PRIMARY RESEARCH

The Impact of *Zakāh* Transfer on Multidimensional Poverty: The Case of Pakistan

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Abstract. While *Zakāh* has a significant effect on reducing income poverty, its impact on multidimensional poverty (deprivation in health, education, and living standard) has not been studied much. Since the size of impact depends on accuracy of *Zakāh* targeting and its coverage, this paper assesses the accuracy of *Zakāh* targeting and coverage by computing Multidimensional Poverty Index (MPI) for Last Year's *Zakāh* (LYZ) recipients and LYZ non-recipients using Pakistan Social and Living Standard Measurement (PSLM) survey (2014). The impact of LYZ transfer on multidimensional poverty is estimated using Propensity Score Matching (PSM) method to control for confounding factors by comparing treatment (LYZ recipients) and control (LYZ non-recipients) groups. The higher MPI of treated group shows accuracy of targeting. The average-treatment effect (ATE), average-treatment effect on the treated (ATET), and potential-outcome mean (POM) estimates show small impact of LYZ payment on total weighted and individual deprivations in the short-run. However, the statistical insignificance of ATE and ATET shows insufficient coverage as well as the possibility of reaching out to income-poor, but not to multidimensional-poor. This implies that public *Zakāh* committees should disburse the *Zakāh* based on multidimensional poverty status for efficient use of *Zakāh* funds for the alleviation of multidimensional poverty.

KAUJIE Classification: E12, E15, N6
JEL Classification: I3, I32, I38

INTRODUCTION

One of the targets of Sustainable Development Goals (SDGs; target 1.2) is to reduce multi-dimensional poverty at least by half by 2030. *Zakāh* (the obligatory charity) is a major tool in Islam to reduce poverty and inequality. The *Zakāh* is one of the five fundamental pillars

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of Islam (declaration of faith, prayer, *Zakāh*, fasting, and *ḥajj*). The belief and practice of *Zakāh* is essential for a person to be a Muslim. Pakistan has a detailed system of *Zakāh* collection and disbursement since 1980 at the government level besides private and individual donations. Previously, *Zakāh* was collected and distributed only individually and privately.

After the implementation of *Zakāh* system in 1980, the poor may receive *Zakāh* from public as well as private sources. According to the first Multidimensional Poverty Report for Pakistan, the headcount ratio fell from 55.2% to 38.8% during the period between 2004/05 and 2014/15 [1]. At the same time, income poverty has also declined. According to the World Bank, Pakistan has made substantial progress in reducing poverty. Using the revised poverty line, the headcount poverty rate declined from 64.3 percent in FY01/02 to 29.5 percent in FY13/14" [2]. The *Zakāh* collection by State Bank of Pakistan through all banks during the same period increased by Rs. 712 Million (17.76%). It is, therefore, interesting, and worthwhile to study the role of *Zakāh* in the significant decline in poverty, particularly in multiple dimensions.

The present study is an attempt to estimate the impact of Last Year's *Zakāh* (LYZ) payment on multidimensional poverty using impact-evaluation methodology. It should be noted at the outset that the study does not evaluate the impact of *Zakāh* as a program since there is no end date for it. It is a continuous income stream for the poor. Our focus is on the impact evaluation of LYZ payment only. Therefore, it does not matter whether income stream is continuous, or it is a one-time payment. The paper also explores the issues of *Zakāh*-targeting, i.e., whether *Zakāh* donations have reached the poor only, and that the coverage, i.e., the *Zakāh* disbursement is not concentrated in few regions, but covers a wide range in multidimensional poverty context, which have not been studied earlier.

In what follows, we describe the concept of *Zakāh* and the *Zakāh* system as implemented in Pakistan.

The Concept of *Zakāh*

The literal meaning of the term *Zakāh*, or more properly *Zakāh*, is purity or growth, since by giving *Zakāh* from the wