index, the higher food insecurity</b> . The discrete index varies from 1 (food security) to 4 (severe food insecurity).
ort	WAZ z-score	INC	Beneficiary	Individual weight for age minus the average weight for age of the reference population, divided by the standard deviation of the reference population. A low index refers to low weight. When the index is high, it is better to observe the WHZ score. I utilize the 2006 WHO child growth standards.
Food Support	HAZ z-score	INC	Beneficiary	Individual height for age minus the average height for age of the reference population, divided by the standard deviation of the reference population. ; i.e. the higher the index, the better the child development. I utilize the 2006 WHO child growth standards.
	WHZ z-score	INC	Beneficiary	Individual weight for height minus the average weight for height of the reference population, divided by the standard deviation of the reference population. High values refers to overweight, while low values indicate emaciation. i utilize the 2006 WHO child growth standards.
	BMI for age z-score	INC	Beneficiary	The Body Mass Index is an indicator of the fat level in the body. High values indicate overweight, while low values suggest underweight.
	Perception of habit changes in food selection, preparation and consumption (continuous and discrete)	DEC, DEF & INC	Beneficiary & Household	I create an index based on several questions; the higher the index, <b>the healthier the</b> eating behaviour. The continuous index varies from 0 to 100, while the discrete one is a binary variable (0 or 1). At the household level, I measure i) selection; ii) preparation; iii) consumption); and iv) a weighted index on the preceding ones. At the beneficiary level, I measure i) selection; ii) consumption; and iii) a weighted index based on the preceding ones.
Food Orientation	Diet Diversity, Variety & Quality (continuous and discrete)	DEC, DEF & INC	Household	The eating behaviour index, utilized for evaluating the diet quality, is comprised by the measurement of two dimensions: diet diversity and diet variety. Diet diversity refers to the consumption of different food groups. Diet variety refers to the consumption of different food groups. Diet variety refers to the consumption of different types of food within a food group. The higher the index, the worse the diet. Diet diversity is measured through 7 food categories, each one valued from 0 to 10 and, in aggregated terms, ranging from 0 (diverse diet) to 70 (non-diverse diet). Its categorical variable varies from 1 (complete) to 3 (incomplete). Diet variety is measured by 6 food categories. Each survey respondent should mention 3 foods of each category (except in 2 categories, in which only 1 food should me mentioned). One unit is added for each food that is not consumed. Thus, the index varies from 0 (highest variety) to 14 (lowest variety); i.e. 4*3 + 2*1. Its categorial variable ranges from 1 (varied) to 3 (non-varied). The diet quality continuous index is the result of the addition of the diet diversity continuous index and the diet variety continuous index. Its categorical variable ranges from 1 (healthier) to 3 (less healthier).
tion	Marks	DEC	Beneficiary	Average mark in the last schooling cycle which varies from 0 to 10 (only primary school).
Education	School Absenteeism	DEC & DEF	Beneficiary	School Absenteeism in the last i) schooling month; and ii) schooling cycle.
ш	Extra-curricular studies	DEC	Beneficiary	Minutes of study outside school per week (only primary school). Weekly frequency of: i) diarrhea or stomach pain; and ii) breathing difficulties. The
Health	Diarrhea and breathing problems	DEC, DEF & INC	Beneficiary & Household	higher the variable, the more deprived health condition; i.e. 0 refers to non- symptoms, while 4 indicates daily-symptoms.
не	Eye or gum disease or yellowish skin	DEC, DEF & INC	Beneficiary & Household	Last month frequency of: i) yellowish skin and obscured urine; ii) eyes disease symptoms; and iii) gum disease symptoms. <b>The higher the variable, the worse</b> health condition; i.e. 0 (no symptoms) and 1 (symptoms).

**<u>CHART 1</u>**: Response Variables per Program and Topic

# **IV. Evaluation Methodology Choice**

After having reviewed the impact evaluation methodological framework and the three DIF-programs, together with their outcome variables, I will present in this section the limitations that this research faces, and afterwards, the justification of the methodologies chosen for the impact evaluation.

### **IV.1. Limitations**

In particular, two main limitations will be explored: i) *ex ante* versus *ex post* evaluation; and ii) the eligibility criterion<sup>16</sup>.

*Ex ante* evaluations refers to those performed at the same time the program is designed; instead, *ex post* evaluations examine the programs after being designed and/or implemented. It is important to notice that the former ones are more likely to generate more accurate estimations, since: i) baseline data can be obtained; and ii) the treatment and control groups are selected before program implementation, thus more (internally and externally) valid methods can be used (e.g. randomization), under clear, transparent and difficult to manipulate selection processes (Gertler et al, 2011)<sup>17</sup>.

The three DIF-Puebla programs analyzed in the current investigation have been designed and implemented before this analysis. The recognition of the **ex post** nature of this evaluation leads to a reduction of the array of impact evaluation methods. In particular, the experimental methods should be discarded, thus the bias in the estimations are potentially higher. Therefore, it will be used a combination of quasi-experimental methods, "based on the realities of how the program was conducted, and what data are available" (DiNardo and Lee, 2010:32). This is a

<sup>&</sup>lt;sup>16</sup> Another bias that the research faces, for example, is the one generated from the fact that the direct beneficiary is not answering the questionnaire; it is rather an adult of the household.

<sup>&</sup>lt;sup>17</sup> Gertler et al (2011) call *ex-ante* evaluations as "prospectives" and *ex-post*'s as "retrospectives".

common procedure when an impact evaluation is performed over: i) priority governmental programs (this is the case with the DIF-programs, in line with the *Cruzada Nacional contra el Hambre*); or ii) programs arising as a consequence of an economic crisis (Jalan and Ravaillon, 2003).

The second sizable limitation of the current investigation is the *eligibility criterion* actually followed by the DIF-Puebla authorities. It was previously stated, among the program requirements, that the beneficiaries (INC) or their schools (DEC and DEF) should be *preferably* located in localities: i) of high or very high marginalization degrees; and ii) where the majority speaks an indigenous language. These *theoretical* requirements correspond fairly well with the available data, since, for example, 85 percent of the DEC and DEF schools are located within the high and very high degree of marginalization, while 79 percent of the INC beneficiaries are found in the same degree of marginalization (Chart 2).

	DE	С	DE	F	INC	
	Scho	ols	Scho	ols	Beneficia	ries
Marginalization	Number	%	Number	%	Number	%
Very High	59	4.0%	142	6.3%	1826	4.1%
High	1208	81.2%	1753	78.3%	33576	75.3%
Medium	147	9.9%	206	9.2%	5150	11.5%
Low	38	2.6%	108	4.8%	2083	4.7%
Very Low	36	2.4%	29	1.3%	1973	4.4%
Total	1488	100%	2238	100%	44608	100%

**<u>CHART 2</u>**: Beneficiaries per Program

However, after some interviews between the UNDP-Mexico Team and the DIF-Puebla authorities, it has been unveiled that the eligibility criterion is neither strict nor exclusive in practice; rather, it follows a first-in-first-out logic due to the excess of public funds not covered by the amount of beneficiaries.

Taking into account that all school requests are accepted (if the other administrative requirements are fulfilled), these schools may have certain characteristics that systematically differ from the selected control group. For example, schools receiving the programs may have more motivated authorities and beneficiaries, and this motivation may be determining better outcomes variables, instead of the actual effect of the programs. Thus, this important evaluation limitation reveals the necessity of balancing both groups by observable characteristics, yet unobservables cannot be controlled for as a consequence of the *ex post* evaluation nature.

### **IV.2. Selected Methods**

Due to the evaluation limitations previously mentioned, the impact evaluation will be carried out by the *propensity score* in order to balance the treatment and the control groups by observable features, and thus creating a common support for obtaining, afterwards, the casual effect. Since there is no propensity score *par excellence*<sup>18</sup> (as shown in the literature review), this study will use the PSM with *Stratification Matching, NN Matching* and *Kernel Matching*<sup>19</sup>. At the same time, the PSW will be performed with either: i) robust standard errors clustered at the locality level; and ii) block-bootstrapped standard errors, with 100 replications, also clustered at the locality level. In other words, the impact of the programs on each variable will be tested by five PS methods.

For practical reasons, as a *first condition*, I will consider that there is empirical evidence of the impact of a program on each variable when the estimated causal effect is significant (and its sign does not change) in at least three out of the five PS estimations. Second, since it is worth differentiating the confidence level of the estimations, I will create a scoring scheme; i.e. if the first condition was fulfilled, each result significant at the 90, 95 or 99 percent confidence level will receive 1.5, 1.75, or 2 points, respectively<sup>20</sup>. For example, if the estimation of the causal effect is significant at the 99 percent confidence level by the five PS methods, this outcome variable will have a score of 10 points. If the results are significant in two or less methods, it will be considered that there is no empirical evidence of the impact on this variable and will receive zero points (since the first condition is not complied).

<sup>&</sup>lt;sup>18</sup> Except for the consensus of avoiding the PS as a covariate method.

<sup>&</sup>lt;sup>19</sup> The PSM with *Radius Matching* is not presented, since several results do not converge.

 $<sup>^{20}</sup>$  This is a non-linear scoring in the sense that a large premium (1.5 points) is given if the method finds the outcome variable significant at the 90 percent. Later on, if the confidence level increases, it only adds 0.25 extra points per additional block of confidence.

Finally, if a certain variable is significant at the 90 percent in two methods and at the 95 percent in a third one, it will receive 4.75 points (1.5\*2 + 1.75).

Afterwards, the scores will be related to the empirical evidence found as described in Chart 3: i) no empirical evidence if the score is less than 4.5 (i.e. not even three methods provide significant coefficients at least at the 90 percent level); ii) small empirical evidence if the score is 4.5 (i.e. 3 methods at the 90 percent confidence level); iii) some empirical evidence if the score range is more than 4.5 and less than 8.75; and iv) large empirical evidence if the score is at least 8.75 (with a maximum of 10 points)<sup>21</sup>.

Degree of EvidenceRange of pointsLarge Evidence>=8.75Some Evidence>4.5 and < 8.75</td>Small Evidence4.5No Evidence<4.5</td>

**<u>CHART 3</u>**: Score for Determining the Degree of Evidence

It is critical to point out that the **DID** method cannot be implemented on these programs, since there is not data of the outcome variables at two periods of time; thus, the casual effect will represent a simple difference between the individuals of the treatment and the control groups that lie on the common support, thereby only controlling for observables.

Additionally, the **quantile regression** will be performed over some continuous variables that are crucial for DIF authorities; i.e. student's marks in DEC and anthropometric measures in INC.

Finally, I will mention the reasons why the IV and RDD methods were not used to evaluate the programs. The difficulty in finding an appropriate instrumental variable in the context of these programs and their questionnaires leaves the **IV method** out of chances. On the one hand, as a randomized offering was not performed

<sup>&</sup>lt;sup>21</sup> This methodology was created in order to summarize the large amount of results that were estimated by several PS methods. Though it is true that this methodology is subjective to the researcher point of view, it was necessary for presentation and organizational issues.

beforehand, the IV cannot be embodied by the initial random selection of eligible units. On the other hand, there were no administrative questions at the school level as a proxy for the likelihood of their students to be beneficiaries of the programs (following Arcand and Bassole, 2006).

As regards the **regression discontinuity design**, it cannot be applied due to the inexistence of a precise eligibility criterion, in practice, that may determine a clear threshold between groups. For example, if only those individuals located in a very high and high marginalization locality were selected to treatment, and the others were selected to the control group, individuals around this discontinuity could have been used for evaluating the program through RDD. However, the *first-in-first-out* logic dominates, thus this option is discarded.

# V. Impact Evaluation

### V.1. General Considerations

### V.1.1. Standard Errors

Since PSM with Kernel Matching offers a non-parametric estimation, the standard errors may be seriously biased. The same problem arises with other parametric PSM methodologies and with the PSW, since the estimated variance from the causal effect should also include the effect: i) of the variance from the PS estimation in the first step; ii) from the creation of a subsample that fulfills the common support; and iii) of the order in which the individuals are matched when a PSM without replacement is used (Lechner, 2002; Caliendo and Kopeining, 2005; Khanker et al, 2010).

Consequently, the PSM methods will include bootstrapped standard errors, as usual. Bootstrapping takes repetitive samples from the original one, where standard errors are re-estimated in each sample, taking into account the estimations of both the PS and the structural equation. Although there is scarce evidence about how appropriate are the bootstrapped standard errors in the PSM context, this technique usually generates valid standard errors and confidence intervals (Imbens, 2004).

In particular, block-bootstrapping will be used due to the clustered structure of the variance-covariance matrix, allowing individuals within the cluster to be correlated as a result of the agglomeration (Wooldridge, 2002: 329-331), and thus avoiding biased estimations of the causal effect (Li et al, 2013).

Finally, as already mentioned, the PSW will be estimated under two different schemes: i) robust standard errors clustered at the locality level; and ii) block-bootstrapped standard errors, with 100 replications, also clustered at the locality level.

### V.1.2. Control for Unobservables

The PSM balances the treatment and control groups by observables. If at least two points in time were taken, DID or a fixed effects model may be applied, thus individual heterogeneity can be controlled for. Since this data is not available for the present investigation, the results of this research may be biased by unobservables.

In order to *reduce* this source of bias, the structural estimations will contain **fixed effects at the locality level**, thus controlling for every common shock that individuals from the same locality are facing. In the case of the PS estimations, **fixed effects at the municipal level** are included. This higher aggregation level in the PS estimations was considered with the purpose of facilitating the PS estimation for each program<sup>22</sup>.

### V.1.3. PSM and PSW

Some particularities of the implementation of the PSM and the PSW will be clarified in the following paragraphs. First, a *logit* model will be used to determine the likelihood of participating in the program. The results by this model are pretty similar

<sup>&</sup>lt;sup>22</sup> In the first place, locality fixed effects were included and the propensity scores were, in general, perfectly determined by only some localities and no other covariates. Thus, it was decided to include municipality fixed effects.

to those obtained by a probit model, though the latter has heavier tails in their distribution. In addition, these models are preferred against a linear probability model that may generate predictions out of the probability limit [0, 1] -see Smith (1997) for a discussion of the topic.

Second, following Jalan and Ravallion (2003) and Heckman, Ichimura and Todd (1997), the treatment and the control group: i) answered the **same questionnaire**; and ii) lived in the **same economic environment** in the sense that both groups are balanced by geographical terms and that there are specific estimations by only rural and only urban units. These strategies significantly increase the accuracy of the results.

Third, as suggested by Heckman, Ichimura and Todd (1997), Bryson, Dorsett and Purdon (2002), and Rubin and Thomas (1996), an **extensive list of covariates** will be used in the PS estimations, though an over-parameterized model will be avoided, in line with the literature review. Due to the *ex post* nature of the current research, the pre-treatment covariates were retrospectively obtained, thus potentially generating *recall bias*. With the purpose of addressing the problem of both the overparameterized model and the recall bias, a simple model will be sought for the PS estimation. That is, at first, it will only include time-invariant variables. Then, it will progressively add new variables significantly correlated with the PS that, at the same time, balance the groups, as recommended by Caliendo and Kopeining (2005).

Fourth, when the PSM is used with *Kernel Matching*, a **kernel function** must be selected. This is used to weight the distance among individuals from the different groups and to perform a non-parametric *weighted least squares* estimation (Smith and Todd, 2005). The kernel function may be uniform, Epanechnikov or Gaussian, among others. This evaluation will consider a Gaussian one. In any case, this choice does not have a determinant effect on the causal effect estimation (DiNardo and Tobías, 2001).

Finally, as regards the PSW estimation, the treatment group's weight will be 1, while the control group's will be PS/(1-PS), as suggested by Hirano and Imbens (2001), Morgan and Todd (2008), and Nicholas (2008).

# V.2. Covariates

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In Chart 4, there is a list of ten variables included in the PS estimation for each program, while Chart 5 provides the complete list of covariates.

DEC	DEF	INC
HH age	Per Capita Food Expanditure	Marginalization Degree
Household with washing mashine	Overcrowding rate	Per Capita Food Expenditure
Household with mobile phone	Urban or rural locality	Household with refrigerator
Attend 2nd grade of	Foreing remittances	Household with
Primary School	received	internet access
Attend 3rd grade of Primary School	Property registered for agricultural use	Belongs to the Ayotoxco de Guerrero <i>municipio</i>
Survey respondent age	Household with TV	Belongs to the Huehuetla <i>municipio</i>
Belongs to the Ayotoxco de Guerrero <i>municipio</i>	Belongs to the Cuyoaco municipio	Belongs to the San Nicolás de los Ranchos <i>municipio</i>
Belongs to the Chiautla municipio	Belongs to the Nealtican <i>municipio</i>	Belongs to the San Salvador el Seco <i>municipio</i>
Belongs to the		Belongs to the Tetela
Chignautla <i>municipio</i>		de Ocampo <i>municipio</i>
Belongs to the		Belongs to the Zacatlán
Nopalucan <i>municipio</i>		municipio

# <u>CHART 4</u>: Control Variables for the Propensity Score Estimation, by Program

 $\underline{Note}:$  In the DEF program, I mention the only eight variables balancing the sample. HH refers to the household head.

-

DimensionVariable DescriptionHousehold# of children aged 3 to 5Household# of household members with a disability (without including the HH)Household# of people older than 65Household% of household members workingHouseholdAt least one household member receiving another government social programHouseholdAt least one household member speaks an indigenous languageHouseholdDrainageHouseholdDwelling deprivation (equal to 1 if dirt floor, sheet metal roof or sheet metal wall)HouseholdElectric EnergyHouseholdForeing remittances (equal to 1 if received)HouseholdHH ageHouseholdHH disability (equal to 1 if moving)HouseholdHH economic activity (equal to 1 if working)HouseholdHH gender (equal to 1 if having a partner)HouseholdHousehold owner (equal to 1 if nowner)HouseholdHousehold owner (equal to 1 if owner)HouseholdHousehold with heaterHouseholdHousehold with internetHouseholdHousehold with internet		
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HouseholdHousehold owner (equal to 1 if owner)HouseholdProperty registered for agricultural useHouseholdHousehold with heaterHouseholdHousehold with internet	Household	HH gender (equal to 1 if men)
HouseholdProperty registered for agricultural useHouseholdHousehold with heaterHouseholdHousehold with internet	Household	HH marital status (equal to 1 if having a partner)
HouseholdHousehold with heaterHouseholdHousehold with internet	Household	Household owner (equal to 1 if owner)
Household Household with internet	Household	Property registered for agricultural use
	Household	Household with heater
Household Household with iron	Household	Household with internet
nousenoia inousenoia with iron	Household	Household with iron
Household Household with mobile phone	Household	Household with mobile phone
Household Household with refrigerator	Household	Household with refrigerator
Household Household with TV	Household	Household with TV
Household Household with washing machine	Household	Household with washing machine
Household Other household member assist to the same beneficiary's shool (only used in DEC and DEF)	Household	Other household member assist to the same beneficiary's shool (only used in DEC and DEF)
Household Overcrowding Rate	Household	Overcrowding Rate
Household Per capita food expenditure	Household	Per capita food expenditure
Household Per capita income	Household	Per capita income
Household Running water	Household	Running water
Household Survey respondent age		
Household HH Years of schooling	Household	HH Years of schooling
Household Years of schooling of individuals older than 14 who do not study		
Beneficiary Attend 2nd grade of Primary School (only used in DEC)	Beneficiary	Attend 2nd grade of Primary School (only used in DEC)
Beneficiary Attend 3rd grade of Primary School (only used in DEC)	Beneficiary	Attend 3rd grade of Primary School (only used in DEC)
Beneficiary Attend 4th grade of Primary School (only used in DEC)	Beneficiary	Attend 4th grade of Primary School (only used in DEC)
Beneficiary Attend 5th grade of Primary School (only used in DEC)	Beneficiary	Attend 5th grade of Primary School (only used in DEC)
Beneficiary Beneficiary age	Beneficiary	Beneficiary age
Beneficiary Beneficiary gender	Beneficiary	Beneficiary gender
Beneficiary Minutes from house to school (only used in DEC and DEF)		
Locality Locality Fixed Effects	Locality	Locality Fixed Effects

### **CHART 5: Control Variables**

Note: HH refers to the household head.

### **V.3. DEC**

The evaluation of the DEC program starts by comparing pre-treatment characteristics between the treatment and the control groups. The large dissimilarities between groups highlight the importance of balancing them by the PS. Chart 6 shows that individuals from the control group are situated, in 2010, in localities with a higher level of marginalization. For example, 76 percent of the control group is in a high or very high marginalized locality, while this percentage decreases to 55 percent for the treated group.

Treatment Variable	M	arginalizatio	n Degree per L	ocality in 20	10	
DEC	Very Low	Low	Medium	High	Very high	Total
Control	4.34	100				
Treatment	9.28	23.51	12.01	53.88	1.33	100
Total	7.54	19.61	10.47	56.2	6.18	100

**CHART 6: Marginalization Degree by Localities** 

Seemingly, Chart 7 illustrates that there is a higher percentage of control group units in rural than in urban areas (54 and 46 percent, respectively), as opposed to the treatment group (32 and 68 percent, respectively). This same chart shows that the percentage of people speaking an indigenous language is smaller in the treatment group (14 versus 19 percent in the control group).

Treatment Variable	Urbar	n or Rural Lo	cality		ne househol n indigenou	
DEC	Rural	Urban	Total	No	Yes	Total
Control	53.69	46.31	100	81.36	18.64	100
Treatment	31.77	68.23	100	86.13	13.87	100
Total	39.47	60.53	100	84.45	15.55	100

**<u>CHART 7</u>**: Urban or Rural Locality and Indigenous Population

Finally, Chart 8 presents the pre-treatment income and food expenditure per capita averages at the level of the households. The treated units face a higher income per capita than the control group, not only by a simple average but also when survey weights are considered. As regards the per capita food expenditure, this is higher in the treatment group by a simple average, but it is slightly smaller by the weighted one (Chart 8).

	Per capi	ta income	Per capita fo	od expenditure
Treatment Variable: DEC	Simple Average	Weighted Average*	Simple Average	Weighted Average*
Control	611.52	611.52	348.03	348.03
Treatment	835.47	633.47	399.35	324.68

# <u>CHART 8</u>: Per Capita Income and Food Expenditure (By Household)

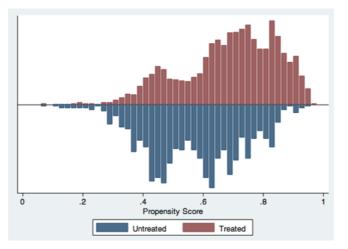
\*Weighted average by survey weights. The units of the control group have a weight of 1.

In brief, these charts anticipate that the control group is more vulnerable than the treatment group. Without balancing by the PS, these differences may overestimate the causal effect due to selection bias. Thus, the PS is estimated (Figure 6), and the remaining bias will only be generated by unobservables.

### **FIGURE 6: PS Estimation (DEC)**

Algorithm to e	stimate the p	ropensity scor	e				Estimated pro	opensity score			
*********	********	******	********	*****	*******	*****		Percentiles	Smallest		
The treatment	is t_DEC						1%	0.2735082	0.0781193		
Variable Tratai	miento DEC	Freq.	Percent	Cum.			5%	0.3695242	0.108476		
Control		853	35.15	35.15			10%	0.4201659	0.1206623	Obs	2426
Tratamiento		1,574	64.85	100			25%	0.5154398	0.138448	Sum of Wgt.	2426
Total		2,427	100								
					_		50%	0.6689835		Mean	0.6487748
Estimation of t	he propensity	score							Largest	Std. Dev.	0.1665424
teration 0: lo	g likelihood	-1573.5392					75%	0.7787249	0.9541228		
teration 1: lo	g likelihood	-1422.4247					90%	0.8559109	0.956936	Variance	0.0277364
Iteration 2: lo	g likelihood	-1418.5309					95%	0.8977319	0.9595618	Skewness	-0.3615688
Iteration 3: lo	g likelihood	-1418.495					99%	0.9370616	0.9614234	Kurtosis	2.414213
Iteration 4: lo	g likelihood	-1418.495					*******	********	*********	*******	*******
							Step 1: Identi	ification of the	e optimal numl	er of blocks	
Logistic regres	sion	Number of obs	= 2427				*******	*********	*********	*******	********
		LR chi2(11)	= 310.09				The final nur	nber of blocks	is 8		
		Prob > chi2	= 0.0000				This number o	f blocks ensures	that the mean p	ropensity scor	e
Log likelihood	= -1418.495	Pseudo R2	= 0.0985				is not different	for treated and	controls in each	blocks	
	-						*******	********	*******	********	*********
t_DEC	Coef.	Std. Err.	z	$P \ge  z $	[95% Conf.	Interval]	-		operty of the p		
edad_JH	-0.0162411	0.0054362	-2.99	0.003	-0.0268958	-0.0055864	********	*********	**********	*********	**********
edad_entr	-0.016585	0.0067966	-2.44	0.015	-0.0299062	-0.0032639	The balancin	g property is s	atisfied		
qk13_11_bis	0.64648	0.1036374	6.24	0	0.4433545	0.8496056	This table show	ws the inferior b	ound, the numbe	r of treated	
qk13_21_bis	0.231393	0.095343	2.43	0.015	0.0445243	0.4182618	and the numbe	r of controls for	each block		
yr_ed_FE1	0.6056023	0.1137068	5.33	0	0.382741	0.8284635	Inferior of	Variable Trat	amiento DEC		
yr_ed_FE2	1.012068	0.1090595	9.28	0	0.7983154	1.225821	block of pscore				
munFE5	0.7262376	0.2944506	2.47	0.014	0.1491251	1.30335	-	Control	Tratamiento	Total	
munFE7	1.089302	0.2801601	3.89	0	0.5401987	1.638406	0.0781193	9	4	13	
munFE8	1.319658	0.2827063	4.67	0	0.7655642	1.873752	0.2	109	63	172	
	0.9720547	0.2926242	3.32	0.001	0.3985219	1.545588	0.4	340	323	663	
munFE16	-1.358603	0.3398062	-4	0	-2.024611	-0.6925949	0.6	200	343	543	
mun FE16 mun FE24	-1.558005	0.2316838	3.57	0	0.3727306	1.280914	0.7	124	394	518	
munFE16 munFE24 _cons	0.8268225						0.8	53	204	257	
munFE16 munFE24 _cons	0.8268225		n selected								
mun FE16 mun FE24	0.8268225 non support o	ption has been		3]			0.85	9	137	146	
mun FE16 mun FE24 _cons Note: the comn	0.8268225 non support o	ption has been		3]			0.85 0.9	9 8	137 106	146 114	

In addition, Figure 6 illustrates that the balancing test is satisfied, thus both groups are balanced by the PS; i.e. the likelihood of participation is similar in each block for the two groups. At the same time, Graph 1 illustrates the histogram of the PS for each group, thus visualizing their degree of juxtaposition and the common support area.

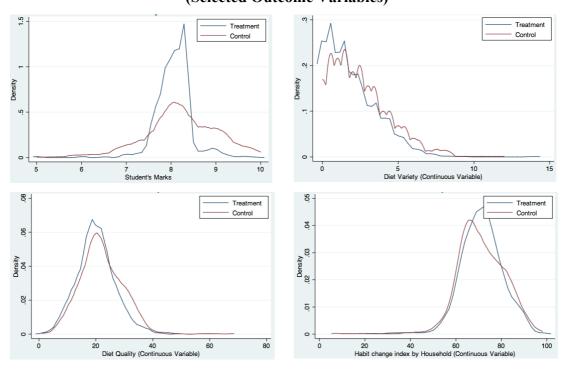


**<u>GRAPH 1</u>**: PS Histogram by Treatment Status (DEC)

Figure 6 also illustrates that the PS estimation depends on the household head age, if the household has a washing machine, if it has a mobile phone, on the survey respondent age, on a dummy variable if attending second year of primary school, a dummy variable if attending the third year, and various municipality fixed effects, as noticed in Chart 4. In addition, it is interesting to see that only one individual was eliminated for establishing the common support area.

Figure 7 shows the density function estimations of some outcome variables through the Kernel method. The upper left graph shows that the student's marks of both groups are concentrated around the eight points and that the control group distribution is much softer than the one of the treated group. The other three illustrations from Figure 7 analyze different outcome variables from the food orientation topic. The upper right graph examines diet variety in its continuous form. The treated group is concentrated at low values of the distribution, as opposed to the control group, thus preliminary suggesting that the diet is more varied in the treatment group (0 points represent the most varied diet and 14 the least). The same occurs with

the lower left graph that explores the continuous quality diet variable, which varies from 0 (more quality) to 84 (less quality). Finally, the lower right graph shows more concentration of the treated units in the higher values of the continuous index of habit changes at the beneficiary level, which ranges from 0 (worst eating habit) to 100 (best eating habit), in line with the two preceding graphs.



# **FIGURE 7:** Kernel Density Function Estimation (Selected Outcome Variables)

After this preliminary analysis, I will show the results of the impact evaluation of the DEC program for the overall sample. In addition, in order to capture heterogeneous effects for more specific policy implications, the causal effect will also be estimated for the following sub-samples: i) boys; ii) girls; iii) urban localities; and iv) rural localities.

Due to the great amount of results, Chart 9 only shows a summary of the significant causal effects, with the reminder that this study considers certain empirical evidence if at least three out of the five evaluation methods show a significant coefficient without changing sign. For presentation issues, this chart excludes: i) those

estimations of a categorical outcome variable if also evaluated by a continuous one<sup>23</sup>; ii) the lower level of aggregation of the habit change compound indexes (i.e. it only includes the overall index and excludes those only referring to selection, preparation or consumption); and iii) school absenteeism in the last month, since it is less precise than the one measuring absenteeism in the last schooling cycle. In any case, all the results of the DEC program are shown at the end of this study in Annex I.

The impact of the DEC program is illustrated in Chart 9, by sample and topic. As regards the <u>food support</u> area, the DEC program has only a partial effect on the food insecurity index. In particular, there is a negative association between program participation and the categorical index in a range between 3 to 4 percent coming from the control group average in the general sample, thus reducing the household food insecurity perception. However, this effect is neither seen in the other sub-samples nor in the continuous index.

The program has a beneficial impact on the <u>food orientation</u> area, not only by different samples (general, girls, boys, urban, and rural area) but also by diverse outcome variables (household diet diversity, variety, and quality, on the one hand, and habit change perception by beneficiaries and households, on the other hand). The favorable results are more pronounced in rural areas, where the diet variety coefficient ranges from -0.39 to -0.93, equivalent to a decrease from 15 to 35 percent with respect to the weighted average of the control group in the rural sample that lies on the common support. In a gender comparison, girls are more benefited by the program. The results are significant for diet diversity, variety, and quality and for the habit change perception by beneficiaries. This last outcome variable presents the strongest evidence, since the five methods are significant at the 99 percent confidence level, thus it receives a score of ten points. The DEC program has a favorable impact on boys only through the habit change perception by beneficiaries. This last outcome variable impact is captured by the five methods at the 99 percent confidence level and ranges from 13 to 17 percent with respect to the control group of boys lying on the common support.

<sup>&</sup>lt;sup>23</sup> The only exception is the food insecurity index in the general sample.

The impact of DEC on the <u>education arena</u> is quite conflictive. The program is associated with lower student's marks in the range between 2 and 3 percent (except for boys and for rural areas). Two possible interpretations may arise from this result: i) unobservable characteristics may be biasing the estimations; ii) a perverse incentive may be determining that the beneficiaries are discouraged to obtain better marks. This can happen if, for example, the beneficiaries reduce their effort in studying as a result of perceiving a long-lasting government aid. Though the first option is viable, the second one turns more likely, considering: i) the beneficial effects found in the other outcome variables; and ii) the better pre-treatment conditions found in the treated group.

Finally, in the <u>health area</u>, the analysis focuses on the impact on the likelihood of five diseases at both the beneficiary and their household level. The DEC is associated with an increased probability of breathing problems in boys in a range of 18-28 percent, coming from the control group weighted average. This result is also unexpected; however, there is not a great amount of evidence in this direction, since: i) only three out of the five methods suggest this result; and ii) it was neither found at the household level nor on the other samples.

Before giving an end to the DEC evaluation, and with the purpose of shedding more light on the unexpected results on student's marks, Chart 10 presents the causal effect at different points of the outcome variable distribution; i.e. on the first, second and third quartile. These **quantile regressions** will be performed through the PSW with block-bootstrapped standard errors (100 replications) under the general sample. It is important to notice that the validity of these results lies, again, on the degree of compliance of the PS assumptions.

# <u>CHART 9</u>: Impact of the DEC Program

Program	Sample	Topic	Variable Food Insecurity Index by Household	Range 1 (Food Security) a 4 (Severe Food	Weighted average of the control group by program and sample	Min		Impact range Max Min	Min		Max	# of methods significant (min=3; max=5)		Score	Score Empirical Evidence of the Impact
	Gral	Food Support	Food Insecurity Index by Household (Categorical Index )	1 (Food Security) a 4 (Severe Food Insecurity)	2.041	-0.07	to	-0.09	-3%	to		-4%	5		5
DEC	Gral	Food Orientation	Diet <u>quality</u> by Household ( <i>Continuous Index</i> )	0 (more healthy) to 84 (less healthy)	22.048	-0.91	to	-1.72	-4%	to		-8%	-8%		5
DEC	Gral	Food Orientation	Habit change perception by Beneficiary (Continuous Index)	0 (less healthy) to 100 (more healthy)	48.804	6.09	ť	8.05	12%	ť		16%	16% 5		ъ
DEC	Gral	Food Orientation	Diet <u>variety</u> by Household ( <i>Continuous Index</i> )	0 (more variety) to 14 (less variety)	2.379	-0.25	to	-0.5	-11%	-	to	:0 -21%		-21% 5	-21% 5
DEC	Gral	Education	Student' marks in Primary School	0 to 10	8.219	-0.15	đ	-0.19	-2%		đ	to -2%	-2%	-2%	-2% 5 9
DEC	Girls	Food Orientation	Diet <u>quality</u> by Household ( <i>Continuous Index</i> )	0 (more healthy) to 84 (less healthy)	22.157	-1.47	to	-2.09	-7%	0	6 to	to	to	to -9% 5	to -9% 5 9.75
DEC	Girls	Food Orientation	Diet <u>diversity</u> by Household ( <i>Continuous Index</i> )	0 (diverse diet) to 70 (non-diverse diet)	19.77	-1.04	ť	-1.64	Ϋ́	%	% to		to	to -8%	to -8% 4 6.75
DEC	Girls	Food Orientation	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	48.052	6.15	to	8.83	1	13%	3% to		to	to 18%	to 18% 5
DEC	Girls	Food Orientation	Diet <u>variety</u> by Household ( <i>Continuous Index</i> )	0 (more variety) to 14 (less variety)	2.387	-0.43	ť	-0.56	-18%	3%	3% to		to	to -23% 5	to -23% 5
DEC	Girls	Education	Student' marks in Primary School	0 to 10	8.27	-0.16	to	-0.21	-2%	0	6 to		to -3%	to -3%	to -3% 4
DEC	Boys	Food Orientation	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	49.546	6.57	to	8.49	ц	13%	3% to		to	to 17%	to 17% 5
DEC	Boys	Health	Beneficiary <u>breathing</u> difficulties (Ordinal Categorical Variable )	0 (never symptoms) a 4 (daily symptoms)	1.028	0.18	ť	0.29	18%	\$%	to		ť	to 28%	to 28% 3
DEC	Rural	Food Orientation	Diet <u>diversity</u> by Household ( <i>Continuous Index</i> )	0 (diverse diet) to 70 (non-diverse diet)	20.684	-2.9	to	-3.4	4	-14%	L4% to		to	to -16%	to -16% 3
DEC	Rural	Food Orientation	Habit change perception by Beneficiary (Continuous Index)	0 (less healthy) to 100 (more healthy)	50.369	8.06	to	80 80		16%	16% to		to	to 17%	to 17% 3
DEC	Rural	Food Orientation	Habit change perception by Household ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	71.042	3.55	to	4.16		5%	5% to		to	to 6%	to 6% 3
DEC	Rural	Food Orientation	Diet <u>variety</u> by Household ( <i>Continuous Index</i> )	0 (more variety) to 14 (less variety)	2.632	-0.39	to	-0.93		-15%	-15% to	5%	5% to	5% to -35%	5% to -35% 4
DEC	Urban	Food Orientation	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	47.038	7.35	to	8.61	16%	5%	5% to	to	to 18%	to 18%	to 18% 5
DEC	Urban	Education	Student' marks in Primary School	0 to 10	8.358	-0.2	to	-0.29	-2	%	% to		to	to -3% 5	to -3% 5

	-			,
Variable	Simple	Impact	Confidence	Impact in %
	Average	•	Level	•
Average Marks	8.2	-0.17	* * *	-2.1%
1st Quartile Marks	7.8	-0.11	**	-1.4%
2nd Quartile Marks	8.2	-0.2	* * *	-2.4%
3rd Quartile Marks	8.9	-0.25	* * *	-2.8%

Note: I take the simple average of those individuals in the control group situated within the common support as the benchmark. This exercise was done over the whole DEC sample found in the common support attending primary school (N=1614). \*\*\* refers to a 99% confidence level, \*\* to a 95% and \* to a 90%.

Chart 10 shows that the impact is negative and significant for every quartile. However, the impact is larger and more significant for the higher quartiles. In particular, the program is associated with a decrease in student's marks in 1.4 percent for the first quartile, 2.4 percent for the second one, and 2.8 for the third one. This implies that the detrimental effect did not augment initial differences.

### **V.4. DEF**

The first step in the cold school breakfast (DEF) analysis is the comparison of the pretreatment characteristics between groups. Chart 11 shows a similar pattern compared with the DEC program, because the control group is also more marginalized than the treated one; i.e. 62 percent of the control units are placed in localities under a high or very high level of marginalization, while this number decreases to the 50 percent in the treatment group.

Treatment Variable	М	arginalizatio	n Degree per L	ocality in 20	10	
DEF	Very Low	Low	Medium	High	Very high	Total
Control	13.09	19.51	5.13	53.27	8.99	100
Treatment	11.31	27.83	11.05	47.52	2.29	100
Total	12.2	23.69	8.11	50.38	5.62	100

**CHART 11: Marginalization Degree by Localities** 

Chart 12 illustrates that the control group was equally balanced between urban and rural regions, while the treated units are more heavily localized in urban areas (81 percent). The same chart shows that the control group tends to speak an indigenous language with more frequency; i.e. 30 percent in the control group versus 17 percent in the treatment.

Treatment Variable	Urbar	n or Rural Lo	cality		ne househol n indigenou	
DEF	Rural	Urban	Total	No	Yes	Total
Control	49.42	50.58	100	70.09	29.91	100
Treatment	19.44	80.56	100	83.21	16.79	100
Total	34.36	65.64	100	76.68	23.32	100

**<u>CHART 12</u>**: Urban or Rural Locality and Indigenous Population

Finally, Chart 13 shows that the control group has higher income and food expenditure pre-treatment levels, as opposed to the trend showed in the previous results. However, these differences between groups are not significantly different and they seem to be driven by outliers situated in very low marginalized localities, as it can be perceived in Chart 11.

# <u>CHART 13</u>: Per Capita Income and Food Expenditure (By Household)

	Per capi	ta income	-	bita food nditure
Treatment Variable: DEF	Simple Average	Weighted Average*	Simple Average	Weighted Average*
Control	791.54	791.54	413.01	413.01
Treatment	753.95	681.11	400.61	361.40

\*Weighted average by survey weights. The units of the control group have a weight of 1.

In sum, it cannot be concluded that there are significant pre-treatment differences between groups. Let us take a look, then, to the PS estimation of the DEF program through Figure 8.

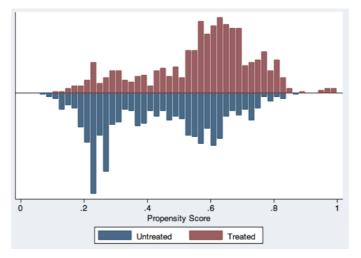
Vgorithm to estima ************************************	********* DEF	• •	********		Algorithm to estimate the propensity score						
The treatment is t_] /ariable Tratamien Control Tratamiento	DEF	*****	*********					ensity score		1	
- Variable Tratamien Control Tratamiento				******	*******	****		Percentiles	Smallest		
Control Tratamiento	ito DEF				_		1%	0.1393415	0.1139171		
ratamiento		Freq.	Percent	Cum.			5%	0.2030709	0.1157953		
		779	49.74	49.74	1		10%	0.2295938	0.1169754	Obs	1556
`otal		787	50.26	100			25%	0.3144983	0.1236284	Sum of Wgt.	1556
		1,566	100								
	-				-		50%	0.5508411		Mean	0.5028477
Estimation of the p	ropensity s	core							Largest	Std. Dev.	0.1906020
teration 0: log lik	kelihood = -	1082.6908					75%	0.6450998	0.9724343		
teration 1: log lik	kelihood = -	.962.96733					90%	0.7312543	0.985017	Variance	0.0363294
teration 2: log lik	kelihood = -	960.78678					95%	0.7794431	0.987877	Skewness	-0.212062
teration 3: log lik	kelihood =	-960.73683					99%	0.8359768	0.9886811	Kurtosis	1.980531
teration 4: log lik	kelihood =	-960.73651					******	****	*****	****	****
							Step 1: Identifi	cation of the opti	imal number of l	blocks	
ogistic regression		Number of obs	= 1562				*******	******	******	******	*****
		LR chi2(11) =	243.91				The final numb	er of blocks is 5			
		Prob > chi2 =					This number of	blocks ensures the	at the mean prope	nsity score	
.og likelihood = -9	060.73651	Pseudo R2 =	0.1126				is not different f	or treated and cor	ntrols in each bloc	ks	
							******	******	*****	*****	*****
t_DEF Coe	ef. Std.	Err. z	P> z	[95%	Conf. Int	erval]	Step 2: Test of	balancing proper	rty of the propen	sity score	
qg2_a_bis 0.83	350698	0.4605008	1.81	0.07	-0.0674951	1.737635	***************************************				
gs_pcap	000872	0.0002491	-3.5	0	-0.0013599	-0.0003834	The balancing	property is satisf	fied		
urb 1.7	755296	0.1303556	13.47	0	1.499804	2.010789	This table show	s the inferior bour	nd, the number of	treated	
hacin 0.12	275488	0.0418761	3.05	0.002	0.0454732	0.2096244	and the number	of controls for ea	ch block		
	660944	0.1391862	4.79	0	0.3932945	0.9388942	Inferior of				
	945618	0.2314994	3	0.003	0.2408313	1.148292	block of	Variable Trata	amiento DEF		
	789298	1.156879	2.41	0.016	0.5218572	5.056739	pscore	Control	Tratamiento	Total	
	405447	0.3907245	-3.6	0	-2.171253	-0.6396407	0.1139171	59	15	74	
	638344	0.9654596	-3.77	0	-5.53061	-1.746078	0.2	312	123	435	
Note: the common s							0.4	225	238	463	
The region of comm							0.6	169	360	529	
							0.0	8	47	55	
							Total	8 773	783	1,556	

### **FIGURE 8: PS Estimation (DEF)**

This figure shows that ten individuals are discarded from the original sample (four from the treatment and six from the control group) to balance both groups in terms of observables and to find the common support illustrated in Graph 2. Figure 8, as well as Chart 4, shows that DEF participation is explained by foreign remittances, per capita food expenditure, a dummy variable equal to 1 if the locality belongs to an urban area or 0 otherwise, the overcrowding rate, if the household has a TV, if the property is registered for agricultural use, and two municipality fixed effects.

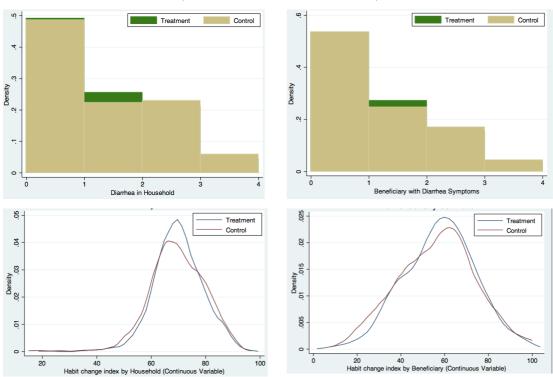
Figure 9 shows the estimations of: i) the histograms of two categorical outcome variables; and ii) the Kernel Epanechnikov density function of two continuous outcome variables. The upper graphs show the diarrhea or stomach pain weekly frequency for households and beneficiaries (left and right chart, respectively), measured through an ordinal categorical variable. In both cases, a higher proportion

of treated units has less symptoms. In the lower charts, from left to right, the density functions of the habit change perception variable by households and beneficiaries, respectively, are deployed. The left chart shows that a larger proportion of households of the treated group is located in the upper part of the distribution (i.e. better eating habits), while the right chart does not infer substantial differences at the beneficiary level.



**<u>GRAPH 2</u>**: PS Histogram by Treatment Status (DEF)

### **FIGURE 9:** Preliminary Graphic Analysis



(Selected Outcome Variables)

Chart 14 describes the impact of the DEF program. As it was done with the DEC analysis, the main results can be visualized in this chart, while the overall results may be found in Annex II.

First, there is no significant association between DEF participation and the food insecurity index (under the <u>food support</u> topic). The categorical index is inversely related to program participation, as expected, but only in the rural sample in two out of the five evaluation methods (Annex II).

Second, DEF is associated with better <u>food orientation</u> outcomes at the *household* level, measured by the habit change perception and diet diversity variables, not only for the general sample (3-4 percent) but also for girls (1-10 percent), and urban areas (4-5 percent). However, this program is associated with worse food orientation outcomes at the *beneficiary* level, measured by habit change perception, except in rural areas where no significant effects were found.

Third, in the <u>education</u> field<sup>24</sup>, DEF is associated with an increase in school absenteeism between 42 to 45 percent in the general sample; yet, no significant results were found in the sub-samples. This result is in line with the detrimental effects of DEC on education. Presumably the same potential interpretations can be provided: i) results are biased by unobservables; or ii) there may be perverse incentives of the program on their beneficiaries. Though it was highlighted that the second option may be more viable for DEC, it is not necessarily the same in this program, considering that this result was significant in three out of the five evaluation methods for only the general sample.

Finally, as regards the <u>health</u> area, DEF is associated with lower diarrhea symptoms in *girls*, not only for the beneficiaries (34-62 percent) but also for their households (29-60 percent). Having found this effect at both levels, the impact of this outcome variable for girls is reinforced. On the other hand, this effect was not found in the other samples.

<sup>&</sup>lt;sup>24</sup> Student's marks are not evaluated in the DEF program, since a large amount of beneficiaries (from DIF reports) were attending kinder school.

				CHART	<u>CHART 14</u> : Impact of the DEF Program	DEF	Prog	ram							
								Impact range	range						
Program	Sample	Topic	Variable	Range	Weighted average of the control group by program and sample	Min		Max	Min		Max	# of methods significant (min=3; max=5)	Score	Empirical Evidence of the Impact	Expected Result
DEF	Gral	Food Orientation	Habit change perception by Household (Continuous Index)	0 (less healthy) to 100 (more healthy)	70.467	2.31	to	3.06	3%	đ	4%	5	7.5	Some Evidence	YES
DEF	Gral	Education	School Absenteeismin last schooling cycle	0 to 87 days	2.118	0.9	to	0.95	42%	đ	45%	ω	6	Some Evidence	NO
DEF	Gral	Food Orientation	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	62.054	-6.26	to	-8.97	-10%	đ	-14%	σ	10	Large evidence	NO
DEF	Girls	Food Orientation	Diet <u>diversity</u> by Household (Continuous Index)	0 (diverse diet) to 70 (non-diverse diet)	18.57	-0.17	to	-1.89	-1%	5	-10%	4	7.5	Some Evidence	YES
DEF	Girls	Food Orientation	Habit change perception by Household ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	69.941	4.07	ť	5.92	6%	ť	8%	л	9.5	Large evidence	YES
DEF	Girls	Health	Beneficiary's Diarrhea symptoms (Ordinal Categorical Variable)	0 (never symptoms) a 4 (daily symptoms)	0.742	-0.25	to	-0.46	-34%	ť	-62%	ω	5.75	Some Evidence	YES
DEF	Girls	Health	Diarrhea symptoms in the Household ( <i>Ordinal Categorical</i> <i>Variable</i> )	0 (never symptoms) a 4 (daily symptoms)	0.712	-0.21	ť	-0.43	-29%	ಕ	-60%	σ	9.25	Large evidence	YES
DEF	Girls	Food Orientation	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	60.855	-8.35	ť	-8.6	-14%	đ	-14%	ω	6	Some Evidence	NO
DEF	Boys	Food Orientation	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	0 (less healthy) to 100 (more healthy)	63.231	-8.35	ť	-10.4	-13%	ಕ	-16%	σ	10	Large evidence	NO
DEF	Urban	Food Orientation	Habit change perception by Household (Continuous Index)	0 (less healthy) to 100 (more healthy)	69.148	2.43	ť	3.24	4%	ť	5%	л	8.25	Some Evidence	YES
DEF	Urban	Food Orientation	Habit change perception by Beneficiary (Continuous Index )	0 (less healthy) to 100 (more healthy)	60.5	-6.57	ť	-9.22	-11%	đ	-15%	υ	9.75	Large evidence	NO

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### **V.5. INC**

The evaluation of the "Starting a Correct Nutrition" (INC) program also begins by comparing pre-treatment differences between groups. As occurred with the previous programs, Chart 15 shows that the control group has a larger proportion of individuals residing in localities with high or very high marginalization levels (66 versus 53 percent in the treatment group).

Treatment Variable	Ma	arginalizatio	on Degree per Lo	ocality in 20	10	
INC	Very Low	Low	Medium	High	Very high	Total
Control	19.18	7.35	7.47	62.89	3.11	100
Treatment	26.58	7.35	13.25	50.6	2.22	100
Total	23.57	7.35	10.9	55.6	2.58	100

**<u>CHART 15</u>**: Marginalization Degree by Localities

Chart 16 indicates that a larger proportion of the treatment group is located in urban areas -almost ten percentage points higher than the control group. In addition, this chart shows that the control group presents a higher proportion of individuals speaking an indigenous language than the treatment group (21 versus 15 percent, respectively).

Treatment Variable	Urbar	n or Rural Lo	cality		ne househol n indigenou	
INC	Rural	Urban	Total	No	Yes	Total
Control	31.51	68.49	100	79.33	20.67	100
Treatment	23.59	76.41	100	84.7	15.3	100
Total	26.81	73.19	100	82.51	17.49	100

**CHART 16: Urban or Rural Locality and indigenous Population** 

Finally, Chart 17 shows that the treatment group presents higher incomes and food expenditures under the different types of analysis. These results are in line with

the previous pre-treatment comparisons, suggesting that the control group is more vulnerable than the treatment group. This highlights the importance of balancing the groups through the propensity score estimation, which is presented in Figure 10.

<u>CHART 17</u> : Per	Capita	Income and	Food	Expenditure
-----------------------	--------	------------	------	-------------

### (By Household)

	Per capi	ta income	Per capita fo	od expenditure
Treatment Variable: INC	Simple Average	Weighted Average*	Simple Average	Weighted Average*
Control	639.05	601.48	337.73	320.81
Treatment	732.47	653.81	412.94	363.37

\*Weighted average by survey weights.

### **FIGURE 10:** PS Score Estimation (INC)

41	4	41	
Algorithm	to estimate	e the pro	pensity score

\*\*\*\*\*

\*\*\*\*\*\*

The	treat	ment	15	t_I	NC	

N. 1.11 m . 1 . 110	1		
Variable Tratamiento INC	Freq.	Percent	Cum.
Control	803	40.7	40.7
Tratamiento	1,170	59.3	100
Total	1,973	100	

Estimation of	of the propensity score
Iteration 0:	log likelihood = -1332.724
Iteration 1:	log likelihood = -1247.2492
Iteration 2:	log likelihood = -1244.8238
Iteration 3:	log likelihood = -1244.7819
Iteration 4:	log likelihood = -1244.7819

Logistic regression	Number of ob	s =	1972
	LR chi2(11)	=	175.8
	Prob > chi2	=	0.000
Log likelihood = -1244.7819	Pseudo R2	=	0.066

t_INC	Coef.	Std. Err.	z	$P \ge  z $	[95% Conf.	Interval]
gr_marg	-0.904285	0.044841	-2.02	0.044	-0.1783152	-0.0025417
gs_pcap	0.0009947	0.0002326	4.28	0	0.0005387	0.0014507
qk13_9_bis	0.2611674	0.1033049	2.53	0.011	0.0586936	0.4636413
qk13_17_bis	-0.817624	0.3854174	-2.12	0.034	-1.573028	-0.0622194
munFE5	1.217157	0.4589025	2.65	0.008	0.3177246	2.116589
munFE10	-2.177375	0.6121422	-3.56	0	-3.377152	-0.9775981
munFE21	1.795524	0.4148813	4.33	0	0.9823715	2.608676
munFE23	1.221084	0.3805662	3.21	0.001	0.4751882	1.96698
munFE30	1.548392	0.3176818	4.87	0	0.9257468	2.171037
munFE37	2.10694	0.6140735	3.43	0.001	0.9033785	3.310502
_cons	0.053992	0.2079435	0.26	0.795	-0.3535697	0.4615536
Note: the com	imon support o	ption has been s	selected			

The region of common support is [.09095891, .9475187]

Description of the estimated propensity score in region of common support Estimated propensity score

	Percentiles	Smallest		
1%	0.407748	0.0909589		
5%	0.4503615	0.0930361		
10%	0.465625	0.095091	Obs	1955
25%	0.5018167	0.0958719	Sum of Wgt.	1955
50%	0.5595568		Mean	0.5972042
		Largest	Std. Dev.	0.1333654
75%	0.6730652	0.9384003		
90%	0.8171089	0.9423464	Variance	0.0177863
95%	0.8579912	0.9423464	Skewness	0.3906595
99%	0.9043326	0.9475187	Kurtosis	3.708735
90% 95% 99%	0.8171089 0.8579912	0.9423464 0.9423464 0.9475187	Skewness Kurtosis	0.3906595 3.708735

Step 1: Identification of the optimal number of blocks

\*\*\*\*\*\*

### The final number of blocks is 6

This number of blocks ensures that the mean propensity score

is not different for treated and controls in each blocks

\*\*\*\*\*\*

Step 2: Test of balancing property of the propensity score

### The balancing property is satisfied

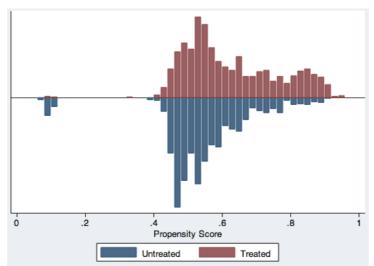
This table shows the inferior bound, the number of treated

### and the number of controls for each block

Inferior of block of	Variable Tratamiento INC											
pscore	Control	Tratamiento	Total									
0.0909589	12	3	15									
0.2	2	1	3									
0.4	262	204	466									
0.5	299	415	714									
0.6	181	351	532									
0.8	30	195	225									
Total	786	1,169	1,955									

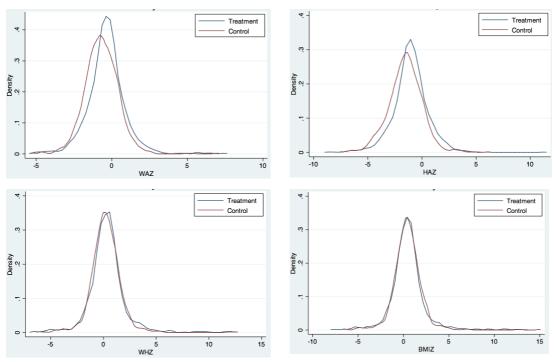
Note: the common support option has been selected

The common support condition reduces the sample in 18 individuals (1 treated and 17 from the control group) to the total amount of 1955. Program participation is estimated by the marginalization degree of the locality, the per capita food expenditure, if the household has a refrigerator, if it has internet access, plus several municipality fixed effects. The degree of juxtaposition is illustrated in Graph 3, which shows, for instance, a small number of units of both groups with low levels of the PS.



**<u>GRAPH 3</u>**: PS Score Histogram by Treatment Status (INC)

**<u>FIGURE 11</u>**: Kernel Density Function Estimation



(Selected Outcome Variables)

Figure 11 examines the four anthropometric outcome variables analyzed in this evaluation. As expected, their averages are located around zero since they are standardized with respect to the reference population. In addition, all the variables present certain bias to the right, in the sense that there are some outliers in the right tails of the distributions. The upper graphs suggest that the treatment group has larger weight-for-age and height-for-age z-scores, presumably indicating promising results of the program at this regard. However, the lower graphs do not suggest substantial differences between groups in the weight-for-height z-score and the BMI per age z-score.

Chart 18 contains the main effects of the INC impact evaluation, while the whole results are presented in Annex III. The INC has a positive impact on the anthropometric measures, reflecting beneficial effects of the food supports on the beneficiaries. Specifically, the participation in the program is associated with higher height-for-age- z-scores or HAZ (i.e. 24-31 percent in the general sample, 26-37 percent for girls, 16-25 percent for boys, and 33-35 percent in urban areas), except for those beneficiaries in rural areas, where the results were insignificant. These results determine that the beneficiaries get closer to the international reference population average, thus leaving behind the "very short" threshold. This can also be appreciated in Chart 19, which shows: i) where is located the average z-score of each group for each variable in blue (e.g. HAZ-T refers to the HAZ average of the treatment group)<sup>25</sup>; and ii) the significant variables shaded in grey (e.g. HAZ averages from the rural sample were not shaded, since they were insignificant). In the first column, where HAZ is presented, it can be seen that not a single group from any sample is located in the short stature range (i.e. HAZ<-2). At the same time, this column indicates that the program generates a jump of range in the general sample (from the control group average between -2 and -1 to the treatment average between -2 to 1), which is more pronounced for girls and urban areas (from -2 to -1 to -1 to 1). Boys receive a positive impact of the program but this is not translated into a jump of range.

<sup>&</sup>lt;sup>25</sup> The control group average consists in the z-score weighted average of those individuals located in the common support. The treatment group average is the control group average plus the range of the INC impact.

INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	P	٦
																			Program	
Urban	Urban	Rural	Rural	Rural	Rural	Rural	Rural	Rural	Boys	Boys	Girls	Girls	Girls	Girls	Girls	Gral	Gral	Gral	Sample	
Foo	Fo	Не	Fog	Fog	Fog	Fo	Fo	Fo	Fo	Fo	Не	Не	Fo	Fo	Fo	Не	Fo	Fo		_
Food Support	Food Support	Health	Food Orientation	Food Orientation	Food Orientation	Food Support	Food Support	Food Support	Food Support	Food Support	Health	Health	Food Orientation	Food Support	Food Support	Health	Food Support	Food Support	Topic	
WAZ	HAZ	Beneficiary's <u>Gum</u> disease symptoms ( <i>Binary Categorical</i> Variable )	Diet <u>variety</u> by Household ( <i>Continuous Index</i> )	Habit change perception by Beneficiary ( <i>Continuous Index</i> )	Diet <u>quality</u> by Household ( <i>Continuous Index</i> )	WHZ	WAZ	BMI	WAZ	HAZ	Yellowish skin in the Household (Binary Categorical variable )	Beneficiary's <u>Gum</u> disease symptoms ( <i>Binary Categorical</i> Variable )	Habit change perception by Beneficiary (Continuous Index)	WAZ	HAZ	Beneficiary's <u>Gum</u> disease symptoms ( <i>Binary Categorical</i> Variable )	WAZ	HAZ	Variable	
-5.38 to 7.43	-8.7 to 11.2	0 (without symptoms) to 1 (with symptoms)	0 (more variety) to 14 (less variety)	0 (less healthy) to 100 (more healthy)	0 (more healthy) to 84 (less healthy)	-6.74 to 12.73	-5.38 to 7.43	-7.74 to 15.07	-5.38 to 7.43	-8.7 to 11.2	old 0 (without symptoms) to 1 (with symptoms)	0 (without symptoms) to 1 (with symptoms)	0 (less healthy) to 100 (more healthy)	-5.38 to 7.43	-8.7 to 11.2	0 (without symptoms) to 1 (with symptoms)	-5.38 to 7.43	-8.7 to 11.2	Range	
-0.608	-1.347	0.046	2.502	54.957	22.208	0.141	-0.735	0.353	-0.721	-1.549	0.035	0.039	54.409	-0.616	-1.303	0.033	-0.671	-1.431	weighted average of the control group by program and sample	
0.21	0.44	-0.06	-0.08	3.03	-1.39	0.42	0.37	0.49	0.2	0.25	0.03	-0.03	2.38	0.3	0.34	-0.001	0.2	0.35	Min	Γ
đ	ಕ	ಕ	ರ	ಕ	ರೆ	ಕ	đ	đ	ಕ	đ	ಕ	đ	ಕ	ಕ	đ	ಕ	đ	ಕ		
0.23	0.47	-0.07	-0.82	4.51	-2.21	0.56	0.56	0.57	0.23	0.39	0.04	-0.04	3.64	0.39	0.48	-0.002	0.29	0.44	Max	Impac
35%	33%	-130%	-3%	6%	-6%	298%	50%	139%	28%	16%	86%	-77%	4%	49%	26%	-3%	30%	24%	Min	mpact range
ť	to	to	to	to	to	to	to	to	ť	to	ť	ť	to	ť	ť	ŧ	ťo	ť		
38%	35%	-152%	-33%	8%	-10%	397%	76%	161%	32%	25%	114%	-103%	7%	63%	37%	-6%	43%	31%	Max	
4	4	ω	σ	4	4	5	ъ	ω	4	5	л	ω	ъ	5	4	ω	5	4	# or methods significant (min=3; max=5)	H of mothods
6.25	7.75	4.75	10	7	7	8	9.75	4.5	7.5	9	8.5	σ	8.25	10	7.5	4.5	10	7.75	Score	
Some Evidence	Some Evidence	Some Evidence	Large evidence	Some Evidence	Some Evidence	Some Evidence	Large evidence	Small Evidence	Some Evidence	Large evidence	Some Evidence	Some Evidence	Some Evidence	Large evidence	Some Evidence	Small Evidence	Large evidence	Some Evidence	Empirical Evidence of the Impact	
YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	Expected Result	

# CHART 18: Impact of the INC Program

65

Chart 18 also shows that the INC has a positive impact on the weight-for-age z-scores or WAZ (i.e. 30-43 percent in the general sample, 49-63 percent for girls, 28-32 percent for boys, 50-76 percent in rural areas, and 35-38 percent urban areas). Though these results get the beneficiaries closer to the reference population, these improvements are not enough to produce a range jump for any sample (Chart 19, second column).

The INC has a positive effect on the weight-for-height z-score or WHZ (300-400 percent) and the BMI per age z-score (140-160 percent) only in rural areas. Even though the control group average is higher than zero, as opposed to the other anthropometric variables (Chart 18), these increases do not suggest likely overweight or obesity problems (Chart 19).

As regards <u>food orientation</u>, Chart 18 indicates that the INC has a beneficial effect on girls (an increase in the habit change perception variable from 4 to 7 percent) and on rural areas (6-8 percent increase in the habit change perception variable for beneficiaries, and a decrease of the diet quality and variety variables in the range of 6-10 and 3-33 percent, respectively). However, there are no significant effects in the other samples.

Lastly, in the <u>health</u> area, program participation is associated with lower gum disease symptoms in the beneficiary, not only in the general sample (3-6 percent) but also for girls (77-103 percent) and rural areas (130-152 percent). By contrary, INC is associated with higher yellowish skin symptoms in households in the sample of girls (86-114 percent). Considering that this last effect was only found in households (not in the beneficiaries) in one out of the five samples, this may be generated by unobservables not captured by the PS estimation.

Z-score	HAZ	WAZ	WHZ	BMI by Age	Sample
> 3	Very tall	Likely overweight but better	Obesity	Obesity	
> 2		evaluated by WHZ	Overweight	Overweight	ଦ୍ର
> 1			Likely Overweight	Likely Overweight	Genera
0	HAZ-T	WAZ-C // WAZ-T	WHZ-C // WHZ-T	IMC-C // IMC-T	<u>a</u>
< -1 < -2	HAZ-C Short (stunting)	Underweight	Wasted	Wasted	
< -3		Severe underweight	Severe wasted	Severe wasted	
> 3	Very tall	Likely overweight	Obesity	Obesity	
> 2		but better evaluated by WHZ	Overweight	Overweight	
> 1			Likely Overweight	Likely Overweight	B
0		WAZ-C // WAZ-T	WHZ-C // WHZ-T	IMC-C // IMC-T	Boys
< -1	HAZ-C // HAZ-T				
< -2	Short	Underweight	Wasted	Wasted	
< -3	Very Short	Severe underweight	Severe wasted	Severe wasted	
> 3	Very tall	Likely overweight	Obesity	Obesity	
> 2		but better	Overweight	Overweight	
> 1		evaluated by WHZ	Likely Overweight	Likely Overweight	G
0	HAZ-T	WAZ-C // WAZ-T	WHZ-C // WHZ-T	IMC-C // IMC-T	Girls
< -1	HAZ-C				
< -2	Short	Underweight	Wasted	Wasted	
< -3	Very Short	Severe underweight	Severe wasted	Severe wasted	
> 3	Very tall	Likely overweight but better	Obesity	Obesity	_
> 2		evaluated by WHZ	Overweight	Overweight	Jrba
> 1			Likely Overweight	Likely Overweight	an L
0	HAZ-T	WAZ-C // WAZ-T	WHZ-C // WHZ-T	IMC-C // IMC-T	оса
< -1	HAZ-C				Urban Localities
< -2	Short	Underweight	Wasted	Wasted	s
< -3	Very Short	Severe underweight	Severe wasted	Severe wasted	
> 3	Very tall	Likely overweight but better	Obesity	Obesity	
> 2		evaluated by WHZ	Overweight	Overweight	Rur
> 1			Likely Overweight	Likely Overweight	al L
0		WAZ-C // WAZ-T	WHZ-C // WHZ-T	IMC-C // IMC-T	Rural Localities
< -1	HAZ-C // HAZ-T				litie
< -2	Short	Underweight	Wasted	Wasted	S
< -3	Very Short	Severe underweight	Severe wasted	Severe wasted	

### **CHART 19: Z-Score Indicators in INC**

<u>Note</u>: the average z-score of each group for each variable are in blue (e.g. HAZ-T refers to the HAZ average of the treatment group). The significant variables are shaded in grey (e.g. both HAZ-C and HAZ-T from the rural sample were not shaded, since they were insignificant).

As a final step, the impact evaluation of the INC program contemplates quantile regressions on anthropometric measures for the general sample. As performed in the DEC evaluation, the heterogeneous effects will be evaluated for the first, second, and third quartile through the PSW with bootstrapped standard errors (100 replications).

Variable	Impact	Confidence Level
Panel A: HAZ		
HAZ average	0.44	***
HAZ 1st Q	0.48	***
HAZ 2nd Q	0.36	***
HAZ 3th Q		
Panel B: WAZ		
WAZ average	0.29	***
WAZ 1st Q	0.27	**
WAZ 2nd Q	0.29	***
WAZ 3th Q	0.34	* * *
Panel C: WHZ		
WHZ average	0.06	
WHZ 1st Q		
WHZ 2st Q	0.05	
WHZ 3st Q	0.04	
Panel D: BMIZ		
BMIZ average	-0.01	
BMIZ 1st Q	-0.02	
BMIZ 2nd Q	0.01	
BMIZ 3th Q	-0.06	

**<u>CHART 20</u>**: Quantile Impact on Anthropometric Measures (INC)

Note: This exercise was performed over the total units located in the common support region. \*\*\* refers to a 99% confidence level, \*\* to a 95% and \* to a 90%.

Panel A, Chart 20, shows the differential impact on HAZ for the first and second quartile (results on the third quartile are not provided since the estimations do not converge for that point of the distribution). The causal effect for the first quartile is higher than for the second quartile (0.48 versus 0.36 respectively), which implies an extra benefit to those with worst initial measures. By contrary, Panel B suggests that the higher the quartiles, the larger the impact of INC on WAZ. Though the opposite would be desirable, these effects are not leading to obesity problems for the higher quartiles, since all of them depart from lower values with respect to the reference population. Finally, Panel C and D do not find significant results on WHZ and BMI per age z-score.

# VI. Final Remarks

This document presents the impact evaluation of three nutritional programs of DIF-Puebla: Hot School Breakfast (DEC), Cold School Breakfast (DEF), and Starting a Correct Nutrition (INC). For this purpose, it examines, first, the main impact evaluation methods available in the literature. Based on this analysis, and on the particular characteristics of the programs, the most appropriate evaluation methods are proposed.

By five variations of the *Propensity Score Matching* and *Weighting*, the programs are evaluated under five samples: i) general sample; ii) boys; iii) girls; iv) urban localities; and v) rural localities. Taking into account the great amount of possible results, the outcome variables found significant in at least three out of the five methods are considered as providing empirical evidence of the impact. In addition, a scoring scheme is devised in order to determine: i) non-empirical evidence; ii) small evidence; iii) some evidence; and iv) large evidence.

In brief, <u>DEC</u> has: i) a beneficial impact on food orientation outcomes at the beneficiary and their household levels throughout different samples and estimations; ii) a marginal favorable effect on food security by households; iii) a detrimental effect on student's marks under different samples, which is larger for higher quartiles; and iv) a negative effect on breathing disease symptoms for boys (though there is not large empirical evidence about this result, since only three out of the five methods determine this result in only the boys sample).

<u>DEF</u> presents: i) a promising impact on food orientation outcomes on households, but unfavorable for their beneficiaries; ii) non-significant effects on food security; iii) a deleterious effect on school absenteeism on the general sample, but no effect on the sub-samples; and iv) a reduction in diarrhea symptoms in girls, not only at the beneficiary but also at their household level. Finally, the <u>INC</u> generates: i) a beneficial impact on growth indicators (specifically on height-for-age and weight-for-age z-scores), consistent throughout different samples (except for rural areas) and quartiles, and with more intensity on girls; ii) a favorable effect on food orientation outcomes for girls and for rural areas (beneficiaries and households); and iii) a reduction of gum disease symptoms for the beneficiaries in three samples (the general one, girls and rural areas), though higher yellowish skin symptoms for households in the general sample.

This evaluation determines strong *policy implications*. On the one hand, it adds substantial empirical evidence of the beneficial effects of nutritional programs on growth indicators. In addition, it provides some evidence about the favorable impact of this kind of programs on food orientation outcomes, such as eating habit changes or diet diversity, variety, and quality variables. On the other hand, it unveils only marginal effects on food security and detrimental effects on the educational arena (specifically on student's marks). Finally, it does not postulate conclusive impacts on health.

This impact evaluation also provides useful *recommendations* for the DIFpolicy makers. In the DEC and DEF programs, it is recommended to get deeper into the benefits of education and disease prevention within the food orientation talks. At the same time, it is proposed to revise the size and quality of the food support, since it was found small evidence about the beneficial effect on food security in the DEC program and no evidence in the DEF program. Finally, as regards the DEF program, it is also recommended to improve the food orientation talks, specifically in urban areas, focused on eating habit changes and better diets.

As regards the INC, it has proved to present sizeable beneficial effects on their beneficiaries and households. However, specific attention should be placed into rural areas, since their beneficiaries have not presented higher HAZ and WAZ measures, while the impact on WHZ and the BMI per age was significant, which eventually may lead to overweight problems. At the same time, it is important to focus on those children with initially worse growth conditions, considering the heterogeneous effects found at distinct points of the outcome variable distributions. Lastly, as suggested for the previous programs, it is recommended to improve the food orientation talks with the purpose of preventing diseases, improving eating habits, and enhancing diet diversity, variety, and quality.

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# VIII. Annex

# VIII.1. DEC Results by Sample

			Food S	Support									Food	Orientation							
	Methodology	Food insecu Househ (Continuous	old	Food inse House (Categoric	hold	perce <u>se</u> H	bit change ption on f <u>lection</u> by ousehold inuous Inc	ood	Habit cha perception c <u>selection</u> Househe (Categorical	n food by old	percept <u>prepa</u> Hou	t change ion on food <u>ration</u> by isehold Jous Index)	percep prep H	bit change bition on food <u>baration</u> by busehold porical Index)	Habit cha perception c <u>consumpti</u> Househo (Continuous	on food on by old	percep <u>cons</u> He	bit chan otion on <u>umption</u> ouseholo gorical Ir	food <u>n</u> by d	percep Hous	
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	Coef. Signif -1.09 * -1.03 -0.96 -0.62	2426 2176 2426 2386	Coef. Sign -0.09 * -0.09 * -0.08 * -0.07 *	2426 2176 2426 2386	Coef. -0.13 -0.25 -0.67 1.557	* 2 2 2 2	N 2426 2175 2426 2375	Coef. Signif. -0.04 -0.04 -0.06 0.025	2426 2175 2426 2375	0.704 0.621 0.684 0.455	ignif. N 2426 2179 2426 2393	Coef. 0.03 0.017 0.03 0.021	2426 2179 2426 2393	Coef. Signif. 0.778 -0.46 0.779 0.014	2426 2170 2426 2369	0.074 0.027 0.073 0.06	signif. **	N 2426 2170 2426 2369	Coef. Sig 0.545 0.062 0.388 0.579	2426 2166 2426 2351
	PSW Bootstrapped s.e.	-0.62	2386	-0.07 *	2386	1.557	2	2375	0.025	2375	0.455	2393	0.021	2393	0.014	2369	0.06	*	2369	0.579	2351
	Methodology	Habit cha perceptic Househ (Categorical	on by Iold	Habit cl perception <u>selectio</u> Benefi ( <i>Continuo</i>	n on food on by iciary us Index)	perce se Bi	bit change ption on fi lection by eneficiary gorical Inc	ood	Habit cha perception c <u>consumpti</u> Benefici ( <i>Continuous</i>	n food on by ary	Habi percept <u>consu</u> Ben	rientation t change ion on food <u>mption</u> by eficiary <i>rical Index</i> )	per Be	bit change ception by neficiary nuous Index)	Habit cha perceptio Beneficia ( <i>Categorical</i>	n by ary	н	Diversit ousehol nuous Ir	d	Diet <u>Div</u> Hous (Continuc	
DEC General	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. Signif 0.075 * 0.065 0.069 0.093 0.093 **	f. N 2426 2166 2426 2351 2351	Coef.         Sign           7.708         **           8.04         **           8.022         **           7.173         **           7.174         **	* 2426 * 2176 * 2426 * 2389 * 2389	0.15 0.138 0.133	**** 2 **** 2 **** 2 **** 2 **** 2	2426 2389	Coef.         Signif.           7.14         ***           5.887         **           7.254         ***           3.038         3.038	N 2426 2168 2426 2357 2357	0.132	ignif. N *** 2426 ** 2168 *** 2426 2357 2357	7.845 8.503 6.087	*** 2426 *** 2165 *** 2426 *** 2353 *** 2353	Coef. Signif. 0.041 *** 0.189 *** 0.186 *** 0.126 *** 0.126 ***	N 2426 2165 2426 2353 2353	Coef. -1.21 -1.2 -1.22 -0.66 -0.66	Signif. *	N 2426 2179 2426 2390 2390	Coef. Sig -0.06 -0.06 -0.03 -0.03 -0.03	nif. N * 2426 2179 2426 2393 2393 alth
DEC	Methodology	Diet <u>Varie</u> Househ ( <i>Continuous</i>	old s Index)	Diet <u>Var</u> House ( <i>Continuo</i>	hold us Index)	H (Cont	t <u>Quality</u> t ousehold inuous Ind	lex)	Diet <u>Quali</u> Househe (Continuous	old Index)	Prima	t' Marks in ry School	last mo prim	I Absence in nth (kinder & ary school)	School Abse last schoolin (kinder & pr school	g cycle rimary )		a-curricu studies		in the Ho (Ordinal C Varia	ategorical able)
		Coef. Signif		Coef. Sign		Coef.	Signif.	Ν	Coef. Signif.	N		ignif. N	Coef.		Coef. Signif.			Signif.	N	Coef. Sig	
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	-0.5 ** -0.49 * -0.48 **	2426 2179 2426	-0.1 ** -0.12 ** -0.11 **	2179	-1.69	** 2	2426 2179 2426 2390	0.00 0.00 0.00	2426 2179 2426	-0.15	* 1626 *** 1304 * 1626 *** 1614		*** 2426 *** 2175 *** 2426 2384	0.257 0.352 0.294 -0.07	2426 2179 2426 2391	7.3 -15.8 7.61		1626 1300 1626 1606	0.088 0.024 0.114 -0.08	2426 2179 2426 2392
		-0.25 *	2393	-0.04	2393		-		0.00	2393	0.17	1014					29.4				2392
	PSW Bootstrapped s.e.	-0.25 * -0.25 *	2393 2393	-0.04 -0.04	2393 2393		-	2390	0.00 0.00	2393 2393	-0.17	*** 1614	0.223	2384	-0.07	2391	29.4 29.4	*	1606	-0.08	
	PSW Bootstrapped s.e.		2393 fficulties sehold tegorical		2393 kin in the d ( <i>Binary</i>	-0.91 Ey symp House	-	2390 he ary		2393 ase in the Binary	-0.17 H Bene Diarrhea (Ordinal	1014	0.223 Be Breath (Ordin			2391 iry's <u>i</u> (Binary	29.4 Benef diseas (Binar	* iciary's ie sympl y Catego 'ariable)	1606 Eyes toms orical	Beneficia disease s (Binary C	ary's <u>Gum</u> ymptoms ategorical able)
	Methodology PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & Custer s.e.	-0.25 * Breathing difi in the Hou: (Ordinal Cat Variab) Coef. Signif 0.166 * 0.154 0.195 * -0.05	2393 fficulties sehold legorical le 2426 2179 2426 2390	-0.04  Yellowish s Household Categorical  Coef. Sign 0.006 0.004 0.005 0.03	2393 <u>kin</u> in the d ( <i>Binary</i> <i>I variable</i> ) if. N 2426 2179 2426 2391	-0.91 <u>Ev</u> symp House Catego 0.009 0.021 0.017 0.04	* 2 es disease toms in ti ehold (Bin rical Vario Signif. 2 2 2 2 2 2 2	2390 he hary ble) N 2426 2179 2426 2393	0.00 <u>Gum</u> dise symptoms Household ( Categorical V Coef. Signif. 0.011 0.021 0.015 0.017	2393 ase in the Binary priable) 2426 2179 2426 2393	-0.17 H Bene Diarrhea (Ordinal Va Coef.  S 0.102 0.05 0.127 -0.04	ealth ficiary's symptoms Categorical riable) ignif. N 2426 2179 2426 2392	0.223 Bei Breath (Ordin V Coef. 0.174 0.16 0.191 -0.03	2384 heficiary's ing difficulties al Categorical ariable) Signif. N 2426 2179 2426 2389	-0.07 Beneficia Yellowish skin Categorical v Coef. Signif. -0.01 -0.01 -0.02 0.022	2391 (Binary ariable) . N 2426 2179 2426 2393	29.4 Benef diseas (Binar V Coef. 0.003 0.008 0.005 0.034	iciary's ie sympl y Catego	1606 Eyes toms orical 2426 2179 2426 2393	Beneficia disease s (Binary C Varia -0.01 0.004 -0.01 0.006	ymptoms ategorical able) nif. N 2426 2179 2426 2393
	Methodology PSM Kernel PSM Nearest Neighbor PSM Stratification	-0.25 * Breathing diff in the Hou: (Ordinal Cat Variab) Coef. Signif 0.166 * 0.154 0.195 * -0.05 -0.05	2393 fficulties sehold tegorical le) f. N 2426 2179 2426 2390 2390	-0.04 Yellowish s Household Categorical Coef. Sign 0.006 0.004 0.005 0.03 0.03	2393 <u>kin</u> in the d ( <i>Binary</i> l variable) iff. N 2426 2179 2426 2391 2391	-0.91 Ey symp House Catego 0.009 0.021 0.017 0.04 0.04	* 2 es disease botoms in ti ehold (Bin rical Vario 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2390 he lary ble) N 2426 2179 2426 2393 2393	Gum dise symptoms Household ( Categorical V Coef. Signif 0.011 0.021 0.015 0.017 0.018	2393 ase n the Binary ariable) 2426 2179 2426 2393 2393	0.17 H Bene <u>Diarrhea</u> (Ordinal Va 0.05 0.127 -0.04 -0.04	Interference           ealth           efficiary's           symptoms           Categorical           riable)           ignif.           2426           2179           2426           2392	0.223 Bei Breath (Ordin V Coef. 0.174 0.16 0.191 -0.03 -0.03	2384 heficiary's ng difficulties al Categorical ariable) Signif. N * 2426 2179 * 2426 2179 * 2426 2389 2389	-0.07 Beneficia Yellowish skin Categorical v Coef. Signif. -0.01 -0.01 -0.02 0.022 0.022	2391 (Binary ariable) 2426 2179 2426 2393 2393	29.4 Benef diseas (Binar V Coef. 0.003 0.008 0.005 0.034 0.034	iciary's se sympi y Catego ariable) Signif. *	1606 Eyes_ toms orical 2426 2179 2426 2393 2393	Beneficia disease s (Binary C Varia 0.001 0.004 -0.01 0.006 0.006	ymptoms ategorical able) nif. N 2426 2179 2426 2393 2393

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are clustered at the locality level. The ca simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

			Food S	upport								Food	Orientatio	n							
	Methodology	Food insecurit Household (Continuous in	y by	Food insecu Househo (Categorical	ld	Habit cl perceptior <u>selectio</u> House (Continuor	on food on by hold	percept sele Ho	it change tion on food action by usehold orical Index)	percep prep Ho	bit change otion on food <u>varation</u> by pusehold nuous Index)	percep prep H	bit change ption on fo <u>paration</u> by ousehold gorical Inde		Habit cha erception o consumptio Househo Continuous	n food on by old	percep <u>consu</u> Ho	it chang tion on f <u>umption</u> ousehold orical Inc	food by	Habit cha perception Househo (Continuous	n by old
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	-1.12 -0.67 -0.22	N 1212 1089 1212 1190 2386	Coef. Signif. -0.08 -0.08 -0.61 -0.04 -0.04	N 1212 1089 1212 1190 2386	Coef. Sign 0.253 0.006 -0.3 2.04 2.04 2.04	if. N 1212 1090 1212 1191 1191	Coef. 5 -0.04 -0.05 -0.06 0.066 0.066	5ignif. N 1212 1090 1212 1191 1191	1.457 1.258 1.074 1.493 1.493	Signif. N * 1212 1090 1212 1194 1194	Coef. 0.042 0.05 0.051 0.061 0.061	* 12 10 12 * 11	V Co 12 1.2 90 1.8 94 0.3 94 0.3	309 395 398	N 1212 1084 1212 1179 2386	Coef. 9 0.069 0.079 0.1 0.067 0.067	*	1212 1179	Coef. Signif. 1.275 1.311 1.095 1.366 1.366 *	N 1212 1084 1212 1176 1176
	Methodology	Habit chang perception I Householo (Categorical In	by 1	Habit chan perception o <u>selection</u> Beneficia (Continuous	n food by ry	Habit cl perception <u>selectio</u> Benefi ( <i>Categoric</i>	on food on by ciary	percept consu Ber	it change tion on food <u>imption</u> by neficiary <i>wous Index</i> )	Hat percep <u>cons</u> Be	Orientation bit change otion on food <u>umption</u> by neficiary <i>porical Index</i> )	per Be	bit change ception by eneficiary inuous Inde	x) (C	Habit cha perception Beneficia Categorical	n by ary	Ho	Diversity Diversity Diversity Diversity	i .	Diet <u>Diversi</u> Househo ( <i>Continuous</i>	old
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	0.094 * 0.086 0.099 **	N 1212 1084 1212 1176 1176	Coef.         Signif.           8.52         ***           9.217         ***           8.192         ***           8.142         ***           8.142         ***	N 1212 1090 1212 1193 1193	Coef. Sign 0.169 ** 0.199 ** 0.177 ** 0.162 ** 0.162 **	1212 1090 1212 1193	Coef. 5 5.776 4.63 3.032 2.86 2.86	5ignif. N ** 1212 1084 * 1212 1175 2386	Coef. 0.142 0.12 0.143 0.067 0.067	Signif. N ** 1212 * 1084 ** 1212 1175 2386	8.041 8.174	*** 12 *** 10 *** 12 *** 12 *** 11		214 *** 162 ***	N 1212 1084 1212 1174 1174	Coef. 9 -0.79 -0.16 -0.87 -0.35 -0.35	*	N 1212 1090 1212 1191 1191	Coef. Signif. -0.02 -0.07 -0.03 0.019 0.019	N 1212 1090 1212 1194 1194
DEC	Methodology	Diet <u>Variety</u> Household ( <i>Continuous In</i>	3	Diet <u>Variet</u> Househo (Continuous	<u>v</u> by Id	Diet Qua Diet Qua House (Continuou	hold	Но	<u>Quality</u> by usehold uous Index)		nt' Marks in ary School	last mo	E DI Absence Donth (kinde Dary school	n la	in ichool Abse st schoolin kinder & pr school	g cycle imary		-curricul tudies	lar	Health <u>Diarrhea</u> sym in the House (Ordinal Cate Variable	nptoms ehold gorical
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.46 * -0.44 -0.07	N 1212 1090 1212 1194 2386	Coef. Signif. -0.09 -0.1 -0.09 0.02 0.02 0.02	N 1212 1090 1212 1194 2386	Coef. Sign -1.34 -2.01 ** -1.32 -0.42 -0.42	if. N 1212 1090 1212 1191 1191	Coef. 5 0.00 0.00 0.00 0.01 0.01	5ignif. N 1212 1090 1212 1194 1194	Coef. -0.13 -0.06 -0.12 -0.17 -0.17	Signif. N 807 643 807 ** 807 ** 807	Coef. 0.478 0.456 0.511 0.478 0.478	*** 12 *** 10 *** 12 *** 12 * 11	12 0.2 87 0.3 12 0.2 91 -0	312	1212 1090 1212 1194	Coef. 17.94 15.56 18.35 17.88 17.88	-	N 807 643 807 802 802	Coef. Signif. 0.126 0.101 0.135 -0.04 -0.04	N 1212 1090 1212 1194 1194
	Methodology	<u>Breathing</u> diffic in the Housel (Ordinal Catege Variable)	nold	Yellowish skir Household ( Categorical vo	Binary	<u>Eves</u> di symptom Household Categorical	s in the I (Binary	sympt House	<u>n</u> disease coms in the hold (Binary ical <i>Variable</i> )	Ber <u>Diarrh</u> (Ordina	Health neficiary's <u>ea</u> symptoms al Categorical ariable)	Breath (Ordin	neficiary's ing difficul al Categori /ariable)	ral Yel	Beneficia Ilowish skin Itegorical va	(Binary	diseas (Binary	iciary's <u>E</u> e sympto y Catego ariable)	oms	Beneficiary's disease sym (Binary Cate Variable	ptoms gorical
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	0.18 0.197 * -0.1		Coef. Signif. 0.018 0.027 0.022 0.081 *** 0.081 ***	N 1212 1090 1212 1194 1194	Coef. Sign 0.028 0.035 * 0.033 0.051 0.051	if. N 1212 1090 1212 1194 1194	Coef. 5 0.025 0.028 0.027 0.042 0.042	5ignif. N 1212 1090 1212 * 1194 * 1194	Coef. 0.129 0.184 0.154 -0.02 -0.03	Signif. N 1212 1090 1212 1194 1194	-0.09	* 12 ** 10 * 12 11	<b>12</b> -0 90 -0		N 1212 1090 1212 1194 1194	Coef. 9 0.001 0.008 0.005 0.029 0.029		N 1212 1090 1212 1194 1194	Coef. Signif. -0.01 -0 0.007 -0 0.006 0.006	N 1212 1090 1212 1194 1194

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are dustered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipally fixed effects.

			Food	unnort		_									Fee	d Oriontat	lan									
			Food	upport	_		_	_	_			-	_	_	100	d Orientat	lion	1	_	_		_	_		_	
	Methodology	Food insec Housef (Continuou	old		security sehold rical ind	.	percept <u>sele</u> Hor	it change tion on fo <u>ection</u> by usehold uous Ind	bod	percepti <u>selec</u> Hou	change on on foo <u>tion</u> by sehold rical Index	d pe	Habit ch rception preparati Housel ontinuou	on food ion by hold	perce pre	abit chang eption on eparation Household egorical In	food by I	percept consu	mption usehold	food by d	perce <u>cons</u> H	bit char ption or <u>umptic</u> ouseho gorical I	n food in by Id	per H	bit chan ception ousehol nuous li	ld
		Coef. Signi	f. N	Coef. Si	gnif.	N	Coef. S	ignif.	N	Coef. Si	gnif. N	Coe	f. Signi	if. N	Coef.	Signif.	N	Coef. S	ignif	N	Coef.	Signif	N	Coef.	Signif	N
	PSM Kernel	-1.27 **	1212	-0.1		212	-0.54		212	-0.05	121			1212			1212	0.233		1212	0.079	**	1212	-0.24	JIGTIT.	1212
	PSM Nearest Neighbor	-1.04	1061	-0.11		061	-1.08		056	-0.04	105			1063	0.012		1063	0.062		1059	0.039		1059	-0.35		1052
	PSM Stratification	-1.2 *	1212	-0.09	1	212	-1.13	1	212	-0.07	121	2 0.2	06	1212	0.011		1212	-0.02		1212	0.062	**	1212	-0.31		1212
	PSW robust & cluster s.e.	-0.97	1196	-0.1			1.173		184	-0.03	118			1199	-0.02		1199	-0.29		1190	0.054		1190	-0.33		1175
	PSW Bootstrapped s.e.	-0.97	1196	-0.1	1	196	1.173	1	184	-0.03	118			1199	-0.02		1199	-0.29		1190	0.051		1190	-0.33		1175
												Fo	od Orie	ntation												
	Methodology	Habit ch percepti Houseł (Categorica	on by nold	percepti sele	<u>tion</u> by: eficiary	bod	percept sele Ben	it change tion on fo <u>ection</u> by neficiary prical Ind	bod	percepti <u>consur</u> Ben	change on on foo <u>nption</u> by eficiary <i>ous Index</i>	d pe	Habit ch rception onsumpt Benefic ategorico	on food tion by ciary	pe B	abit chang rception t eneficiary tinuous In	ру /	perce	t chang eption l eficiary prical In	by /	н	Diversi ouseho nuous i	ld	н	Diversit ousehol inuous li	ld
		Coef. Signi	f. N	Coef. Si	gnif.	N	Coef. S	ignif.	N	Coef. Si	enif. N	Coe	f. Signi	if. N	Coef.	Signif.	N	Coef. S	ignif.	N	Coef.	Signif.	N	Coef.	Signif.	N
	PSM Kernel	0.053	1212	6.898		212	0.092		212	8.547 *	*** 121	2 0.1		1212	8.282		1212			1212	-1.64	***	1212	-0.11	***	1212
	PSM Nearest Neighbor	0.037	1052				0.089			0.330	*** 105				7.768		1053			1053	-1.23		1063	-0.07		1063
Ś	PSM Stratification	0.049	1212				0.101		212	5.17	*** 121									1212	-1.59	**	1212	-0.1	***	1212
DEC Girls	PSW robust & cluster s.e.	0.091	1175	0.752			0.114			3.706	118			1182						1179	-1.04	*	1199	-0.09	**	1199
G	PSW Bootstrapped s.e.	0.091	1175	6.732			0.114	** 1	196	3.038	118	2 0.0	7	1182	6.15	***	1179	0.108	*	1179	-1.04	*	1199	-0.09	**	1199
Sec. 1				r	Foo	od Orie	entation								-		Educ	ation							Health	
0	Methodology	Diet <u>Vari</u> Housel ( <i>Continuou</i>	hold	Hou	ariety sehold ious Ind		Hou	<u>Quality</u> b usehold uous Ind		Hou	uality by sehold tous Index		udent' N Primary S		last m	ol Absenc onth (kind nary scho	der &	School last scho (kinder sc	ooling	cycle		a-curric studies	ular	in the (Ordin	<u>ea</u> symj e House al Categ /ariable	hold gorical
		Coef. Signi	f. N	Coef. Si	gnif.	N	Coef. S	ignif.	N	Coef. Si	gnif. N	Coe	f. Signi	if. N	Coef.	Signif.	N	Coef. S	ignif.	N	Coef.	Signif.	N	Coef.	Signif.	N
	PSM Kernel	-0.45 *	1212	-0.11	*** 1	212	-2.09		212	-0.01	* 121	2 -0.:	17 **	816	0.327	**	1212	0.257	- 1	1212	-2.48		816	0.05		1212
	PSM Nearest Neighbor	-0.56 **	1063	-0.14			-1.79		063	-0.01	106			641	0.31		1062	0.37		1063	0.718		641	0.008		1063
	PSM Stratification	-0.5 *	1212				2.00		212	-0.01	* 121			816	0.336		1212	0.311		1212	-2.67		816	0.091		1212
	PSW robust & cluster s.e.	-0.43 **	1199	0.1			A		199	-0.01	119				-0.04		1193	-0.14		1197	33.7		804	-0.09		1198
	PSW Bootstrapped s.e.	-0.43 **	1199	-0.1	1	199	-1.47	*** 1	199	-0.01	119	9 -0.2			-0.04		1193	-0.14		1197	33.7		804	-0.09		1198
	Methodology	Breathing di in the Hou (Ordinal Car Variat	isehold tegorical	Yellowish Househ Categorie	old (Bin	ary	sympt Househ	s disease oms in th nold (Bini cal Varia	ne ary	sympto Househ	disease ims in the old (Binar al <i>Variabl</i>	/ (Or	Healt Benefici <u>rrhea</u> sy dinal Cat Variab	iary's mptoms tegorical	Breat (Ordi	eneficiary <u>hing</u> diffic nal Catego Variable)	ulties	Bene Yellowish Categori		Binary	disea: (Binar	ficiary's se symp y Categ /ariable	otoms	disea: (Binar	ficiary's se symp y Categ /ariable	otoms
		Coef. Signi	f. N	Coef. Si	gnif.	N	Coef. S	ignif.	N	Coef. Si	gnif. N	Coe	f. Signi	if. N	Coef.	Signif.	N	Coef. S	ignif.	N	Coef.	Signif.	N	Coef.	Signif.	N
	PSM Kernel	0.15	1212	-0.01		212	-0.1		212	-0	121	2 0.0		1212			1212	-0.01		1212	0.005		1212	-0		1212
	PSM Nearest Neighbor	0.123	1063	-0.02	1	063	0.012	1	063	0.009	106			1063	0.193		1063	0.007		1063	0.018		1063	-0.01		1063
	PSM Stratification	0.199	1212	-0.01		212	0		212	0.001	121			1212			1212	-0.01		1212	0.006		1212	-0.01		1212
	PSW robust & cluster s.e.	-0	1198	-0.02			0.019		199	-0.01	119			1198			1197	-0		1199	0.034	**		0.003		1199
	PSW Bootstrapped s.e.	-0	1198	-0.02	1	197	0.019	1	199	-0.01	119	9 -0.0	)1	1198	0.047		1197	-0		1199	0.034	**	1199	0.003		1199
Note: * is sig	nificant at the 90% confidence	e level, ** is sig	nificant a	the 95% a	nd *** i	is signi	icant at t	he 99%. E	Estima	ations with	bootstrap	ed stan	dard erro	rs are rep	licated 1	00 times. R	Robust	standard e	rrors ar	e dust	ered at tl	ne locali	ty level.	The caus	al effect	is

Note: \*is significant at the 90% confidence level, \*\*is significant at the 95% and \*\*\*is significant at the 95%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are dustered at the as inple difference, since the response variables are not/captured in a single point of time. The propensity score estimations include include multicapitif year defects, while the structural equations consider location (single point of time. The propensity score estimations include enclosed) are defects, while the structural equation (single point of time. The propensity score estimations include include) and the structural equations consider location (single point of time. The propensity score estimations include include) are structural equations consider locations (single point of time. The propensity score estimations include include) are structural equations consider locations (single point of time. The propensity score estimations include include) are structural equations consider locations (single point of time. The propensity score estimations include include) are structural equations consider locations (single point of time. The propensity score estimations include include) are structural equations consider locations (single point of time) are structural equations (

### Impact Evaluation on DIF-Programs

	1		Food S	upport										Food	Orientation								
			. 000 5	appoir.				-	_		1			1000	Grandion	1	_		1		-		
	Methodology	Food insecuri Household (Continuous in	4	Food insect Househ (Categorical	old	percep <u>sel</u> Ho	bit change otion on fo <u>ection</u> by ousehold nuous Inde		rcepti <u>selec</u> Hou	change on on food <u>sehold</u> rical Index)	perce pre H	bit chan ption or paration lousehol inuous I	n food <u>n</u> by Id	percep prep H	bit change ption on food <u>paration</u> by ousehold gorical Index)	perce <u>con</u> F	abit cha eption o <u>sumptio</u> louseho tinuous	n food on by old	percep <u>consi</u> Ho	bit change otion on f <u>umption</u> ousehold gorical Inc	food by	Habit ch percepti Housef (Continuou	on by hold
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. Signif. -0.5 -1.13 -0.54 -0.09 -0.09	N 1467 1381 1467 1437 1437	Coef. Signif -0.03 -0.07 -0.03 -0.03 -0.03	N 1467 1381 1467 1437 1437	Coef. -2.18 -2.5 -2.4 1.489 1.489	13 14 14	67 -0. 79 -0.	08 08 09 33	gnif. N * 1467 1379 * 1467 1427 1427	-0.37 -0.31	Signif.	N 1467 1383 1467 1442 1442	Coef. 0.034 0.007 0.035 0.002 0.002	Signif. N 1467 1383 1467 1442 1442	0.235 -0.33 0.377 0.385	Signif.	N 1467 1378 1467 1434 1434	Coef. 0.063 0.03 0.067 0.065 0.065	* 1		Coef. Signi -0.91 -1.1 -0.88 0.374 0.374	f. N 1467 1374 1467 1419 1419
											Food	l Orienta	ation										
	Methodology	Habit chan perception Househol (Categorical Ir	by d ndex)	Habit cha perception o <u>selection</u> Benefici ( <i>Continuous</i>	on food by ary Index)	percep <u>sel</u> Be (Categ	bit change otion on fo <u>ection</u> by neficiary porical Inde	x) (C	ercepti consum Bene continu	change on on food n <u>ption</u> by eficiary tous Index)	perce <u>con</u> B ( <i>Cate</i>	bit chan ption on sumption enefician gorical li	n food <u>n</u> by ry ndex)	per Be ( <i>Conti</i>	bit change ception by eneficiary inuous Index)	pe B ( <i>Cate</i>	abit cha rception eneficia egorical	n by ary Index)	Hc (Contin	Diversity ousehold nuous Inc	dex)	Diet <u>Diver</u> Housel ( <i>Continuou</i>	hold is Index)
DEC Urban	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. Signif. 0.035 0.046 0.032 0.082 0.082	N 1467 1374 1467 1419 1419	Coef.         Signif           7.173         ***           7.165         ***           7.36         ***           7.95         ***           7.95         ***	N 1467 1383 1467 1441 1441	Coef. 0.097 0.105 0.102 0.15 0.133		67 8.3 83 6.3 67 8.5 41 4.4	13 17 77 34	gnif. N ** 1467 ** 1378 ** 1467 * 1427 1427	0.17 0.205 0.086	Signif. *** ** ***	N 1467 1378 1467 1427 1427	Coef. 8.264 7.512 8.614 7.35 7.35	Signif. N *** 1467 *** 1378 *** 1467 *** 1426 *** 1426	0.162 0.157 0.172 0.144	Signif. *** *** *** ***	N 1467 1378 1467 1426 1426	Coef. 0.192 0.429 0.189 -0.68 -0.68	1	N 1467 1383 1467 1439 1439	Coef. Signi -0 0.026 -0 -0.02 -0.02	if. N 1467 1383 1467 1442 1442
<u> </u>						ientation					-					cation						Healt	
DEC	Methodology	Diet <u>Variety</u> Househole ( <i>Continuous Ir</i>	d	Diet <u>Varie</u> Househ (Continuous	<u>ty</u> by old	Diet	Quality by busehold huous Indé		Hou	uality by sehold lous Index)		ent' Mar nary Sch		last mo	ol Absence in onth (kinder & aary school)	Scho last s	ol Abse choolin ler & pr school	g cycle imary		a-curricul studies	lar	<u>Diarrhea</u> sy in the Hou (Ordinal Cat Variat	mptoms isehold tegorical
		Coef. Signif.	N	Coef. Signif	N	Coef.	Signif.	V Co	ef. Si	gnif. N	Coef.	Signif.	N	Coef.	Signif. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef. Signi	if. N
	PSM Kernel	-0.22	1467	-0.07	1467	-0.03	14	67 <b>0.</b>		* 1467	-0.29	***	924	0.382	** 1467	-0.07		1467	13.32		924	0.171	1467
	PSM Nearest Neighbor	-0.18	1383	-0.11 *	1383	0.246	13	83 <b>0.</b> 0		* 1383	-0.28	***	808	0.407	*** 1382	0.108		1383	2.502		805	0.143	1383
	PSM Stratification	-0.19	1467	-0.08	1467	-0.01		67 <b>0.</b>		* 1467	-0.29	***	924	0.406	** 1467	-0.11		1467	12.34		924	0.187	1467
	PSW robust & cluster s.e.		1442	-0.05	1442	-0.88	** 14			1442		***	919	0.187	1438	-0.07		1442	24.7		915	-0.08	1441
	PSW Bootstrapped s.e.	-0.2	1442	-0.05	1442	-0.88	** 14	27 <b>0.</b>	01	1442	-0.2	***	919	0.223	1438	-0.07		1442	24.7		915	-0.08	1441
	Methodology	Breathing diffic in the Housel (Ordinal Categ Variable)	hold orical	Yellowish ski Household Categorical v	Binary ariable)	symp House Categor	es disease toms in th hold (Bina rical Varial	ry H le) Cat	ympto ouseho egoric	disease ms in the old (Binary al <i>Variable</i>	Diarrh (Ordin	Health neficiar nea symp nal Categ Variable	ptoms gorical )	Breath (Ordin V	neficiary's <u>ing</u> difficulties al Categorical /ariable)	Yellow Categ	orical v	(Binary ariable)	diseas (Binary V	iciary's <u>E</u> ie sympto y Categoi 'ariable)	oms rical	Beneficiary disease syr (Binary Cat Variat	nptoms egorical ble)
		Coef. Signif.	Ν	Coef. Signif			Signif.		ef. Si		Coef.	Signif.	N		Signif. N		Signif.		Coef.		Ν	Coef. Signi	
	PSM Kernel	0.178	1467	0.002	1467	0.012	14			1467	0.18		1467	0.139	1467	-0.02		1467	0.013		1467	0.002	1467
	PSM Nearest Neighbor	0.129	1383	0	1383	-0.01		83 0.0		1383			1383	0.026	1383	-0.01		1383	0.011			0.002	1383
	PSM Stratification		1467	0.004	1467	0.015	14			1467	0.187		1467	0.141	1467	-0.02		1467	0.014		1467	0.002	1467
	PSW robust & cluster s.e.	-0.08	1440	0.009	1440	0.008		42 0.0		1442			1442	-0.1	1439			1442	0.02		1442	-0	1442
	PSW Bootstrapped s.e.	-0.08	1440	0.009	1440	0.008	14	42 0.0	)1	1442	-0.03		1442	-0.1	1439	9E-04		1442	0.02	1	1442	-0	1442

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are clustered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

		Food 5	Support				Food Orientation			
	Methodology	Food insecurity by Household (Continuous index)	Food insecurity by Household (Categorical index)	Habit change perception on food <u>selection</u> by Household (Continuous Index)	Habit change perception on food <u>selection</u> by Household (Categorical Index)	Habit change perception on food <u>preparation</u> by Household (Continuous Index)	Habit change perception on food <u>preparation</u> by Household (Categorical Index)	Habit change perception on food <u>consumption</u> by Household (Continuous Index)	Habit change perception on food <u>consumption</u> by Household (Categorical Index)	Habit change perception by Household (Continuous Index)
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef.         Signif.         N           -0.15         957         957           0.163         745         -0.96         957           -2.55         ***         949         -2.55         *         949	Coef.         Signif.         N           -0.12         957         957           0.061         745         -0.05         957           -0.17         949         -0.17         949	Coef.         Signif.         N           5.636         **         957           5.767         745           4.265         *         957           3.121         **         948           3.121         *         948	Coef.         Signif.         N           0.083         957           0.155         745           0.085         957           0.001         948           0.025         948	Coef.         Signif.         N           3.702         ***         957           4.36         *         746           3.64         **         957           2.293         951         951	Coef.         Signif.         N           0.022         957           -0.02         746           0.018         957           0.087         ***           951         0.087	Coef.         Signif.         N           1.438         957           -0.1         742           1.063         957           -1.43         935           -1.43         935	Coef.         Signif.         N           0.063         957           0.027         742           0.065         957           0.028         935           0.028         935	Coef.         Signif.         N           4.158         ***         957           3.981         *         741           3.55         ***         957           1.198         932           1.198         932
	Methodology	Habit change perception by Household (Categorical Index)	Habit change perception on food <u>selection</u> by Beneficiary (Continuous Index)	Habit change perception on food <u>selection</u> by Beneficiary ( <i>Categorical Index</i> )	Habit change perception on food <u>consumption</u> by Beneficiary ( <i>Continuous Index</i> )	Food Orientation Habit change perception on food <u>consumption</u> by Beneficiary ( <i>Categorical Index</i> )	Habit change perception by Beneficiary (Continuous Index)	Habit change perception by Beneficiary ( <i>Categorical Index</i> )	Diet <u>Diversity</u> by Household ( <i>Continuous Index</i> )	Diet <u>Diversity</u> by Household ( <i>Continuous Index</i> )
DEC Rural	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef.         Signif.         N           0.184         ***         957           0.214         *         741           0.193         ***         957           0.144         *         932           0.144         *         932	Coef.         Signif.         N           10.17         ***         957           10.5         ***         746           9.645         ***         957           4.3         948         4.3         948	Coef.         Signif.         N           0.225         ***         957           0.268         ***         746           0.212         ***         957           0.05         948         0.05         948           0.05         948         948         105	Coef.         Signif.         N           5.149         957           2.406         738           3.975         957           -4.44         930           -4.44         930	Coef.         Signif.         N           0.099         957           0.05         738           0.083         957           0.019         930           0.019         930	Coef.         Signif.         N           8.8         ***         957           8.064         ***         738           8.139         ***         957           0.919         927         0.919         927           0.919         927         5400         5400	Coef.         Signif.         N           0.235         ***         957           0.128         738           0.182         957           0.067         927           0.067         927           ation         957	Coef.         Signif.         N           -3.04         **         957           -2.9         *         746           -3.4         ***         957           -0.4         951           -0.4         951	Coef.         Signif.         N           -0.14         **         957           -0.11         746           -0.14         **         957           -0.03         951           -0.03         951           -0.14         Health
DEC	Methodology	Diet <u>Variety</u> by Household ( <i>Continuous Index</i> )	Diet <u>Variety</u> by Household (Continuous Index)	Diet <u>Quality</u> by Household (Continuous Index)	Diet <u>Quality</u> by Household ( <i>Continuous Index</i> )	Student' Marks in Primary School	School Absence in last month (kinder & primary school)	School Absence in last schooling cycle (kinder & primary school)	Extra-curricular studies	Diarrhea in the Household (Ordinal Categorical Variable)
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef.         Signif.         N           -0.93         ***         957           -0.9         *         746           -0.91         ***         957           -0.39         951           -0.39         *	Coef.         Signif.         N           -0.1         **         957           -0.11         746           -0.11         **         957           0.053         951           0.053         951	Coef.         Signif.         N           -3.97         **         957           3.792         **         746           -4.31         ***         957           -0.79         951           -0.79         *	Coef.         Signif.         N           -0.02         957           -0.02         746           -0.02         * 957           -0.01         951           -0.01         951	Coef.         Signif.         N           -0.01         700         0.062         434           0.033         700         0.055         695           0.055         695         Health         695	Coef.         Signif.         N           0.453         ***         957           0.548         **         746           0.529         ***         957           0.456         946         0.456	Coef.         Signif.         N           0.668         *         957           1.15         **         746           0.637         957           0.137         949           0.137         946	Coef.         Signif.         N           -27.9         700           -26.7         432           -26.1         700           43.53         691           43.53         691	Coef.         Signif.         N           -0.11         957           0.069         746           -0.03         957           -0.08         951           -0.08         951
	Methodology	Breathing difficulties in the Household (Ordinal Categorical Variable)	Yellowish skin in the Household (Binary Categorical variable)	Eves disease symptoms in the Household (Binary Categorical Variable)	<u>Gum</u> disease symptoms in the Household (Binary Categorical <i>Variable</i> )	Beneficiary's <u>Diarrhea</u> symptoms (Ordinal Categorical Variable)	Beneficiary's <u>Breathing</u> difficulties (Ordinal Categorical Variable)	Beneficiary's <u>Yellowish skin</u> (Binary Categorical variable)	Beneficiary's <u>Eyes</u> disease symptoms (Binary Categorical Variable)	Beneficiary's <u>Gum</u> disease symptoms (Binary Categorical Variable)
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef.         Signif.         N           0.133         957           0.332         746           0.172         957           0.094         950           0.094         950	Coef.         Signif.         N           0.028         957           0.039         746           0.023         957           0.148         **           0.148         951	Coef.         Signif.         N           -0         957           0.023         746           0.028         957           0.184         ***           0.184         **	Coef.         Signif.         N           0.009         957           0.01         746           -0.01         957           0.062         951           0.062         951	Coef.         Signif.         N           -0.1         957           0.026         746           -0.04         957           -0.07         950           -0.07         950	Coef.         Signif.         N           0.195         957           0.444         **         746           0.233         *         957           0.265         950         0.265         950	Coef.         Signif.         N           0.035         957           0.046         746           0.028         957           0.131         **           951         0.131	Coef.         Signif.         N           -0.01         957           -0.01         746           0         957           0.106         951           0.106         951	Coef.         Signif.         N           -0.01         957           -0.02         746           -0.01         957           0.05         951           0.05         951

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are clustered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

# VIII.2. DEF Results by Sample

			Food S	upport	-											Food	Orienta	ation								
	Methodology	Food insecu Househ (Continuous	old	Но	nsecurit ousehold orical ine	i I	percep <u>sel</u> Ho	nit chan ntion on <u>ection</u> t ousehole nuous le	food by d	perce <u>se</u> H	bit char otion or lection ousehol gorical I	h food by Id	percep prep Ho	bit chang otion on <u>paration</u> pusehole nuous Ir	food by d	perce <u>pre</u> H	bit chan ption or paratior ousehol gorical li	food by d	percep <u>cons</u> He	bit char otion or <u>umptio</u> ouseho nuous	n food <u>in</u> by Id	perce cons H	bit chan ption on <u>umption</u> ousehol gorical In	food <u>n</u> by d	pero Ho	it change eption by usehold uous Index
		Coef. Signif	. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif. N
	PSM Kernel	-0.16	1556	-0.11		1556	4.203	*	1556	0.06	<u>0</u>	1556	2.994			0.033	*	1556	-0.79		1556	-0.01		1556	2.618	* 155
	PSM Nearest Neighbor	0.066	1295	-0.1		1295	4.151	**	1292	0.054		1292	2.294	*	1295	0.034		1295	-0.86		1284	-0.01		1284	2.31	* 128
	PSM Stratification	-0.28	1556	-0.11		1556	4.134		1556	0.062		1556	2.933	***	1556	0.031	*	1556	-0.78		1556	-0.01		1556	2.584	* 155
	PSW robust & cluster s.e.	-0.61	1539	-0.11		1539	3.87	*	1529	0.075		1529	3.68	***	1540	0.043	***	1540	-0.68		1507	-0.01		1507	3.06	* 149
	PSW Bootstrapped s.e.	-0.61	1539	-0.11		1539	3.87	*	1529	0.075		1529	3.68	***	1540	0.043	***	1540	-0.68		1507	-0.01		1507	3.06	* 149
													Food	Orienta	tion											
	Methodology	Habit cha perceptio Househ (Categorical	n by old	percep <u>sele</u> Ber	hit chang Ition on f <u>ection</u> by neficiary nuous Ind	food y y	percep <u>sel</u> Be	bit chang otion on <u>ection</u> b neficiar orical In	food by Y	perce cons Be	bit char otion or <u>umptio</u> neficia nuous I	n food <u>n</u> by ry	percep <u>cons</u> Be	oit chang otion on <u>umptior</u> neficiar o <i>rical Ir</i>	food <u>1</u> by y	per Be	bit chan ception eneficiar inuous li	by 'y	per Be	bit char ception neficia gorical I	n by ry	н	<u>Diversit</u> ousehol nuous li	d	но	Diversity by usehold nuous Index
		Coef. Signif	. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif	N	Coef.	Signif	N	Coef.	Signif	N	Coef.	Signif. N
	PSM Kernel	0.088	1556	-8.84		1556	-0.22	***	1556	-7.14	**	1556	-0.19		1556	-8.97	***	1556	-0.28	***	1556	-1.47	*	1556	-0.1	* 155
	PSM Nearest Neighbor	0.063	1281	-9.35		1292	-0.23	***	1292	-6.19		1284	-0.16		1284	-8.92	***	1292	-0.28	***	1292	-0.94		1295	-0.06	129
-	PSM Stratification	0.084	1556	-8.62		1556	-0.21	***	1556	-6.96	**	1556	-0.19		1556	-8.71	***	1556	-0.28	***	1556	-1.53	*	1556	-0.1	* 155
5	PSW robust & cluster s.e.	0.13 *	1494	-3.25		1537	-0.1		1537	-9.95	***	1506	-0.25		1506	-6.26	***	1503	-0.24	***	1503	-1.27		1541	-0.14	154
E.	PSW Bootstrapped s.e.	0.13 *	1494	-3.25		1537	-0.1		1537	-9.95	***	1506	-0.25		1506	-6.26	***	1503	-0.24	***	1503	-1.27		1541	-	154
ō					Fo	od Ori	entation	1							Educa	ation							Health			
DEF General	Methodology	Diet <u>Varie</u> Househ ( <i>Continuous</i>	bld	Но	<u>Variety</u> ousehold nuous Ind	ı	Ho	Quality ousehole nuous Ir	d	н	Quality ousehol nuous I	d	last mo	l Absen nth (kin ary scho	der &	last so (kind	ol Abser hooling er & prii school)	cycle	in the (Ordin	ea sym House al Categ Iariable	ehold gorical	in the (Ordin	ing diffi e House al Categ (ariable)	hold Iorical	House	<u>sh skin</u> in th hold ( <i>Binar</i> ) ical variable
		Coef. Signif	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif. N
	PSM Kernel	-0.2	1556	-0.03		1556	-1.67	*	1556	-0.02	-	1556	0.952	**		0.257	-	2426	-0.06	-	1556	0.012		1556	0.005	155
	PSM Nearest Neighbor	-0.18	1295	-0.03		1295	-1.12		1295	-0.04		1295	0.933		1295	0.352		2179	-0.03		1295	0.006		1295	-0	129
	PSM Stratification	-0.15	1556	-0.01		1556	-1.68	*	1556	0.00		1556	0.898			0.294		2426	-0.08		1556	-0		1556	0.005	155
	PSW robust & cluster s.e.	0.57 ***	1541	0.05		1541	-0.7		1541	-0.07	*	1541	0.6		1540	-0.07		2391	-0.3	**	1541	-0.38	***	1541	-0	154
	PSW Bootstrapped s.e.	0.57 ***	1541	0.05		1541	-0.7		1541	-0.07	*	1541	0.6		1540	-0.07		2391	-0.3	**	1541	-0.38	***	1541	-0	154
											Health															
	Methodology	Eves dise symptoms Household   Categorical V	in the Binary	sympt House	<u>n</u> disease toms in t hold (Bir ical <i>Vari</i>	the nary	<u>Diarrha</u> (Ordina	neficiary <u>ea</u> symp al Categ ariable)	otoms orical	Be <u>Breath</u> (Ordin	neficiar ing diffi al Categ 'ariable	culties gorical	Yellowis	neficiary s <u>h skin</u> ( rical var	Binary	disea: (Binar	ficiary's se symp y Categ /ariable	toms orical	diseas (Binar	ficiary's ie symp y Categ fariable	otoms gorical					
	Methodology	symptoms Household Categorical V	in the Binary ariable)	sympt Housel Categori	toms in t hold (Bir ical <i>Vari</i>	the nary iable)	<u>Diarrh</u> (Ordina V	<u>ea</u> symp al Categ ariable)	orical	Be <u>Breath</u> (Ordin	ing diffi al Categ 'ariable	culties gorical )	Yellowis Catego	<u>sh skin</u> ( rical var	Binary iable)	disea: (Binar \	se symp y Categ /ariable	toms orical )	diseas (Binar V	e symp y Categ ariable	otoms gorical !)					
		symptoms Household	in the Binary ariable)	sympt Housel Categori	toms in t hold (Bir ical <i>Vari</i> Signif.	the nary	<u>Diarrha</u> (Ordina	<u>ea</u> symp al Categ ariable)	otoms orical	Be <u>Breath</u> (Ordin	ing diffi al Categ	culties gorical	Yellowis Catego	sh skin ( rical var Signif.	Binary	disea: (Binar \	se symp y Categ	toms orical	diseas (Binar	e symp y Categ ariable	otoms gorical !)					
	PSM Kernel	symptoms Household Categorical V Coef. Signif	in the Binary ariable) N 1556	sympt Housel Categori Coef. 5 0.005	toms in t hold (Bir ical <i>Vari</i> Signif.	the nary <i>iable</i> ) N 1556	Diarrhe (Ordina V Coef. -0.05	<u>ea</u> symp al Categ ariable)	orical N 1556	Be Breath (Ordin V Coef. 0	ing diffi al Categ 'ariable	culties gorical ) N 1556	Yellowis Catego Coef. 0.008	sh skin ( rical var Signif.	Binary iable) N 1556	disea: (Binar \ Coef. -0.01	se symp y Categ /ariable	toms orical N 1556	diseas (Binar V Coef. 0.002	e symp y Categ ariable	otoms gorical ) N 1556					
	PSM Kernel PSM Nearest Neighbor	symptoms Household Categorical V Coef. Signif	in the Binary ariable)	sympt Housel Categori Coef.	toms in t hold (Bir ical <i>Vari</i> Signif.	the nary iable) N	Diarrhe (Ordina V Coef.	<u>ea</u> symp al Categ ariable)	orical N	Be <u>Breath</u> (Ordin \ Coef.	ing diffi al Categ 'ariable	culties gorical )	Yellowis Catego Coef.	sh skin ( rical var Signif.	Binary iable) N	disea (Binar \ Coef.	se symp y Categ /ariable	n N 1556 1295	diseas (Binar V Coef.	e symp y Categ ariable	otoms gorical					
	PSM Kernel	symptoms Household I Categorical V Coef. Signif 0 -0	in the Binary ariable) . N 1556 1295	sympt Housel Categori 0.005 0.019	toms in t hold (Bir ical Vari Signif.	the nary <i>iable</i> ) N 1556 1295	Diarrhe (Ordina V Coef. -0.05 -0.02	<u>ea</u> symp al Categ ariable)	N 1294	Be Breath (Ordin V Coef. 0 -0.09	ing diffi al Categ 'ariable	N 1556 1295	Yellowis Catego Coef. 0.008 -0	sh skin ( rical var Signif.	Binary iable) N 1556 1295	disea (Binar \ Coef. -0.01 -0.02	se symp y Categ /ariable	n N 1556 1295	diseas (Binar V Coef. 0.002 0.009	e symp y Categ ariable	N 1556 1295					
	PSM Kernel PSM Nearest Neighbor PSM Stratification	symptoms Household I Categorical V Coef. Signif 0 -0 0.002	in the Binary ariable) N 1556 1295 1556	sympt Housel Categori 0.005 0.019 0.008	toms in t hold (Bir ical Vari Signif.	the nary <i>iable</i> ) N 1556 1295 1556	Diarrhe (Ordina V Coef. -0.05 -0.02 -0.05	ea symp al Categ ariable) Signif.	N 1556 1294 1556	Be Breath (Ordin V Coef. 0 -0.09 -0.03	ing diffi al Categ 'ariable Signif.	N 1556 1295 1556	Yellowis Catego Coef. 0.008 -0 0.009	s <u>h skin</u> ( rical var Signif.	Binary iable) N 1556 1295 1556	disea: (Binar \ Coef. -0.01 -0.02 -0.01	se symp y Categ /ariable	toms orical N 1556 1295 1556	diseas (Binar V Coef. 0.002 0.009 0.002	e symp y Categ 'ariable Signif.	N 1556 1295 1556					

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are clustered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

### Impact Evaluation on DIF-Programs

			Feed				_			_		Feed	Oriontatio -			_			
			Food	Support				-		-		Food	Orientation	1		-		1	
	Methodology	Food inse House ( <i>Continuo</i>	hold	Food inser House ( <i>Categoric</i>	nold	Habit cha perception <u>selection</u> Househ (Continuous	on food 1 by old	percept sele Ho	it change tion on food <u>ection</u> by usehold prical Index)	percep prep Ho	it change tion on food <u>aration</u> by usehold uous Index)	percep prep Ho	bit change otion on food <u>paration</u> by pusehold orical Index)	percepti <u>consur</u> Hou	t change ion on food <u>mption</u> by isehold uous Index)	percep <u>cons</u> H	bit change ption on food <u>sumption</u> by ousehold gorical Index)	Habit cha perceptio Househo (Continuous	n by old
		Coef. Sigr	nif. N	Coef. Sign	f. N	Coef. Signif	. N	Coef.	Signif. N	Coef.	Signif. N	Coef.	Signif. N	Coef. Si	ignif. N	Coef.	Signif. N	Coef. Signif.	N
	PSM Kernel	-0.56	779	-0.13	779	3.851	779	0.033	779	1.35	779	0.026	779	-1.96	779	-0.04	779	1.158	779
	PSM Nearest Neighbor	-0.45	643	-0.1	643	4.077	642	0.071	642	1.023	643	0.026	643	-1.69	638	-0.04	638	1.255	637
	PSM Stratification	-0.71	779	-0.14	779	3.566	779	0.025	779	1.25	779	0.022	779	-2.1	779	-0.05	779	0.981	779
	PSW robust & cluster s.e.	-0.29	776	-0.06	776	1.88	769	0.004	769	0.28	776	0.25	776	-2.74	* 761	-0.07	* 761	-0.2	752
	PSW Bootstrapped s.e.	-0.29	776	-0.06	776	1.88	769	0.004	769	0.28	776	0.25	776	-2.74	* 761	-0.07	* 761	-0.2	752
	Methodology	Habit c percept House (Categoric	tion by shold al Index)	Habit ch perception <u>selectio</u> Benefi ( <i>Continuo</i>	on food in by ciary s Index)	Habit cha perception <u>selection</u> Benefici ( <i>Categorica</i>	on food h by ary I Index)	percept <u>consu</u> Ber ( <i>Contin</i>	it change tion on food <u>imption</u> by neficiary <i>iuous Index</i> )	Hab percep <u>consu</u> Ber ( <i>Categ</i>	Drientation it change tion on food <u>umption</u> by neficiary <i>orical Index</i> )	pero Ber ( <i>Contir</i>	bit change ception by neficiary nuous Index)	perce Beni ( <i>Catego</i>	t change eption by eficiary rical Index)	H (Conti	Diversity by ousehold inuous Index)	Diet <u>Divers</u> Househo ( <i>Continuous</i>	old Index)
		Coef. Sigr		Coef. Sign		Coef. Signif			Signif. N		Signif. N	Coef.			ignif. N *** 779		Signif. N	Coef. Signif.	
	PSM Kernel PSM Nearest Neighbor	0.053 *	779 637	-8.99 ***	779	-0.19 *** -0.2 ***	779	-9.09 -8.81	** 779 ** 638	-0.23	*** 779 *** 638	-9.82 -10.4	*** 779 *** 638	0.34	*** 779 *** 638	-1.04	779 643	-0.08 -0.08	779 643
	PSM Stratification	0.043	779	-9.12 *	779	-0.19 ***	779	-0.01	** 779	-0.2	*** 779	-10.4	*** 779		*** 779	-1.13	779	-0.08	779
λ	PSW robust & cluster s.e.	0.043	752	-5.41 *	776	-0.13	776	-11.6	*** 762	-0.23	*** 762	-8.35	*** 762	0.55	*** 762	-0.46	777	-0.1	777
DEF Boys	PSW Bootstrapped s.e.	0.01	752	-5.41 *	776	-0.11	776		*** 762		*** 762	-8.35	*** 762		*** 762		777	-0.1	777
Ē					Food O	rientation					Edu	cation				· · · · · ·	Health		
ā	Methodology	Diet <u>Var</u> House		Diet <u>Vari</u> House		Diet <u>Qual</u> Househ			<u>Quality</u> by		Absence in hthe (kinder &	last sch	l Absence in nooling cycle	in the H	<u>symptoms</u> Household	in the	ing difficulties e Household	Yellowish skir Household (	Binary
		(Continuo		(Continuou	s Index)	(Continuous			usehold uous Index)		ary school)		er & primary school)		Categorica riable)		al Categorical /ariable)	Categorical v	andbic)
		Coef. Sigr	us Index) nif. N	Coef. Sign	f. N	Coef. Signif	Index)	(Contin	signif. N	prima Coef.	signif. N	Coef.	signif. N	Var Coef. Si	riable)	Coef.	/ariable) Signif. N	Coef. Signif.	. N
	PSM Kernel	Coef. Sigr -0.55	us Index) nif. N 779	Coef. Sign -0.07	f. N 779	Coef. Signif	Index)	(Contin	Signif. N 779	Coef. 9	Signif. N 779	Coef. 0.878	Signif. N 779	Var Coef. Si 0.097	riable) ignif. N 779	Coef. 0.128	/ariable) Signif. N 779	Coef. Signif.	N 779
	PSM Nearest Neighbor	Coef. Sigr -0.55 -0.57	us Index) nif. N 779 643	Coef. Sign -0.07 -0.07	f. N 779 643	Coef. Signif -1.58 -1.36	Index) . N 779 643	(Contin Coef. 5 -0 0.001	signif. N 779 643	prima Coef. 5 0.101 0.186	Signif. N 779 643	Coef. 0.878 0.753	Signif. N 779 643	Var Coef. Si 0.097 0.122	riable) ignif. N 779 643	Coef. 0.128 0.096	Signif. N 779 643	Coef. Signif. 0.015 0.01	N 779 643
	PSM Nearest Neighbor PSM Stratification	Coef. Sigr -0.55 -0.57 -0.51	us Index) nif. N 779 643 779	Coef. Sign -0.07 -0.07 -0.06	f. N 779 643 779	Coef. Signif -1.58 -1.36 -1.64	. N 779 643 779	(Contin Coef. 5 -0 0.001 -0	iuous Index) 5ignif. N 779 643 779	prima Coef. 9 0.101 0.186 0.098	5ignif. N 779 643 779	Coef. 0.878 0.753 0.832	Signif. N 779 643 779	Var Coef. Si 0.097 0.122 0.098	riable) ignif. N 779 643 779	Coef. 0.128 0.096 0.107	/ariable) Signif. N 779 643 779	Coef. Signif. 0.015 0.01 0.016	N 779 643 779
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	Coef. Sigr -0.55 -0.57 -0.51 -0.02	us Index) nif. N 779 643 779 777	Coef. Sign -0.07 -0.07 -0.06 -0	f. N 779 643 779 777	Coef. Signif -1.58 -1.36 -1.64 -0.48	. N 779 643 779 777	(Contin -0 -0 -0 -0 -0 -0 -0 -0 -0	signif. N 779 643 779 * 777	prima Coef. 9 0.101 0.186 0.098 0.25	5ignif. N 779 643 779 776	Coef. 0.878 0.753 0.832 0.73	Signif. N 779 643 779 777	Var Coef. Si 0.097 0.122 0.098 -0.23	riable) ignif. N 779 643 779 777	Coef. 0.128 0.096 0.107 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777
	PSM Nearest Neighbor PSM Stratification	Coef. Sigr -0.55 -0.57 -0.51	us Index) nif. N 779 643 779	Coef. Sign -0.07 -0.07 -0.06	f. N 779 643 779	Coef. Signif -1.58 -1.36 -1.64	. N 779 643 779	(Contin -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	signif. N 779 643 779 * 777 777	prima Coef. 9 0.101 0.186 0.098	5ignif. N 779 643 779	Coef. 0.878 0.753 0.832	Signif. N 779 643 779	Var Coef. Si 0.097 0.122 0.098	riable) ignif. N 779 643 779	Coef. 0.128 0.096 0.107	/ariable) Signif. N 779 643 779	Coef. Signif. 0.015 0.01 0.016	N 779 643 779
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	Coef. Sigr -0.55 -0.57 -0.51 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.55 -0.57 -0.55 -0.57 -0.55 -0.57 -0.52 -0.57 -0.52 -	us Index) hif. N 779 643 779 777 777 777 777 visease is in the d (Binary Variable)	Coef. Sign -0.07 -0.07 -0.06 -0 -0 -0 -0 Symptom Household Categorical	f. N 779 643 779 777 777 777 eease s in the (Binary Variable)	Coef. Signif -1.58 -1.36 -1.64 -0.48 -0.48 -0.48 Beneficii <u>Diarrhea</u> syr (Ordinal Cat Variab	Index) Index	(Contin Coef. 5 -0 0.001 -0 -0.01 -0.01 -0.01 -0.01 Ben Breathir (Ordina Va	signif. N 779 643 779 777 777 4ealth eficiary's <u>9</u> difficulties il Categorical ariable)	prima           Coef.         1           0.101         0.186           0.098         0.25           0.25         0.25           Ben         Yellowis           Categor         Categor	Signif. N 779 643 779 776 776 776 776 8 8 8 9 776 776 776 776 776 776 776	Coef. 1 0.878 0.753 0.832 0.73 + Benefit diseas (Binary V.	Signif. N 779 643 779 777 777 777 777 777 777 777 777 77	Van Coef. Si 0.097 0.122 0.098 -0.23 -0.23 Benefic disease (Binary I Van	iable) 779 643 779 777 777 777 iary's <u>Gum</u> symptoms Categorical riable)	Coef. 0.128 0.096 0.107 -0.22 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777
	PSM Nearest Neighbor PSM Stratification PSW robust & duster s.e. PSW Bootstrapped s.e. Methodology	Coef. Sigr -0.55 -0.57 -0.51 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0.55 -0.02 -0.05 -	us Index) iif. N 779 643 779 777 777 777 777 777 777 77	Coef. Sign -0.07 -0.06 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	f. N 779 643 779 777 777 777 777 eease s in the (Binary Variable) f. N	Coef. Signif -1.58 -1.36 -1.64 -0.48 -0.48 Beneficit Diarrhea syr (Ordinal Cat Variab Coef. Signif	Index) Index	(Contin -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	uous Index) Signif. N 779 643 779 * 777 * 777 tealth eficiary's ng difficulties I Categorical ariable) Signif. N	Coef. 5 0.101 0.186 0.098 0.25 0.25 0.25 Ben Yellowis Categor	signif. N 779 643 779 776 776 776 776 776 776 776 555 811 811 811 811 811 811 811 811 811	Coef. [ 0.878 0.753 0.832 0.73 + Benefit diseas (Binary V. Coef. [	Signif. N 779 643 779 777 777 777 777 777 777 777 777 77	Vai Coef. Si 0.097 0.122 0.098 -0.23 -0.23 Benefic disease (Binary U Vai Coef. Si	ignif. N 779 643 779 777 777 777 777 8 symptoms Categorical riable) ignif. N	Coef. 0.128 0.096 0.107 -0.22 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e. Methodology PSM Kernel	Coef.         Sigr           -0.55         -0.57           -0.51         -0.02           -0.02         -0.02           -0.02         -0.02           Coef.         Sigr           Coef.         Sigr           -0.02         -0.02	iif. N 779 643 779 777 777 777 777 visease is in the d (Binary Variable) iif. N 779	Coef.         Sign           -0.07         -0.07           -0         -0           -0         -0           -0         -0           -0         -0           Categorical         Categorical           Coef.         Sign           -0.01         -0.01	f. N 779 643 779 777 777 777 777 777 777 777 6ease 5 in the (Binary Variable) f. N 779 779	Coef. Signif -1.58 -1.36 -1.64 -0.48 -0	Index) Index N 779 643 779 777 777 777 777 r77 r77 r77	(Contin -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	signif. N 779 643 779 * 777 4ealth eficiary's g difficultes il Categorical rriable) signif. N 779	prima           Coef.         1           0.101         0.186           0.098         0.25           0.25         0.25           Ben         Yellowis           Categor         Categor           Coef.         1           0.012         0.012	signif. N 779 643 779 776 776 776 776 776 776 5 h skin (Binary ical variable) 5 ignif. N 779	Coef. ] 0.878 0.753 0.832 0.73 + Benefit diseas (Binary V: Coef. ] -0.01	signif. N 779 643 779 777 777 777 777 777 777 777 8 9 9 9 9	Vai Coef. Si 0.097 0.122 0.098 -0.23 -0.23 -0.23 Benefic disease (Binary I Vai Coef. Si 0.009	ignif. N 779 643 779 777 777 777 777 iary's <u>Gum</u> symptoms Categorical riable) ignif. N 779	Coef. 0.128 0.096 0.107 -0.22 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Nearest Neighbor	Coef. Sigr -0.55 -0.57 -0.51 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0 -0 -0	us Index) iif. N 779 643 779 777 777 777 iisease is in the d (Binary Variable) iif. N 779 643	Coef.         Sign           -0.07         -0.07           -0.06         -0           -0         -0	f. N 779 643 779 777 777 777 777 777 777 777 777 643	Coef. Signif -1.58 -1.36 -1.64 -0.48 -0.49	. N 779 643 779 777 777 777 777 777 777 777 777 9 777 9 643	(Contin -0 -00 -0.001 -0.01 -0.01 -0.01 -0.01 -0.01 -0.01 Coef. [5 -0.072 -0.02	signif. N 779 643 779 * 777 4ealth eficiary's gy difficulties gy difficulties ariable) 5ignif. N 779 643	Prima 0.101 0.186 0.098 0.25 0.25 0.25 Categor Categor 0.012 -0	signif. N 779 643 779 776 777 776 776 777 643 779 776 5ignif. N 779 643	Coef. ] 0.878 0.753 0.832 0.73 + Benefit diseas (Binary V. Coef. ] -0.01	Signif.         N           779         643           779         777           777         777           iciary's Eyes         e symptoms           y Categorical ariable)         signif.           Signif.         N           779         643	Vai Coef. 5i 0.097 0.122 0.098 -0.23 -0.23 Benefic disease (Binary I Vai Coef. 5i 0.009 0.009	ignif. N 779 643 779 777 777 777 iary's <u>Gum</u> symptoms Categorical riable) ignif. N 779 643	Coef. 0.128 0.096 0.107 -0.22 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Kernel PSM Stratification	Coef.         Sign           -0.55         -0.57           -0.51         -0.02           -0.02         -0.02           Symptom         Househol           Categorical         -0           -0         -0           -0.01         -0	us Index) iif. N 779 643 779 777 777 777 iisease is in the d (Binary Variable) iif. N 779 643 779 643 779 643 779 777 777 777 777 777 777 77	Coef.         Sign           -0.07         -0.07           -0.06         -0           -0         -0           Symptom         Householt           Categorical         Coef.           Coef.         Sign           -0.016         -0	f. N 779 643 779 777 777 777 777 777 777 777 643 779 643 779	Coef.         Signift           -1.58         -1.36           -1.54         -0.48           -0.48         -0.48           Beneficion         -0.48           Ordinal Cat.         Variab           Coef.         Signift           0.721         0.074	Index) Index	(Contin -0 -0 -0 -0.01 -0 -0.01 -0.01 -0.01 -0.01 -0 -0.01 -0.01 -0 -0.01 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	uous Index) signif. N 779 643 779 * 777 777 777 realth eficiary's g difficulties I Categorical ariable) 5ignif. N 779 643 779	Prima Coef. 3 0.101 0.186 0.098 0.25 0.012 0	signif. N 779 643 779 776 776 776 776 186 186 187 779 776 187 779 776 776 187 779 776 776 187 779 776 779 779 779 779 779 77	Coef. 1 0.878 0.753 0.832 0.73 + Benefi diseas (Binary V Coef. 1 -0.01 -0.01 -0.09	Signif.         N           643         779           643         779           777         777           iciary's Eves.         e symptoms           y Categorical ariable)         779           5ignif.         N           779         779           643         779           779         779	Vai Coef. Si 0.097 0.122 0.098 -0.23 -0.23 -0.23 Benefic disease (Binary I Vai Coef. Si 0.009 0.016 0.009	ignif. N 643 779 643 779 777 777 777 777 iary's <u>Gum</u> iary's <u>Gum</u> iary's <u>Gum</u> iary's <u>Gum</u> iary's <u>Gum</u> iary's <u>Gum</u> (ategorical riable) 779 643 779	Coef. 0.128 0.096 0.107 -0.22 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Nearest Neighbor	Coef. Sigr -0.55 -0.57 -0.51 -0.02 -0.02 -0.02 -0.02 -0.02 -0.02 -0 -0 -0	us Index) iif. N 779 643 779 777 777 777 iisease is in the d (Binary Variable) iif. N 779 643	Coef.         Sign           -0.07         -0.07           -0.06         -0           -0         -0	f. N 779 643 779 777 777 777 777 777 777 777 777 643	Coef. Signif -1.58 -1.36 -1.64 -0.48 -0.49	. N 779 643 779 777 777 777 777 777 777 777 777 9 777 9 643	(Contin -0 -00 -0.001 -0.01 -0.01 -0.01 -0.01 -0.01 -0.01 Coef. [5 0.072 -0.02	signif. N 779 643 779 * 777 4ealth eficiary's gy difficulties gy difficulties ariable) 5ignif. N 779 643	Prima 0.101 0.186 0.098 0.25 0.25 0.25 Categor Categor 0.012 -0	signif. N 779 643 779 776 777 776 776 777 643 779 776 5ignif. N 779 643	Coef. ] 0.878 0.753 0.832 0.73 + Benefit diseas (Binary V. Coef. ] -0.01	Signif.         N           779         643           779         777           777         777           iciary's Eyes         e symptoms           y Categorical ariable)         signif.           Signif.         N           779         643	Vai Coef. 5i 0.097 0.122 0.098 -0.23 -0.23 Benefic disease (Binary I Vai Coef. 5i 0.009 0.009	ignif. N 779 643 779 777 777 777 iary's <u>Gum</u> symptoms Categorical riable) ignif. N 779 643	Coef. 0.128 0.096 0.107 -0.22 -0.22	/ariable) Signif. N 779 643 779 776	Coef. Signif. 0.015 0.016 -0	N 779 643 779 777

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are dustered at the locality level. The car a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

			Food	Support										Food	Drientation									
			1000													1								
	Metodología	Food insecu Househ (Continuous	old	Hou	security by isehold rical index)	perce <u>Se</u> H	abit cha eption o election louseho tinuous	n food by old	Habit cl perceptior <u>selectii</u> House (Categoric	on food on by hold	percep prep Ho	it change tion on fo <u>aration</u> by pusehold nuous Inde	'	percept <u>prepa</u> Ho	it change tion on foo <u>aration</u> by usehold prical Index	i perce cor	abit cha eption o <u>isumptio</u> Househo tinuous	n food on by Id	percep cons H	bit char ption or <u>umptio</u> ouseho gorical I	n food <u>n</u> by Id	per H	bit chan ception ousehol nuous l	by d
		Coef. Signif	f. N	Coef. S	ignif. N	Coef.	Signif.	N	Coef. Sign	if. N	Coef.	Signif.	N	Coef. S	ignif. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N
	PSM Kernel	0.309	773	-0.09	773	4.331	**	773	0.082	773	4.58			0.034	* 77		1.0	773	0.036		773	4.071	***	773
	PSM Nearest Neighbor	1.45	589	-0.05	589	2.2		586	-0	586	4.588	** 5	89	0.01	58	1.55		586	0.046		586	3.837	***	583
	PSM Stratification	0.266	773	-0.09	773		**	773	0.113	773	4.584			0.032	* 77			773	0.023		773	4.25	***	773
	PSW robust & cluster s.e.	0.35	763	-0.08	763		**	760	0.145 *	760	6.29			0.045	** 76			746	0.05		746	5.92	**	742
	PSW Bootstrapped s.e.	0.35	763	-0.08	763	5.58	*	760	0.145	760	6.29			0.045	* 76	1.23		746	0.05		746	5.92	**	742
											Food	Orientatio	n											
	Methodology	Habit cha perceptic Househ (Categorical	on by old	percept sele Ben	t change ion on food <u>ction</u> by eficiary <i>Jous Index</i> )	l perce <u>se</u> B	abit cha ption o election eneficia egorical	n food by ary	Habit cl perceptior <u>consump</u> Benefi ( <i>Continuo</i>	on food tion by ciary	percep consu Ber	it change ition on fo <u>umption</u> b neficiary orical Inde	y	perc Ben	it change eption by leficiary uous Index	pe E	abit cha creption leneficia	n by iry	н	Diversit ouseho nuous I	ld	н	Diversit ousehol inuous li	ld
		Coef. Signif	f. N	Coef. S	ignif. N	Coef.	Signif.	N	Coef. Sign	if. N	Coef.	Signif.	N	Coef. S	ignif. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif.	N
	PSM Kernel	0.12 ***	773	-9.1	*** 773	-0.27	***	773	-5.09	773	-0.16	* 7	73	-8.35	*** 77	-0.22		773	-1.89	***	773	-0.12	***	773
	PSM Nearest Neighbor	0.063	583	-12.5	*** 588		***	588	-1.44	585	-0.1		85	-0.05	*** 58		**	584	-0.53		589	-0.06		589
Ś	PSM Stratification	0.117 ***	773	0.70	*** 773		***	773	-6.29	773	-0.18		73	0.0	*** 77		***	773	-0.17	***	773	-0.11	***	773
Ë	PSW robust & cluster s.e.	0.198 ***	742	-2.25	761		**	761	-8.27	744	-0.23			-4.96	74			741	-1.65	**	764	-0.16	***	764
(7)	PSW Bootstrapped s.e.	0.198 ***	742	-2.25	761	-0.12	*	761	-8.27	744	-0.23	7	44	-4.96	74	-0.13		741	-1.65	**	764	-0.16	**	764
•								/01	0.27		1													
Ē				1	Food 0	Drientatio	n	701	0.27			E	duca	ation					-	Health				
DEF Girls	Methodology	Diet <u>Varie</u> Househ (Continuous	old	Hou	Food C <u>'ariety</u> by isehold <i>ious Index</i> )	Die	et <u>Qualit</u> Iouseho tinuous	<u>v</u> by	Diet <u>Qua</u> House ( <i>Continuo</i>	<u>lity</u> by hold	School last mor	l Absence nth (kinde ary school	in r &	School last sch (kinder	Absence ir ooling cycl · & primary :hool)	in th (Ordi	<u>hea</u> sym ne House nal Cate Variable	ehold gorical	Breath in the (Ordin	Health ing diffi e House al Cater 'ariable	hold anical	House	<u>ish skin</u> ehold (E vrical va	Binary
DEFO	Methodology	Househ	old Index)	Hou (Continu	<u>'ariety</u> by isehold	Die	t <u>Qualit</u> Iouseho	<u>v</u> by	Diet <u>Qua</u> House	<u>lity</u> by hold is Index)	School last mor prima	l Absence nth (kinde ary school	in r & )	School last sch (kinder so	ooling cycl & primary	in th (Ordi	ne House nal Cate Variable	ehold gorical	Breath in the (Ordin	ing diffi e House al Categ	hold anical	House	ehold (B	Binary
DEFO	Methodology PSM Kernel	Househ (Continuous	old Index)	Hou (Continu	' <u>ariety</u> by isehold <i>ious Index</i> )	Die H (Cont	t <u>Qualit</u> louseho tinuous	iy by old Index)	Diet <u>Qua</u> House ( <i>Continuo</i>	<u>lity</u> by hold is Index)	School last mor prima	I Absence nth (kinde ary school Signif.	in r& )	School last sch (kinder so	ooling cycl & primary :hool)	(Ordi	ne House nal Cate Variable	ehold gorical e)	Breath in the (Ordin	ing diffi e House al Cate 'ariable	hold gorical )	House Catego	ehold (E vrical va	Binary riable)
DEFO		Househ (Continuous Coef. Signif 0.146 0.213	old Index)	Hou (Continue) Coef. 5 0.017 0.052	fariety Isehold Jous Index	Die + (Cont -1.74 -0.32	t <u>Qualit</u> louseho tinuous	iy by old Index)	Diet <u>Qua</u> House ( <i>Continuo</i> Coef. Sign	ility by hold is Index) if. N 773 589	School last mor prima Coef. 5 0.062 0.155	l Absence nth (kinde ary school Signif.	in r & ) N 73	School last sch (kinder so Coef. S	ooling cycl & primary :hool) iignif. N * 77. 58	Coef. -0.21	he House nal Cate Variable Signif. ** *	ehold gorical 2) N 773 589	Breath in the (Ordin V Coef.	ing diffi e House al Cate 'ariable	ehold gorical ) N	House Catego Coef. -0 0.002	ehold (E vrical va	Binary riable) N 773 589
DEFO	PSM Kernel PSM Nearest Neighbor PSM Stratification	Househ (Continuous Coef. Signif 0.146 0.213 0.282	f. N 773 589 773	Hou (Continue) Coef. S 0.017 0.052 0.062	r <u>ariety</u> by isehold <i>Jous Index</i> ) ignif. N 773 589 773	Die + (Cont -1.74 -0.32 -1.39	t <u>Qualit</u> louseho tinuous	v by old Index) 773 589 773	Diet <u>Qui</u> House ( <i>Continuou</i> Coef. Sign -0 0 -0	lity by hold is Index) if. N 773 589 773	School last mor prima Coef. 5 0.062 0.155 0.021	I Absence nth (kinde ary school Signif. 7 5 7	in r & ) N 73 89 73	School last sch (kinder sc Coef. S 1.002 0.929 0.915	ooling cycl & primary :hool) ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	Coef. -0.21 -0.25 -0.35	he House nal Cate Variable Signif. ** **	ehold gorical 2) N 773 589 773	Breath in the (Ordin V Coef. -0.1 -0.06 -0.15	ing diffi e House al Categ 'ariable Signif.	N 773 589 773	House Catego Coef. -0 0.002 -0.01	ehold (E vrical va	Rinary riable) N 773 589 773
DEF	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	Househ (Continuous 0.146 0.213 0.282 1.23 **	f. N 773 589 773 764	Hou (Continue) 0.017 0.052 0.062 0.121	rariety by isehold <i>Jous Index</i> ) ignif. N 773 589 773 ** 764	Die H (Cont Coef. -1.74 -0.32 -1.39 -0.42	t <u>Qualit</u> louseho tinuous	v by old Index) 773 589 773 764	Diet <u>Ou</u> House ( <i>Continuou</i> -0 -0 -0 -0	lity by hold is Index) if. N 773 589 773 764	School last mor prima 0.062 0.155 0.021 -0.2	l Absence nth (kinde ary school Signif. 7 5 7 7 7 7	in r & ) 73 89 73 63	School last sch (kinder sc <u>Coef.</u> <u>S</u> 1.002 0.929 0.915 0.57	ooling cycl & primary :hool) iignif. N * 77 58 * 77. 76	Coef. -0.21 -0.25 -0.35 -0.43	Ne House nal Cate Variable Signif. ** * * *** ***	ehold gorical 2) 773 589 773 764	Breath in the (Ordin V -0.1 -0.06 -0.15 -0.54	ing diffi e House al Categ 'ariable Signif. ***	N N 773 589 773 764	House Catego Coef. -0 0.002 -0.01 -0.01	ehold (E vrical va	Binary riable) N 773 589 773 764
DEFO	PSM Kernel PSM Nearest Neighbor PSM Stratification	Househ (Continuous Coef. Signif 0.146 0.213 0.282	f. N 773 589 773	Hou (Continue) 0.017 0.052 0.062 0.121	r <u>ariety</u> by isehold <i>Jous Index</i> ) ignif. N 773 589 773	Die H (Cont Coef. -1.74 -0.32 -1.39 -0.42	t <u>Qualit</u> louseho tinuous	v by old Index) 773 589 773	Diet Qui House (Continuou -0 -0 -0 -0 -0 -0	lity by hold is Index) if. N 773 589 773 764 764	School last mor prima Coef. 5 0.062 0.155 0.021	l Absence nth (kinde ary school Signif. 7 5 7 7 7 7	in r & ) 73 89 73 63	School last sch (kinder sc Coef. S 1.002 0.929 0.915	ooling cycl & primary :hool) ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	Coef. -0.21 -0.25 -0.35 -0.43	Ne House nal Cate Variable Signif. ** * * *** ***	ehold gorical 2) N 773 589 773	Breath in the (Ordin V Coef. -0.1 -0.06 -0.15	ing diffi e House al Categ 'ariable Signif.	N 773 589 773	House Catego Coef. -0 0.002 -0.01	ehold (E vrical va	Rinary riable) N 773 589 773
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DEFG	PSM Kernel PSM Nearest Neighbor PSM Startification PSW robust & Custer s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Nearest Neighbor PSM Startification	Househ (Continuous Coef. Signif 0.146 0.213 1.23 * 1.23 * Eves dis symptoms Household Categorical V Coef. Signif 0.001 0.019 0.007	ease in the (Binary <i>ariable</i> ) (Binary <i>ariable</i> ) (Binary (Binary (Binary (Binary) (Bin	Hou (Continu 0.052 0.052 0.062 0.121 0.121 0.121 Symptu Househ Categoria Coef. S 0.019 0.032	ariety by isehold jous Index) ignif. N 588 773 764 ** 764 ** 764 disease oms in the old (Binary cal Variable ignif. N 773 589 773	Diee Diee Cont Coref. -1.74 -0.32 -0.42 -0.42 Diarrt (Ordir ) Dief Coref. -1.74 -0.32 -0.44 -0.44	t Qualiti kousehci inuous Signif. * * * * * * * * * * * * * *	vy by idd index) 773 589 764 764 764 764 764 773 807 764 764 764 773 764 764 764 773 764 764 773 764 764 773 773 764 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 764 773 773 773 764 773 773 773 764 773 773 773 773 774 773 774 773 774 774	Diet Quue House (Continuou -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	Iity         by           hold         ss index)           is         773           773         589           774         764           764         764           iff(culties         stiff(culties)           iff.         N           fiff.         N           773         764           773         773           589         773           773         773           589         773           773         762	School last mor prima 0.062 0.155 0.021 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2	I Absence nth (kinde ary school Signif. 7 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	in r & ) N 73 89 73 63 63 63 63 63 63 63 63 89 73 89 73 89 73 64	School last sch (kinder 50 0.929 0.915 0.57 0.57 0.57 Va Coef. [S Benefit disease (Binary Va Coef. [S 0.008 -0	ooling cycl & primary shool) * 77 58 * 77 76 76 76 76 76 76 76 76 76 76 76 76 7	Coef. Co	eficiary's signif. ** ** *** *** *** *** *** *** *** ***	N           773         589           773         764           764         764           764         764           764         764           700         764           700         764           763         569           773         764           764         764           773         764           764         764	Breath in the (Ordin V -0.1 -0.06 -0.15 -0.54	ing diffi e House al Categ 'ariable Signif. ***	N N 773 589 773 764	House Catego Coef. -0 0.002 -0.01 -0.01	ehold (E vrical va	Binary riable) N 773 589 773 764

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	Methodology	perc Ho	it change eption b usehold orical Inc	y	percep sele	ection b neficiar	food by Ty	perce <u>se</u> Bi	bit chai ption o lection eneficia gorical	n food by ary	perce con B	bit char ption o sumptic eneficia	n food on by ary	Hal percep <u>cons</u> Be	Orientat bit chang ption on umption eneficiary gorical In	e food by /	per Be	bit chan ception meficiar	by 'y	per Bi	bit char ception eneficia gorical l	n by ry	н	Diversit ouseho inuous I	ld	н	Diversit ouseho inuous I	ld
DEF Urban	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. 5 0.105 0.066 0.101 0.13 0.13	* 1	N 1024 934 1024 904 904	Coef. 5 -7.7 -9.17 -7.42 -3.53 -3.53	signif. *** *** ***	N 1024 938 1024 1009 1011	Coef. -0.19 -0.22 -0.18 -1.04 -1.04	Signif. *** *** ***	N 1024 938 1024 1011 1011	Coef. -8.2 -7.02 -7.93 -10.3 -10.3	Signif. ** ** *** ***	N 1024 935 1024 992 992	Coef. -0.2 -0.17 -0.19 -0.26 -0.26	**	N 1024 935 1024 992 992	-8.71 -9.22 -8.38 -6.57 -6.57	Signif. *** *** *** *** ***	N 1024 933 1024 990 990	Coef. -0.28 -0.29 -0.28 -0.25 -0.25	Signif. *** *** *** ***	N 1024 933 1024 990 990	Coef. -1.78 -1.29 -1.84 -1.16 -1.16	* *	N 1024 941 1024 1012 1012	Coef. -0.12 -0.08 -0.12 -0.13 -0.13	Signif. ** * **	N 1024 941 1024 1012 1012
DEF	Methodology	Но	Variety usehold uous Ind			Variety usehole	<u>r</u> by d	н	n t <u>Qualit</u> ouseho inuous	old	н	t <u>Qualit</u> Iouseho <i>inuous</i> i	ld	last mo	ol Absenc onth (kinc ary scho	der &	Schoo last sci (kinde	ol Absen hooling er & prir school)	cycle	in th (Ordin	i <u>ea</u> sym e House al Categ /ariable	ehold gorical	in th (Ordin	Health ing diffi e House al Cater /ariable	ehold gorical	House	<u>ish skin</u> ehold (E vrical va	Binary
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. 5 -0.16 -0.04 -0.09 0.59 0.59	1 *** 1		Coef. 9 -0.02 0.004 -0.01 0.057 0.057	signif.	N 1024 941 1024 1012 1012	Coef. -1.94 -1.33 -1.93 -0.57 -0.57	Signif. * *	N 1024 941 1024 1012 1012	Coef. -0.01 -0.01 -0.01 -0.01 -0.01	Signif. ** ** *	N 1024 941 1024 1012 1012	Coef. 0.173 0.138 0.164 0.026 0.026		N 1024 941 1024 1011 1011	Coef. 0.83 0.713 0.776 0.6 0.6	signif. *	N 1024 941 1024 1012 1012	Coef. -0.09 -0.08 -0.11 -0.28 -0.28	Signif. ** *	N 1024 941 1024 1012 1012	Coef. 0.006 -0.02 -0.01 -0.37 -0.37	Signif. ***	N 1024 941 1024 1012 1012	Coef. 0.007 -0.01 0.006 -0 -0	Signif.	N 1024 941 1024 1012 1012
	Methodology	sympt Housel Categori	<u>s</u> disease coms in t hold (Bin ical Vario	he Iary	sympt Housel Categori	n diseas coms in hold (Bi ical Var	the inary	Diarrh (Ordin	neficiar ea sym al Cate /ariable Signif.	ptoms gorical	Breath (Ordin	Health meficiar iing diff nal Cate Variable Signif.	iculties gorical	Yellowi	neficiary' <u>sh skin</u> (E rrical vari Signif.	Binary	diseas (Binar	ficiary's se symp y Categ (ariable) Signif	toms orical	disea (Binai	ficiary's se symp ry Categ /ariable Signif.	otoms	-					
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	0.013 0.005 0.015 -0.01 -0.01	1 1 1 1	N 1024 941 1024 1012 1012	-0 0.016 0 -0.05 -0.05	** **	N 1024 941 1024 1012 1012	-0.09 -0.06 -0.09 -0.29 -0.29	* *	1024 940 1024 1010 1010	-0.02 -0.13 -0.04 -0.21 -0.21	** **	1024 941 1024 1010 1010	0.006 -0.01 0.005 -0.02 -0.02		1024 941 1024 1012 1012	-0.01 -0.02 -0.01 -0.01 -0.01	5.5m.	1024 941 1024 1012 1012	-0.01 -0 -0.01 -0.03 -0.03	** **	1024 941 1024 1011 1011						

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are dustered at the locality level. The cau a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

		Food	Support				Food Orientation			
				Habit change	Habit change	Habit change	Habit change	Habit change	Habit change	Habit change
		Food insecurity by Household	Food insecurity by Household	perception on food selection by	perception on food selection by	perception on food preparation by	perception on food preparation by	perception on food consumption by	perception on food consumption by	perception by
	Methodology	(Continuous index)	(Categorical index)	Household	Household	Household	Household	Household	Household	Household (Continuous Index)
				(Continuous Index)	(Categorical Index)	(Continuous Index)	(Categorical Index)	(Continuous Index)	(Categorical Index)	
		Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N
	PSM Kernel PSM Nearest Neighbor	-0.72 532 0.504 358	-0.12 * 532 -0.04 358	-0.47 532 0.074 357	-0.13 532 -0.1 357	-0.15 532 -0.28 358	0.022 532 0.005 358	0.35 532 2.49 352	0.034 532 0.067 352	0.089 532 1.105 351
	PSM Stratification	-0.96 532	-0.14 * 532	-0.17 532	-0.12 532	-0.1 532	0.016 532	0.57 532	0.045 532	0.31 532
	PSW robust & cluster s.e. PSW Bootstrapped s.e.	1.83 528 1.83 528	0.34 528 0.34 528	4.54 ** 526 4.54 526	0.075 526 0.075 526	-8.73 *** 529 -8.73 * 529	0.17 529 0.17 529	3.2 * 513 3.2 513	0.26 *** 513 0.26 513	-2.05 510 -2.05 510
	15W bootstrupped ster	1.05 520	0.54 520	4.54 520	0.075 520	Food Orientation		5.2 515	0.20 515	2.05 510
			Habit change	Habit change	Habit change	Habit change				
		Habit change perception by	perception on food	perception on food	perception on food	perception on food	Habit change perception by	Habit change perception by	Diet Diversity by	Diet Diversity by
	Methodology	Household	selection by Beneficiary	selection by Beneficiary	consumption by Beneficiary	consumption by Beneficiary	Beneficiary	Beneficiary	Household (Continuous Index)	Household (Continuous Index)
		(Categorical Index)	(Continuous Index)	(Categorical Index)	(Continuous Index)	(Categorical Index)	(Continuous Index)	(Categorical Index)	(continuous index)	(continuous muex)
		Coef. Signif. N	Coef, Signif, N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N
	PSM Kernel	0.02 532	-13.5 *** 532	-0.37 *** 532	-3.03 532	-0.16 532	-10.1 * 532	-0.27 ** 532	0.043 532	0.004 532
	PSM Nearest Neighbor	0.012 351	-12.5 *** 358	-0.35 *** 358	1.433 353	-0.07 353	-7.52 353	-0.22 * 353	0.876 358	0.076 358
<u>a</u>	PSM Stratification PSW robust & cluster s.e.	0.017 532 -0.14 510	-13.1 *** 532 0.04 528	-0.36 *** 532 0.107 528	-3.32 532 -10.2 * 514	-0.16 532 -0.05 514	-9.99 * 532 -4.11 513	-0.28 ** 532 -0.04 513	-0.15 532 2.03 ** 529	-0.01 532 0.104 529
DEF Rural	PSW Bootstrapped s.e.	-0.14 510	0.04 528	0.107 528	-10.2 514	-0.05 514	-4.11 513	-0.04 513	2.03 529	0.104 529
<b>H</b>			Food Or	ientation	1	Educ	ation		Health	
0										
		Diet <u>Variety</u> by Household	Diet <u>Variety</u> by Household	Diet <u>Quality</u> by Household	Diet <u>Quality</u> by Household	School Absence in last month (kinder &	School Absence in last schooling cycle	Diarrhea symptoms in the Household	Breathing difficulties in the Household	Yellowish skin in the Household (Binary
	Methodology	(Continuous Index)	(Continuous Index)	(Continuous Index)	(Continuous Index)	primary school)	(kinder & primary school)	(Ordinal Categorical Variable)	(Ordinal Categorical Variable)	Categorical variable)
							schooly	variable)	Vanable)	
		Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N
	PSM Kernel	-0.41 532	-0.05 532	-0.37 532	0.017 532	-0.3 * 532	1.46 532	0.095 532	0.03 532	-0 532
	PSM Nearest Neighbor PSM Stratification	-0.79 358 -0.38 532	-0.13 358 -0.04 532	0.091 358 -0.53 532	0.02 * 358 0.017 532	-0.44 358 -0.25 532	1.61 * 358 1.47 532	0.109 358 0.07 532	0.036 358 0.053 532	0.014 358 0.001 532
	PSW robust & cluster s.e.	-0.1 529	-0.12 529	1.93 * 529	-0 529	-0.53 528	-2.47 528	-0.05 529	-0.1 529	0.016 529
	PSW Bootstrapped s.e.	-0.1 529	-0.12 529	1.93 529	-0 529 Health	-0.53 528	-2.47 528	-0.05 529	-0.1 529	0.016 529
									1	
		Eves disease	Gum disease	Beneficiary's	Beneficiary's	Beneficiary's	Beneficiary's Eyes	Beneficiary's Gum		
	Methodology	symptoms in the Household (Binary	symptoms in the Household (Binary	Diarrhea symptoms (Ordinal Categorical	Breathing difficulties (Ordinal Categorical	Yellowish skin (Binary	disease symptoms (Binary Categorical	disease symptoms (Binary Categorical		
	wethodology	Categorical Variable)	Categorical Variable)	Variable)	Variable)	Categorical variable)	Variable)	Variable)		
		Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N	Coef. Signif. N		
	PSM Kernel	-0.06 * 532 -0.04 358	0.034 532 0.057 * 358	0.117 532 0.064 358	0.062 532 0.046 358	0.021 532 0.021 358	-0.01 532 0 358	0.052 532 0.069 ** 358		
	PSM Nearest Neighbor PSM Stratification	-0.04 358	0.036 532	0.098 532	0.046 358	0.021 358	-0 532	0.058 * 532		
	PSW robust & cluster s.e.	-0.03 529	-0 529	0.14 529	-0.09 529	-0.07 529	-0.05 529	-0.04 529		
	PSW Bootstrapped s.e.	-0.03 529	-0 529	0.14 529	-0.09 529	-0.07 529	-0.05 529	-0.04 529	]	

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are dustered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

# VIII.3. INC Results by Sample

		_	_		Food Sup	port										Food Orie	ntation		_			
Methodology	v	VAZ		HA	ŗ	v	ИНZ		BMI		Habit cha food <u>selec</u> (Cont		ousehold	on for	nange perception od <u>selection</u> by old (Categorical Index)	food	ange perce <u>preparatic</u> Iold (Cont Index)	in by	percept prepa Hou	t change tion on food a <u>ration</u> by usehold orical Index)	Habit perceptio <u>consum</u> Hous (Continue	on on <u>option</u> sehole
	Coef. Si	ignif.	N Co	ef. Sign	if. N	Coef. Sig	gnif. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif. N	Coef.	Signif.	N	Coef. S	ignif. N	Coef. Sig	gnif.
PSM Kernel	0.20		1955 0.		1999	0.108	1955	0.046		1955	0.97		1955	0.019	1955	0.575		1955	0.00	1955		
PSM Nearest Neighbor			1854 0.		1854	0.18	1854	0.158		1854	1.07		1849	0.037	1849	0.331		1854	-0.01	1854		
PSM Stratification	0.25		1955 0.			0.09	1955	0.026		1955	0.66		1955	0.017	1955	0.256		1955	-0.01	1955		
PSW robust & cluster s.e.	0.25		1942 0.		1.541	0.06	1939	0.0		1942	0.70		1934	0.02	1934	0.38		1942	0.00	1942		
PSW Bootstrapped s.e.	0.29	••••	1942 0.	44 **	* 1942	0.06	1939	0.0		1942	0.70	rientatio	1934	0.02	1934	0.38		1942	0.00	1942	-0.12	
			-	-		1	-				FOOD	irientatio	n			1			-	-	1	
Methodology	Habit chan on food <u>co</u> Household In	nsumptio	n by Habi		erception by Continuous x)	perce Hous	change ption by sehold ical Index)	on fo	hange per od <u>selectii</u> iary ( <i>Cont</i> <i>Index</i> )	on by		nge perce <u>selection</u> ary (Cate Index)	by	on food	hange perception I <u>consumption</u> by iary ( <i>Continuous</i> Index )	food o	inge perce consumpti- iary (Cate Index)	on by	perce Ben	t change eption by eficiary <i>uous Index</i> )	Habit percep Bene ( <i>Categori</i>	ption ficia
	Coef. Si	ignif.	N Co	oef. Sign	if. N	Coef. Sig	gnif. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif. N	Coef.	Signif.	N	Coef. S	ignif. N	Coef. Sig	znif.
PSM Kernel	0.039	_	1955 0.1	519	1955	0.049	* 1955	1.78	•	1955	0.08	••	1955	-0.179	1955	-0.02		1955	1.185	1955	0.01	
PSM Nearest Neighbor	0.023		1844 0.	35	1839	0.006	1839	2.12	•	1854	0.09	••	1854	-1.24	1846	-0.03		1846	0.946	1846	0.00	
PSM Stratification	0.027		1955 0.:	173	1955	0.032	1955	1.74		1955	0.09	••	1955	-0.797	1955	-0.04		1955	0.894	1955	0.00	
PSW robust & cluster s.e.	0.03		1904 0.	18	1896	0.032	* 1896	1.83	••	1939	0.09	•••	1939	-1.85	1907	-0.05	•	1907	0.39	1904	-0.01	
PSW Bootstrapped s.e.	0.03		1904 0.	18	1896	0.032	1896	1.83	•	1939	0.09	***	1939	-1.85	1907	-0.05		1907	0.39 Heal	1904	-0.01	
Methodology	Household	i <u>versity</u> b I (Contini dex )		Diet <u>Dive</u> usehold (C Inde	Continuous	Hous	<u>ariety</u> by sehold ous Index )		<u>iety</u> by Ho tinuous Inc		Diet <u>Qual</u> (Conti	<u>ity</u> by Hoi nuous Inc			ality by Household tinuous Index )	Hous	<u>e</u> symptom ehold (Ori orical Vari	dinal	(Ordinal	Household Categorical riable )	Yellowish Househo Categorico	ld (B
				ef. Sign	-							a	N	Coef.	1					ignif. N	Coef. Sig	znif.
	Coef. Si	ignif.	N Co		if. N	Coef. Sig	gnif. N	Coef.	Signif.	N	Coef.	Signif.			Signif. N	Coef.	Signif.	N	Coef. S			
PSM Kernel	Coef. Si -0.56			.02	1955 N	-0.21 Coef. Sig	gnif. N 1955	Coef. 0.00	Signif.	N 1955	Coef. -0.77	Signit.	1955	-0.01	Signif. N 1955	Coef. -0.04	Signif.	N 1955	Coef. S 0.0	1955 agrii.		<u> </u>
PSM Kernel PSM Nearest Neighbor				.02					Signif.			Signit.					Signif.				0.0	
	-0.56		1955 -0 1854 0.	.02	1955	-0.21	1955	0.00	Signif.	1955	-0.77	Signit.	1955	-0.01	* 1955	-0.04	Signif.	1955	0.0	1955	0.0 0.0	
PSM Nearest Neighbor	-0.56 -0.43		1955 -0 1854 0.	.02 00 .01	1955 1854	-0.21 -0.23	1955 1854	0.00 -0.01	Signif.	1955 1854	-0.77 -0.66	Signit.	1955 1854	-0.01 -0.01	* 1955 1854	-0.04 -0.04	Signif.	1955 1854	0.0 0.0	1955 1854	0.0 0.0 0.0	
PSM Nearest Neighbor PSM Stratification	-0.56 -0.43 -0.39		1955 -0 1854 0. 1955 -0	.02 00 .01 00	1955 1854 1955	-0.21 -0.23 -0.19	1955 1854 1955	0.00 -0.01 0.00		1955 1854 1955 1942 1942	-0.77 -0.66 -0.58	Signit.	1955 1854 1955	-0.01 -0.01 0.00	* 1955 1854 * 1955	-0.04 -0.04 -0.03	Signif.	1955 1854 1955	0.0 0.0 0.0	1955 1854 1955	0.0 0.0 0.0 0.0	
PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	-0.56 -0.43 -0.39 -0.23	e sympto shold (Bi	1955 -0 1854 0. 1955 -0 1942 0. 1942 0. 1942 0. 1942 th hary th	.02 00 .01 00 00	1955 1854 1955 1942 1942 1942	-0.21 -0.23 -0.19 -0.22 -0.22 Benef <u>Diarrhea</u> (Ordinal 0	1955 1854 1955 1942	0.00 -0.01 0.00 -0.01 -0.01 Benefic diffic	Heal Heal Heal Heal Stary's <u>Bre</u> ulties (On orical Vari	1955 1854 1955 1942 1942 1942 Ith	-0.77 -0.66 -0.58 -0.45	y's <u>Yello</u> v	1955 1854 1955 1942 1942 vish skin	-0.01 -0.01 0.00 -0.01 -0.01 Beneficia sym	* 1955 1854 * 1955 * 1942	-0.04 -0.03 -0.01 -0.01 Benefici sym	Signif. ary's <u>Gum</u> ptoms (Bir orical Vari	1955 1854 1955 1942 1942 disease	0.0 0.0 0.0 0.0	1955 1854 1955 1942	0.0 0.0 0.0 0.0	
PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.56 -0.43 -0.39 -0.23 -0.23 <u>-0.23</u> <u>Eves</u> diseas the House Categoric	e sympto shold (Bi	1955 -0 1854 0. 1955 -0 1942 0. 1942 0. 1944 0	02 00 00 00 00 <u>n</u> disease s e Househo	1955 1854 1955 1942 1942 1942 symptoms in old (Binary <i>Variable</i> )	-0.21 -0.23 -0.19 -0.22 -0.22 Benef <u>Diarrhea</u> (Ordinal 0 Vari	1955 1854 1955 1942 1942 ficiary's symptoms Categorical	0.00 -0.01 0.00 -0.01 -0.01 Benefic diffic	Heal Heal	1955 1854 1955 1942 1942 1942 Ith	-0.77 -0.66 -0.58 -0.45 -0.45 Beneficiar	y's <u>Yellov</u> tegorical	1955 1854 1955 1942 1942 vish skin	-0.01 -0.01 0.00 -0.01 -0.01 Beneficia sym	* 1955 1854 * 1955 * 1942 1942 ary's <u>Eyes</u> disease ptoms (Binary	-0.04 -0.03 -0.01 -0.01 Benefici sym	ary's <u>Gum</u> ptoms (Bir orical Vari	1955 1854 1955 1942 1942 disease	0.0 0.0 0.0 0.0	1955 1854 1955 1942	0.0 0.0 0.0 0.0	
PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.56 -0.43 -0.39 -0.23 -0.23 <u>-0.23</u> <u>Eves</u> diseas the House Categoric	e sympto shold (Bi al Varial	1955 -0 1854 0. 1955 -0 1942 0. 1942 0. 1944 0. 1955 1. 1955 1. 195	02 00 .01 00 00 <u>n</u> disease s e Househo ategorical	1955 1854 1955 1942 1942 1942 symptoms in old (Binary <i>Variable</i> )	-0.21 -0.23 -0.19 -0.22 -0.22 Benef <u>Diarrhea</u> (Ordinal 0 Vari	1955 1854 1955 1942 1942 1942 ficiary's symptoms Categorical iable)	0.00 -0.01 0.00 -0.01 -0.01 Benefic diffic Categ	Heal clary's <u>Bre</u> ulties (On orical Vari	1955 1854 1955 1942 1942 1942 Ith eathing dinal iable)	-0.77 -0.66 -0.58 -0.45 -0.45 Beneficiar (Binary Ca	y's <u>Yello</u> v	1955 1854 1955 1942 1942 vish skin variable)	-0.01 -0.01 0.00 -0.01 -0.01 Beneficia symp Categ	* 1955 1854 * 1955 * 1942 1942 ary's <u>Eves</u> disease ptoms (Binary orical Variable)	-0.04 -0.03 -0.01 -0.01 Benefici sym Categ	ary's <u>Gum</u> ptoms (Bir	1955 1854 1955 1942 1942 disease hary able)	0.0 0.0 0.0 0.0	1955 1854 1955 1942	0.0 0.0 0.0 0.0	
PSM Hearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.56 -0.43 -0.39 -0.23 -0.23 -0.23 <u>Eves</u> diseas the House Categoric	e sympto shold (Bii al Variat	1955         -0           1854         0.           1955         -0           1942         0.           1943         0.           1944         0.           1945         0.           1945         0.           1946         0.           1945         0.	02 00 .01 00 00 00 00 00 00 00 00 00 00 00	1955 1854 1955 1942 1942 1942 Symptoms in old (Binary Variable )	-0.21 -0.23 -0.19 -0.22 -0.22 -0.22 Benef <u>Diarrhea</u> (Ordinal ( Vari	1955 1854 1955 1942 1942 1942 ficiary's symptoms Categorical iable) gnif. N	0.00 -0.01 0.00 -0.01 -0.01 Benefic diffic Categ	Heal clary's <u>Bre</u> ulties (On orical Vari	1955 1854 1955 1942 1942 1942 Ith eathing dinal iable)	-0.77 -0.66 -0.58 -0.45 -0.45 Beneficiar (Binary Ca	y's <u>Yellov</u> tegorical	1955 1854 1955 1942 1942 vish skin variable)	-0.01 -0.01 0.00 -0.01 -0.01 Beneficia sym Categ	* 1955 1854 1955 1942 1942 1942 1942 any's <u>Eves</u> disease ptoms (Binary orical Variable)	-0.04 -0.03 -0.01 -0.01 Benefici sym Categ	ary's <u>Gum</u> ptoms (Bir orical Vari	1955 1854 1955 1942 1942 disease hary able)	0.0 0.0 0.0 0.0	1955 1854 1955 1942	0.0 0.0 0.0 0.0	
PSM Heariest Neighbor SPM Struttication PSW robust & cluster s.e. PSW Bookstrapped s.e. Methodology	-0.56 -0.43 -0.39 -0.23 -0.23 -0.23 <u>Eves</u> diseas the House Categoric <u>Coef.</u> Si -0.01	e sympto shold (Bi al Varial	1955         -0           1854         0.           1955         -0           1942         0.           1942         0.           1942         0.           1942         0.           1955         -0           1942         0.           1942         0.           1942         0.           1955         -0           1955         -0           1854         -0.	02 00 .01 00 00 00 00 00 00 00 00 00 00 00 00 0	1955 1854 1955 1942 1942 1942 wmptoms in old (Binary <i>Variable</i> )	-0.21 -0.23 -0.19 -0.22 -0.22 -0.22 Benef Diarrhea (Ordinal ( Vari	1955 1854 1955 1942 1942 1942 1942 ficiary's symptoms Categorical iable) gnif. N 1955	0.00 -0.01 0.00 -0.01 -0.01 Benefid diffic Categ 0.016	Heal clary's <u>Bre</u> ulties (On orical Vari	1955 1854 1955 1942 1942 1942 Ith eathing dinal iable) N 1955	-0.77 -0.66 -0.58 -0.45 -0.45 -0.45 Beneficiar (Binary Ca	y's <u>Yellov</u> tegorical	1955 1854 1955 1942 1942 1942 wish skin variable) N 1955	-0.01 -0.01 0.00 -0.01 -0.01 Beneficia sym Categ Categ 0.00	* 1955 1854 1955 1952 1942 1942 1942 1942 1942 1942 1942	-0.04 -0.03 -0.01 -0.01 Benefici sym Categ Coef. -0.01	ary's <u>Gum</u> ptoms (Bir orical Vari	1955 1854 1955 1942 1942 disease hary able) N 1955	0.0 0.0 0.0 0.0	1955 1854 1955 1942	0.0 0.0 0.0 0.0	
PSM Hearest Neighbor PSM Straffication PSW robust & cluster s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Kernel	-0.56 -0.43 -0.33 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.23 -0.24 -0.25 -0.25 -0.23	e sympto shold (Bi al Varial	1955         -0           1854         0.           1955         -0           1942         0.           1942         0.           1942         0.           1942         0.           1955         -0           1955         -0           1955         -0           1955         -0.           1955         -0.	02 00 .01 00 00 00 00 00 00 00 00 00 00 00 00 0	1955 1854 1955 1942 1942 1942 :ymptoms in kd (Binary Variable ) 1955 1854	-0.21 -0.23 -0.19 -0.22 -0.22 -0.22 Benef <u>Diarrhea</u> (Ordinal ( Vari	1955 1854 1955 1942 1942 1942 1942 1942 1942 1942 1942	0.00 -0.01 0.00 -0.01 -0.01 Benefic diffic Categ Coef. 0.016 0.053	Heal clary's <u>Bre</u> ulties (On orical Vari	1955 1854 1955 1942 1942 1942 1942 Ith eathing dinal iable) N 1955 1854	-0.77 -0.66 -0.58 -0.45 -0.45 -0.45 Beneficlar (Binary Ca (Binary Ca -0.01 -0.01	y's <u>Yellov</u> tegorical	1955 1854 1955 1942 1942 1942 wish skin variable) N 1955 1854	-0.01 -0.01 0.00 -0.01 -0.01 Beneficia sym Categ Categ 0.00 0.00	* 1955 1854 1955 1942 1942 1942 any's <u>Eves</u> disease ptoms (Binary orical Variable) <u>Signif. N</u> 1955 1854	-0.04 -0.03 -0.01 -0.01 -0.01 Benefici Sym Categ Coef. -0.01 -0.02	ary's <u>Gum</u> ptoms (Bir orical Vari	1955 1854 1955 1942 1942 disease hary able) N 1955 1854	0.0 0.0 0.0 0.0	1955 1854 1955 1942	0.0 0.0 0.0 0.0	

						Food S	Support								Food Orie	ntation				
	Methodology		WAZ		HAZ			NHZ	BMI		perceptic <u>select</u> Hous	change on on food <u>tion</u> by sehold ous Index)	percept <u>sele</u> Hou	change on on food <u>tion</u> by sehold rical Index)	Habit cl perception <u>preparat</u> House (Continuou	i on food tion by hold	Habit c perception <u>prepara</u> House (Categoric	n on food a <u>tion</u> by ehold	Habit cha perception <u>consumpti</u> Househ (Continuous	on food ion by old
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	Coef. 0.214 0.183 0.201 0.23 0.23	5ignif. / ** 10 9: * 10 ** 9: ** 9:	10 0. 16 0. 10 0. 19 0	Coef. Signif. 0.327 ** 0.249 * 0.311 ** 0.39 *** 0.39 ***	N 1010 936 1010 999 999	Coef. S 0.029 0.042 0.022 -0.02 -0.02	ignif. N 1010 936 1010 998	Coef. Signif -0.02 0.012 -0.03 -0.08	N 1010 936 1010 999 999	Coef. Sig 0.992 -0.54 0.505 1.36 1.36	nif. N 1010 933 1010 994 994	Coef. 5 0.042 0.007 0.042 0.06 0.06	1010 933 1010 * 994	Coef. Sign -0.13 -0.46 -0.4 -0.48	1010 936 1010 999	Coef. Sigr -0.01 -0.01 -0.02 -0.01	1010 936 1010 999	Coef. Signif -0.49 -1.4 -0.91 -0.46	N 1010 933 1010 980 980
	PSW Bootstrapped s.e.	0.23	•• 9	9 0	0.39 ***	999	-0.02	998	-0.08	999		ientation	0.06	994	-0.48	999	-0.01	999	-0.46	980
	Methodology	percep <u>consi</u> Ho (Categ	it change tion on fo <u>imption b</u> usehold prical Inde	, (	Habit char perception Househol (Continuous I	ld Index)	perce Hou (Catego	t change eption by usehold rical Index)	Habit cha perception o <u>selectior</u> Benefici ( <i>Continuous</i>	on food by ary Index)	Habit perceptic <u>select</u> Bene ( <i>Categor</i> )	change on on food tion by ficiary fical Index)	percept <u>consu</u> Ben ( <i>Contine</i>	change on on food nption by eficiary nous Index)	Habit ch perception <u>consump</u> Benefi ( <i>Categoric</i>	tion food tion by ciary al Index)	Habit c percept Benefi ( <i>Continuo</i>	tion by iciary ous Index)	Habit cha perceptic Benefici ( <i>Categorica</i>	on by iary I Index)
sk	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	Coef. -0.04 0.015 0.022 0.04	Signif. 10 93 10 94	10 0. 13 -0 10 -	Coef. Signif. 0.041 -0.85 -0.3 -0.06	N 1010 930 1010 975	Coef. S 0.012 -0.03 -0 -0	ignif. N 1010 930 1010 975	Coef. Signif 0.508 -0.72 0.371 0.95	N 1010 936 1010 999	0.056 0.029 0.057 0.094	nif. N 1010 936 1010 ** 999	Coef. 5 -2.44 -1.36 -2.49 -3.65	1010 935 1010 * 984	Coef. Sign -0.06 -0.03 -0.06 -0.08 **	1010 935 1010 984	Coef. Sigr -0.69 -1.02 -0.8 -1.03	nif. N 1010 935 1010 984	Coef. Signif -0.05 -0.06 -0.05 -0.04	f. N 1010 935 1010 984
8	PSW Bootstrapped s.e.	0.04	9	- 0	0.06	975	-0	975	0.95	999	0.094 *	* 999	-3.65	* 984	-0.08 **	984	-1.03	984	-0.04	984
INC Boys	Methodology	Но	Diversity b usehold nuous Inde		Diet <u>Diversit</u> Househo (Continuous I	ld	Hou	Food Ori <u>ariety</u> by usehold uous Index)	Diet <u>Varie</u> Househ ( <i>Continuous</i>	old	Hous	uality by ehold ous Index)	Hou	<u>uality</u> by sehold rous Index)	Diarrhea in the Ho (Ordinal Ca Varial	usehold tegorical	Breathing of in the Ho (Ordinal Co Varia	difficulties ousehold ategorical	<u>Yellowish ski</u> Household Categorical v	(Binary
			Signif.		Coef. Signif.	N		ignif. N	Coef. Signif			nif. N		gnif. N	Coef. Sign		Coef. Sigr		Coef. Signif	
1	PSM Kernel	-0.46	10	10 -0	0.02	1010	-0.3	1010	-0	1010	-0.76	1010	-0.01	* 1010	-0.05	1010	0.037	1010	-0.02	1010
	PSM Nearest Neighbor	-0.46 -0.34	10	10 -0 16 0.	0.02	1010 936	-0.3 -0.24	1010 936	-0 -0.02	1010 936	-0.76 -0.59	1010 936	-0.01 -0.01	* 1010 936	-0.05 -0.03	1010 936	0.037 0.033	1010 936	-0.02 -0.02	1010 936
	PSM Nearest Neighbor PSM Stratification	-0.46 -0.34 -0.31	10 9: 10	10 -0 16 0. 10 -0	0.02 0.002 0.02	1010 936 1010	-0.3 -0.24 -0.26	1010 936 1010	-0 -0.02 -0.02	1010 936 1010	-0.76 -0.59 -0.57	1010 936 1010	-0.01 -0.01 -0.01	* 1010 936 * 1010	-0.05 -0.03 -0.05	1010 936 1010	0.037 0.033 0.048	1010 936 1010	-0.02 -0.02 -0.01	1010 936 1010
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	-0.46 -0.34 -0.31 -0.37	10 9: 10 9:	10 -0 16 0. 10 -0 19 -0	0.02 0.002 0.02 0.02 0.02	1010 936 1010 999	-0.3 -0.24 -0.26 -0.24	1010 936 1010 999	-0 -0.02 -0.02 -0.72	1010 936 1010 999	-0.76 -0.59 -0.57 -0.61	1010 936 1010 999	-0.01 -0.01 -0.01 -0.01	* 1010 936 * 1010 * 999	-0.05 -0.03 -0.05 -0.03	1010 936 1010 999	0.037 0.033 0.048 0.041	1010 936 1010 999	-0.02 -0.02 -0.01 -0.01	1010 936 1010 999
	PSM Nearest Neighbor PSM Stratification	-0.46 -0.34 -0.31	10 9: 10	10 -0 16 0. 10 -0 19 -0	0.02 0.002 0.02	1010 936 1010	-0.3 -0.24 -0.26	1010 936 1010	-0 -0.02 -0.02 -0.72 -0.72	1010 936 1010 999 999	-0.76 -0.59 -0.57	1010 936 1010	-0.01 -0.01 -0.01	* 1010 936 * 1010	-0.05 -0.03 -0.05	1010 936 1010	0.037 0.033 0.048	1010 936 1010	-0.02 -0.02 -0.01	1010 936 1010
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	-0.46 -0.34 -0.31 -0.37 -0.37 <u>Eve</u> symp House	10 9: 10 9:	10 -( 10 -( 10 -( 19 -( 10	0.02 0.002 0.02 0.02 0.02	1010 936 1010 999 999 999	-0.3 -0.24 -0.26 -0.24 -0.24 -0.24 Bene <u>Diarrhea</u> (Ordinal	1010 936 1010 999	-0 -0.02 -0.02 -0.72	1010 936 1010 999 999 1 rry's ficulties egorical	-0.76 -0.59 -0.57 -0.61 -0.61 Benef Yellowish	1010 936 1010 999	-0.01 -0.01 -0.01 -0.01 -0.01 Benefic disease (Binary	* 1010 936 * 1010 * 999	-0.05 -0.03 -0.05 -0.03	1010 936 1010 999 999 y's <u>Gum</u> mptoms tegorical	0.037 0.033 0.048 0.041	1010 936 1010 999	-0.02 -0.02 -0.01 -0.01	1010 936 1010 999
	PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.46 -0.34 -0.31 -0.37 -0.37 <u>Eve</u> symp House	10 9: 10 9: 9: 9: 5: oms in the hold (Bina ical Variat	10 -(1 16 0, 10 -(1 19 -(1 19 -(1 10 -(1 16 -(1 10 -(1 19 -(1 19 -(1 19 -(1 19 -(1 19 -(1 19 -(1 19 -(1) 19 -(1 19 -(1) 19 -(1) 10 -(1) 1	0.02 0.002 0.002 0.02 0.02 0.02 0.02 <u>Gum</u> disea symptoms ir Household (E	1010 936 1010 999 999 ase h the Binary triable)	-0.3 -0.24 -0.26 -0.24 -0.24 -0.24 Bene <u>Diarrhea</u> (Ordinal Va	1010 936 1010 999 999 eficiary's a symptoms Categorical	-0 -0.02 -0.02 -0.72 -0.72 Healtl Beneficia Breathing dif (Ordinal Cato	1010 936 1010 999 999 1 n rry's ficulties egorical e)	-0.76 -0.59 -0.57 -0.61 -0.61 Benef Yellowish Categoric	1010 936 1010 999 999 iciary's s <u>kin</u> (Binary	-0.01 -0.01 -0.01 -0.01 -0.01 Benefic disease (Binary	* 1010 936 * 1010 * 999 * 999 * 999 symptoms Categorical iable)	-0.05 -0.03 -0.05 -0.03 -0.03 -0.03 Beneficiar disease sy (Binary Cal	1010 936 1010 999 999 y's <u>Gum</u> mptoms tegorical ble)	0.037 0.033 0.048 0.041	1010 936 1010 999	-0.02 -0.02 -0.01 -0.01	1010 936 1010 999

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are dustered at the locality level. The causal significant errors are used to be structural equations consider locality fixed effects.

						Food	Support										Food C	rientation					
	Methodology		WAZ		HA			WHZ			BMI		percep <u>sele</u> Ho	it change tion on food <u>action</u> by usehold nuous Index)	Habit chi perception <u>selection</u> Househ (Categorica	on food n by old	Habit percept <u>prepa</u> Hou	t change ion on food <u>ration</u> by isehold Jous Index)	perce pre H	bit change ption on foo paration by ousehold gorical Inde		Habit ch perception <u>consumpt</u> Househ Continuou	on food ion by old
		Coef.	Signif.	N	Coef. Sign	f. N	Coef.	Signif.	N	Coef.	Signif.	N	Coef.	Signif. N	Coef. Signif	F. N	Coef. S	ignif. N	Coef.	Signif. N	i c	oef. Signi	F. N
	PSM Kernel	0.314	***	940	0.36 **	940	0.21		940	0.143		940	1.074	940	-0	940	1.31	940	0.008	94	0 0.	765	940
	PSM Nearest Neighbor	0.386	***	884	0.301	884	0.36	**	884	0.314	*	884	0.528	882	0	882	0.572	884	-0.01	88		492	877
	PSM Stratification	0.298	***	940	0.338 **	940	0.204		940	0.14		940	0.725	940	-0.01	940	0.884	940	0.001	94		.444	940
	PSW robust & cluster s.e.	0.39	***	943	0.48 ***		0.207	•	941	0.13		943	0.83	940	-0.02	940	1.23	943	0.005	94		.14	924
	PSW Bootstrapped s.e.	0.39		943	0.48 ***	943	0.207		941	0.13		943	0.83 Food (	940 Orientation	-0.02	940	1.23	943	0.005	94	13 U	.14	924
	Methodology	percej <u>cons</u> Hi (Categ	bit chan ption on <u>sumption</u> ousehol gorical Ir	i food <u>n</u> by d ndex)	Habit ch percepti Housel (Continuou	on by Iold s Index)	per H (Cate	bit chan ception lousehol gorical li	by Id ndex)	perce <u>Se</u> B ( <i>Cont</i>	bit chan ption on <u>election</u> t eneficiar inuous li	n food oy ∩y ndex)	Hab percep <u>sele</u> Ber ( <i>Categ</i>	it change tion on food <u>ection</u> by neficiary <i>orical Index</i> )	Habit ch perception <u>consumpt</u> Benefic ( <i>Continuou</i>	on food ion by iary s Index)	percept <u>consur</u> Ben ( <i>Catego</i>	t change ion on food <u>mption</u> by eficiary <i>rical Index</i> )	per Be ( <i>Conti</i>	bit change ception by eneficiary inuous Inde:		Habit ch perceptic Benefic Categorica	on by iary I Index)
			Signif.	N	Coef. Sign			Signif.	N	Coef.	Signif.	N		Signif. N	Coef. Signif		Coef. S		Coef.			oef. Signi	
	PSM Kernel	0.037		940	1.156	940	0.096	**	940	3.69	**	940	0.133	** 940	2.293	940	0.016	940	3.64	** 94		077 *	940
	PSM Nearest Neighbor PSM Stratification	0.013		877 940	0.934 0.687	875 940	0.015	**	875 940	2.9 3.5	**	884 940	0.114	** 884 ** 940	1.745 1.295	877 940	-0.01 -0	877 940	2.83 3.1	* 87		036 056	877 940
s	PSW stratification PSW robust & cluster s.e.	0.035		940 924	0.687	940	0.076	**	940	3.5	***	940 940	0.124	** 940	0.22	940	-0.02	940	2.38	** 92		.056	940 920
NC Girls	PSW Bootstrapped s.e.	0.008		924	0.63	921	0.08	**	921	3.42	***	940	0.1	** 940	0.22	923	-0.02	923	2.38	* 92		.05	920
ů.	15W bootstrupped s.e.	0.000		524	0.05	521	0.00	F		ientatio	n	540	0.1	540	0.11	525	0.02	525	2.50	Health		.05	520
		Diet	Diversit		Diet <u>Dive</u> House			t <u>Variety</u> ousehol			t <u>Variety</u>		Diet	<u>Quality</u> by usehold	Diet <u>Qual</u> Househ	old	in the I	symptoms lousehold	in th	ing difficult e Househol	d 1	ellowish sk Household ategorical	(Binary
	Methodology		ousehol inuous II		(Continuou			inuous I	ndex)		lousehol inuous II			nuous Index)	(Continuou:	index)		Categorical riable)		al Categorie /ariable)	. <i>ur</i>   G	regorieur	,
	Methodology	(Conti				s Index)	(Cont		ndex)				(Contin		(Continuous		Va			/ariable)	6	-	
	Methodology PSM Kernel	(Conti	inuous II	ndex)	(Continuou	s Index)	(Cont	inuous I		(Cont	inuous Ir	ndex)	(Contin	nuous Index)			Va	riable)	· 1	/ariable)	i c	-	
		(Conti	inuous II	ndex)	(Continuou Coef. Sign	s Index) f. N	(Cont	inuous I	N	(Cont Coef.	inuous Ir	ndex)	(Contin	Signif. N	Coef. Signit	f. N	Va Coef. S	riable) ignif. N	Coef.	/ariable) Signif. N	1 C	oef. Signi	F. N
	PSM Kernel	(Conti Coef. -0.77	inuous II	ndex) N 940	(Continuou Coef. Sign -0.02	f. N 940	(Cont Coef. -0.14	inuous I. Signif.	N 940	(Cont Coef. 0.027	inuous Ir	ndex) N 940	(Contin	Signif. N 940	Coef. Signif	F. N 940	Va Coef. Si -0	riable) ignif. N 940	Coef. -0.07	/ariable) Signif. N 94	1 C 10 0. 34 0.	oef. Signi 026 ** 037 *** 026 *	F. N 940
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e.	(Conti Coef. -0.77 -0.12 -0.53 -0.26	inuous II	N 940 884 940 943	(Continuou -0.02 -0.025 -0.01 0.012	f. N 940 884 940 943	(Cont Coef. -0.14 -0.44 -0.16 -0.14	inuous I. Signif.	N 940 884 940 943	(Cont Coef. 0.027 -0.01 0.028 0.02	inuous Ir	N 940 884 940 943	(Contin Coef. 9 -0.91 -0.56 -0.69 -0.4	5ignif. N 940 884 940 943	-O O O -O -O	F. N 940 884 940 943	Coef. Si -0 -0.06 -0.01 -0	riable) ignif. N 940 884 940 943	-0.07 -0.05 -0.07 -0.1	(ariable) Signif. M 94 88 94 94 94	4 C 10 0. 14 0. 14 0. 14 0. 15 0. 15 0. 15 0. 15 0. 15 0. 16 0. 17 0. 18 0. 19 0. 10 0. 10. 10 0. 10 0.	oef. Signi 026 ** 037 *** 026 * 0.03 **	F. N 940 884 940 943
	PSM Kernel PSM Nearest Neighbor PSM Stratification	(Conti Coef. -0.77 -0.12 -0.53	inuous II	N 940 884 940	(Continuou Coef. Sign -0.02 0.025 -0.01	f. N 940 884 940	(Cont Coef. -0.14 -0.44 -0.16	inuous I. Signif.	N 940 884 940	(Cont Coef. 0.027 -0.01 0.028	inuous II	N 940 884 940	(Contin Coef. 5 -0.91 -0.56 -0.69	5ignif. N 940 884 940	-O O O	. N 940 884 940	Va Coef. Si -0 -0.06 -0.01	riable) ignif. N 940 884 940	-0.07 -0.05 -0.07	(ariable) Signif. N 94 88 94	4 C 10 0. 14 0. 14 0. 14 0. 15 0. 15 0. 15 0. 15 0. 15 0. 16 0. 17 0. 18 0. 19 0. 10 0. 10. 10 0. 10 0.	oef. Signi 026 ** 037 *** 026 *	. N 940 884 940
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	PSM Kernel PSM vearest Neighbor PSM Stratification PSW robust & Cutter s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Nearest Neighbor PSM Stratification	(Conti -0.77 -0.12 -0.53 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 Coef. 0.013 0.033 0.018	Signif. Signif	ndex) N 940 884 943 943 943 943 943 943 943 94	(Continuou Coef, Sign -0.02 -0.01 0.012 0.012 0.012 -0.01 0.012 -0.01 Coef, Sign 0.008 -0.01 0	s Index)           f.         N           940         884           940         943           943         943           943         943           943         943           944         940           945         in the (Binary //ariable)           f.         N           940         884           940         844	(Cont -0.14 -0.14 -0.16 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14 -0.14 -0.16 -0.14	inuous I. Signif. ** neficiar <u>tea</u> sym al Categ /ariable	N 940 884 943 943 943 943 943 943 943 940	(Cont 0.027 -0.01 0.028 0.02 0.02 0.02 Be Breath (Ordir (Ordir 0.004 -0.03 0	Health Health Ineficiary Ing diffinal Catego Variable	N 940 884 943 943 943 943 943 943 943 943 943 94	(Contin -0.91 -0.56 -0.69 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4	signif. N 940 884 943 943 943 943 943 943 943 943 943 94	Coef.         Signit           -0         0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0.01           0.002         -0.01	F. N 940 884 943 943 943 943 943 943 *s <u>Eves</u> pptoms egorical le) F. N 940 884 940	Va Coef. S -0 -0.06 -0.01 -0 -0 Benefic disease (Binary Va Coef. S -0.01 -0.04 -0.04 -0.04 -0.05 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	iable) 940 884 940 943 943 943 943 943 943 symptoms Categorical riable) 940 ** 884 940	Coef. -0.07 -0.05 -0.07 -0.1 -0.1	(ariable) Signif. M 94 88 94 94 94	4 C 10 0. 14 0. 14 0. 14 0. 15 0. 15 0. 15 0. 15 0. 15 0. 16 0. 17 0. 18 0. 19 0. 10 0. 10. 10 0. 10 0.	oef. Signi 026 ** 037 *** 026 * 0.03 **	F. N 940 884 940 943
	PSM Kernel PSM Nearest Neighbor PSM straitfication PSW robust & cluster s.e. PSW Boolstrapped s.e. Methodology PSM Kernel PSM Nearest Neighbor PSM Straitfication PSM robust & cluster s.e.	(Conti -0.77 -0.12 -0.53 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.20	Signif. Signif	ndex) 940 940 884 943 943 943 943 944 940 884 940 940 940 940 940	(Continuou 0.02 0.025 0.012 0.012 0.012 0.012 0.012 0.012 Categorical Categorical Categorical Cooff, Sign 0.008 -0.01 0	s Index)           940           943           943           943           943           943           943           943           943           943           943           943           945           946           947           940           940           940           943	(Cont -0.14 -0.03 -0 -0 -0.03 -0 -0 -0.007	inuous I. Signif. ** neficiar <u>tea</u> sym al Categ /ariable	N 940 884 943 943 943 943 943 943 N 940 884 940 940 943	(Cont. 0.027 -0.01 0.028 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Health Health Ineficiary Ing diffinal Catego Variable	N 940 884 940 943 943 943 943 943 N 940 884 940 943	(Contin -0.91 -0.56 -0.69 -0.4 -0.4 Ben Yellowis Categor Coef. [3 0.003 0.003 0.009 0 0.004	signif. N 940 884 940 943 943 943 943 943 943 943 943 943 943	Coef.         Signit           -0         -0           0         -0           -0         -0	N         940           884         940           943         943           943         943           's Eyes         sgorical           le)         940           884         940           943         943	Va -0.06 -0.06 -0.01 -0 -0 -0 Benefic disease (Binary Va Coef. S -0.01 -0.04 -0.02	ignif. N 940 884 943 943 943 943 943 943 symptoms Categorical riable) ignif. N 940 ** 884 940	Coef. -0.07 -0.05 -0.07 -0.1 -0.1	(ariable) Signif. M 94 88 94 94 94	4 C 10 0. 14 0. 14 0. 14 0. 15 0. 15 0. 15 0. 15 0. 15 0. 16 0. 17 0. 18 0. 19 0. 10 0. 10. 10 0. 10 0.	oef. Signi 026 ** 037 *** 026 * 0.03 **	F. N 940 884 940 943
	PSM Kernel PSM vearest Neighbor PSM Stratification PSW robust & Cutter s.e. PSW Bootstrapped s.e. Methodology PSM Kernel PSM Nearest Neighbor PSM Stratification	(Conti -0.77 -0.12 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.26 -0.20 -0.013 -0.013 -0.013 -0.013 -0.013 -0.012 -0.02 -0.02	Signif.	ndex) 940 884 943 943 943 943 943 884 N 940 943 943 943	(Continuou coef. Sign -0.02 0.025 -0.01 0.012 0.012 0.012 0.012 Categorical Categorical Coef. Sign 0.008 -0.01 0 -0.01	s Index) f. N 940 884 943 943 943 943 943 943 940 884 940 884 940 943 943	(Cont -0.14 -0.14 -0.14 -0.14 -0.14 -0.14 Be <u>Diarrh</u> (Ordin V 0.007 -0.03 -0 0.007 0.007	inuous I Signif. ** neficiarr ea sym al Categ yariable. Signif.	N 940 884 943 943 943 943 943 940 940 940 943 943	(Cont. Coef. 0.027 -0.01 0.028 0.02 0.02 0.02 0.02 0.02 0.02 Coef. 0.004 -0.03 0 -0.02 -0.02	Health Health Ineficiary Ing Giffi nal Categ Variable	N         940           943         943           943         943           943         943           944         943           945         943           946         940           943         943           943         943	(Contin -0.91 -0.56 -0.69 -0.4 -0.4 Ben Yellowis Categor Coef. [3 0.003 0.003 0.009 0 0.004 0.004	Signif. N 940 884 940 943 943 943 943 943 943 943 943 943 943	Coef.         Signif           -0         0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0         -0           -0.01         -0.01           -0.01         -0.01           -0.01         -0.01	N           940           884           940           943           943           943           943           943           943           943           943           943           946           947           948           949           949           940           884           940           840           943           943           943	Va -0 -0.06 -0.01 -0 -0 -0 Benefic disease (Binary Va Coef. S -0.01 -0.04 -0.03 -0.03	ignif. N 940 943 943 943 943 943 943 943 symptoms Categorical riable) 940 ** 844 940 ** 943	Coef. -0.07 -0.07 -0.07 -0.1 -0.1	Yariable) Signif. <u>P</u> 94 88 94 94 94 94	Ci 10 0. 10 0. 10 0. 10 0. 10 0. 10 0. 13 0. 13 0. 13 0. 13 0. 13 0. 14 0. 15 0. 15 0. 16 0. 17 0. 17 0. 18 0. 19 0. 10 0.	oef. Signi 026 ** 037 *** 026 * .03 *	N 940 943 943 943

Note: Is significant at the systematic event of the systematic at the systematic at

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						Food S	upport									Food	Orient	ation				
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	Methodology		WAZ		HAZ			WHZ		BMI		lection by ousehold		selection Househo			oaratio ouseho			aration by usehold	consumpti Househ	
												inuous Inde	~	(Categorical		(Contin				orical Index)	(Continuous	
											(0011	indous inde	~	(cureBoncur	macky	(contin	nuous	mucky	Curche	incur macky	(continuou.	5 mack)
		Coef. S	ignif. N	Coef	f. Signif.	N	Coef.	Signif. N	Coef. S	Signif. N	Coef.	Signif. N		Coef. Signif.	N	Coef.	Signif.	N	Coef. 5	ignif. N	Coef. Signif	f. N
	PSM Kernel	0.227	* 144	3 0.43	5 ***	1443	-0	1443	-0.09	144		14	43	0.029	1443	0.736	-	1443	-0	1443	-0.38	1443
	PSM Nearest Neighbor	0.181	135			1357	0.054	1357	-0	135	1.781	13		0.039		1.063		1357	-0.01	1357	-0.45	1357
	PSM Stratification	0.209	* 144			1443	-0.05	1443	-0.14	144		14		0.034	1443	0.461		1443	-0.01	1443	-0.75	1443
	PSW robust & cluster s.e. PSW Bootstrapped s.e.	0.21	1.40	2 0.46		1432 1432	-0.07 -0.07	1429 1429	-0.15 -0.15	143 143		14 14		0.035	1424 1424	0.86 0.86		1432 1432	-0 -0	1432 1429	-0.44 -0.44	1404 1404
	PSW BOOIStrapped S.e.	0.21	143	2 0.40	5	1452	-0.07	1429	-0.15	145.		I Orientation		0.055	1424	0.86		1452	-0	1429	-0.44	1404
		Habi	t change		Habit cha		Hai	oit change	Hab	it change	На	bit change		Habit cha	nge	Hab	oit cha	nge	Habi	it change	Habit cha	
			ion on foo		Habit cha erception			ception by	percept	tion on food		ption on foo	bd	perception o				n food		eption by	perceptic	
	Methodology		mption by		Househo			ousehold		ection by		lection by		consumpti			umptic			eficiary	Benefici	
			usehold prical Index	(Cor	ntinuous	Index)	(Categ	orical Index)		neficiary 1 <i>uous Index</i> )		eneficiary gorical Inde		Beneficia (Continuous		Be (Categ	neficia		(Contin	uous Index)	(Categorica	l Index)
		(catego	incar muex	'   · · ·					(contin	iuous muex)	(core	goncarmaes	^/	(continuous	muckj	(cutey	oncui	muexj				
		Coef. S	ignif. N	Coef	f. Signif.	N	Coef.	Signif. N	Coef.	Signif. N	Coef.	Signif. N		Coef. Signif.	. N	Coef.	Signif.	N	Coef. S	ignif. N	Coef. Signif	f. N
	PSM Kernel	0.023	144			1443	0.058	1443	1.241	144		14		-1.64	1443	-0.05	5-5-11-	1443	0.164	1443	-0.02	1443
	PSM Nearest Neighbor	0	135			1344	0.043	1344	1.159	135		13		-1.92	1351	-0.03		1351	0.001	1351	-0.02	1351
<b>_</b>	PSM Stratification	0.013	144			1443	0.045	1443	1.542	144		* 14		-2.3	1443	-0.07		1443	0.091	1443	-0.03	1443
pa	PSW robust & cluster s.e.	0.01	140			1396	0.05	** 1396	1.52	142		** 14		-2.65 *	1408	-0.07	**	1408	-0.15	1405	-0.03	1405
5	PSW Bootstrapped s.e.	0.01	140	4 0.34		1396	0.05	1390	1.52 ientation	142	0.09	** 14	29	-2.65 *	1408	-0.01	**	1408	-0.15	1405 lealth	-0.03	1405
INC Urban								1000.01	lentation		1								1	icaltii		
_ ≤																Director			Burnetter			
			iversity by	Di	et <u>Divers</u>			Variety by		Variety by		t <u>Quality</u> by		Diet Quali		Diarrhe in the	ea sym House			ig difficulties Household	Yellowish ski	
	Methodology		usehold		Househo			ousehold		usehold		ousehold		Househo (Continuous		(Ordina				l Categorical	Household	
		(Contin	uous Index	(CO	ntinuous	index)	Conti	nuous Index)	(Contin	uous Index)	Cont	inuous Inde	°	(continuous	index)	v	ariable	e)	Va	riable)	Categorical v	variable)
		Coef. S	ignif. N	Coef	f. Signif.	N	Coef.	Signif. N	Coef.	Signif. N	Coef.	Signif. N	-	Coef. Signif.	N	Coef.	Signif.	N	Coef. S	ignif. N	Coef. Signif	f. N
	PSM Kernel	-0.49	144			1443	-0.05	1443	0.025	144		14	43	-0.01 **	1443	-0.04	-	1443	-0.01	1443	0.009	1443
	PSM Nearest Neighbor	-0.47	135		3	1357	-0.11	1357	0.01	135		13		-0.01	1357	-0.06		1357	-0.08	1357	0.009	1357
	PSM Stratification	-0.31 -0.14	144 143			1443 1432	-0.02 -0.02	1443 1432	0.021	144 143		14		-0.01 ** -0.01 ***	1443 1432	-0.03 -0.01		1443 1432	-0.02 -0.01	1443 1432	0.011 0.01	1443 1432
	PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.14	143			1432	-0.02	1432	0.01	143.		14.		-0.01 **	1432	-0.01		1432	-0.01	1432	0.01	1432
	15W bootstrupped s.e.	0.14	140	2 0.00	5	1452	0.02	1451		Health	0.10	14.	52	0.01	1452	0.01		1452	0.01	1452	0.01	1452
																			1			
		Eve	disease		Sum dise	200	Box	neficiary's	Ron	eficiary's				Beneficiary'	r Evor	Benef	icianda	Gum				
			oms in the		mptoms i			ea symptoms		ne difficultie		neficiary's		disease sym		diseas						
	Methodology		old (Binar		usehold (			al Categorical	(Ordina	I Categorica		i <u>sh skin</u> (Bina orical variab		(Binary Cate		(Binar						
		Categori	cal Variabl	e) Cate	gorical Ve	ariable)	v	ariable)	Va	ariable)	Categ	orical variab	(e)	Variable	e)	v	ariable	≥)				
		Coef. S	ignif. N	Coef	f. Signif.	N	Coef.	Signif. N	Coef.	Signif. N	Coef.	Signif. N		Coef. Signif.	N	Coef.	Signif.	N	-			
	PSM Kernel	-0.02	144			1443	-0.02	1443	0.027	144		14		0.013	1443	-0.01	0	1443	1			
	PSM Nearest Neighbor	-0.01	135			1357	-0.05	1357	0.048	135		13		0.026	1357	-0.01		1357				
	PSM Stratification	-0.01	144		-	1443	-0.03	1443	0.045	144		14		0.012	1443	-0.01		1443				
	PSW robust & cluster s.e. PSW Bootstrapped s.e.	-0.01 -0.01	143 143			1432 1432	0.006	1432 1432	0.01	143	0.003 0.003	14		0.006	1432	-0.01		1432 1432				
				2 -0.0					0.01							-0.01						

Note \* is significant at the 90% configuration level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Nobust standard errors are ductered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.

							Food S	upport											Food O	rientation					
	Methodology		WAZ			HAZ			WHZ			BMI		percep <u>sel</u> He	bit chang ption on lection b ousehold inuous In	food y	Habit chai perception o <u>selection</u> Househo (Categorical	n food by Id	percepti prepa Hou	change on on food r <u>ation</u> by sehold ious Index)	perce pre H	bit char ption or paration louseho gorical I	n food <u>n</u> by Id	percept <u>consu</u> Ho	it change tion on food <u>imption</u> by usehold uous Index)
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. 0.384 0.395 0.367 0.56 0.56	Signif. *** *** *** ***	N 512 474 512 510 510	Coef. 0.155 0.121 0.066 0.29 0.29	Signif.	N 512 474 512 510 510	Coef. 0.421 0.473 0.47 0.557 0.557	Signif. * * * **	N 512 474 512 510 510	Coef. 0.423 0.483 0.485 0.566 0.566	Signif. * *	N 512 474 512 510 510	Coef. 1.82 1.473 1.41 -0.09 -0.09	Signif.	N 512 474 512 510 510	Coef. Signif. 0.035 0.04 0.019 -0.02 -0.02	N 512 474 512 510 510	Coef. Si 0.351 -0.55 0.279 -1.27 -1.27	gnif. N 512 474 512 510 510	Coef. 0.017 -0 0.012 0.001 0.001	Signif.	N 512 474 512 510 510	Coef. 5 2.023 2.071 1.768 1.16 1.16	iignif. N * 512 472 * 512 500 500
	Methodology	perce cons H	bit char ption or <u>sumptio</u> ouseho gorical I	n food <u>n</u> by Id	per Ho	oit chan ception ouseholi nuous Ir	by d	per He	oit chan ception ousehol corical li	by d	perce <u>se</u> B	bit char ption o <u>election</u> eneficia	n food by ary	Hal percep <u>sel</u> Be	Oriental bit chang ption on lection b enefician gorical In	ge food y	Habit char perception o <u>consumptic</u> Beneficia ( <i>Continuous</i>	n food on by ry	percepti <u>consur</u> Bene	change on on food n <u>ption</u> by eficiary <i>rical Index</i> )	per B	ibit char rception eneficia <i>inuous I</i>	by ry	perc Ber	it change eption by neficiary prical Index)
INC Rural	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. 0.104 0.088 0.088 0.06 0.06	Signif. ** * **	N 512 472 512 500 500	Coef. 1.727 1.242 1.453 -0.05 -0.05	Signif.	N 512 472 512 500 500	Coef. 0.054 0.015 0.045 -0.03 -0.03	Signif.	N 512 472 512 500 500	Coef. 4.471 5.521 3.895 3.128 3.128	Signif. *** ** ** ** **	N 512 474 512 510 510	Coef. 0.127 0.181 0.111 0.114 0.114	Signif. *** *** *** ***	N 512 474 512 510 510	Coef. Signif. 3.23 3.587 4 2.03 2.03	N 512 472 512 499 499	Coef. Si 0.042 0.012 0.065 0.017 0.017	gnif. N 512 472 512 499 499	Coef. 4.51 4.413 4.418 3.03 3.03	Signif. ** *** **	N 512 472 512 499 499	Coef. 9 0.105 0.101 0.101 0.06 0.06	signif. N * 512 472 * 512 499 499
INC	Methodology	н	<u>Diversi</u> ouseho inuous I	ld	Но	Diversit ousehol nuous Ir	d	Н	Variety Dusehol nuous li	<u>r</u> by d	н	n t <u>Variet</u> louseho <i>inuous i</i>	ld	н	: <u>Quality</u> ousehold nuous In	i.	Diet <u>Qualit</u> Househo ( <i>Continuous</i> )	ld	in the H (Ordinal	symptoms lousehold Categorical iable)	in th (Ordin	Health hing diffi he House hal Cates Variable	hold hold	House	<u>h skin</u> in the nold ( <i>Binary</i> ical variable
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. -1.18 -1.42 -1.1 -0.57 -0.57	signif.	N 512 474 512 510 510	Coef. -0.07 -0.12 -0.06 -0.02 -0.02	Signif.	N 512 474 512 510 510	Coef. -0.08 -0.79 -0.77 -0.82 -0.82	Signif. *** *** *** ***	N 512 474 512 510 510	Coef. -0.09 -0.1 -0.08 -0.08 -0.08	Signif. *** ** ** ** Health	N 512 474 512 510 510	Coef. -1.98 -2.21 -1.87 -1.39 -1.39	Signif. ** *** *	N 512 474 512 510 510	Coef. Signif. -0 -0 -0 -0 -0 -0	N 512 474 512 510 510	Coef. Si -0.09 -0.12 -0.06 0.05 0.05	gnif. N 512 474 512 510 510	Coef. -0.05 -0.07 0.001 -0.04 -0.04	Signif.	N 512 474 512 510 510	Coef. 5 -0.01 -0.01 -0.01 -0.02 -0.02	iignif. N 512 474 512 510 510
	Methodology	sym Hous	<u>es</u> disea otoms ir ehold (E rrical <i>Va</i>	h the linary	symp House	<u>m</u> disea itoms in shold (B rical <i>Var</i>	the inary	Diarrh (Ordina	neficiary <u>ea</u> symp al Categ 'ariable)	otoms	Breath (Ordin	neficiar <u>iing</u> diff nal Cate Variable	iculties gorical	Yellowi	neficiary <u>sh skin</u> (E rical vari	Binary	Beneficiary's disease symp (Binary Categ Variable	otoms	disease (Binary (	iary's <u>Gum</u> symptoms Categorical iable)					
	PSM Kernel PSM Nearest Neighbor PSM Stratification PSW robust & cluster s.e. PSW Bootstrapped s.e.	Coef. -0.01 0.011 -0.01 0.016 0.016	Signif.	N 512 474 512 510 510	Coef. 0.007 -0.09 0.013 -0.02 -0.02	Signif.		0.123 0.126 0.143 0.127 0.127	Signif.	N 512 474 512 510 510	Coef. -0.05 -0.08 -0.03 -0.01 -0.01	Signif.	N 512 474 512 510 510	Coef. -0.02 -0.03 -0.02 -0.01 -0.01	Signif.	N 512 474 512 510 510	Coef. Signif. -0.04 -0.03 -0.03 -0.03 -0.03	N 512 474 512 510 510	-0.03 -0.07 -0.03 -0.06	gnif. N 512 * 474 512 * 510 ** 510				<b>T</b> L	

Note: \* is significant at the 90% confidence level, \*\* is significant at the 95% and \*\*\* is significant at the 99%. Estimations with bootstrapped standard errors are replicated 100 times. Robust standard errors are clustered at the locality level. The causal effect is a simple difference, since the response variables are only captured in a single point of time. The propensity score estimations include municipality fixed effects, while the structural equations consider locality fixed effects.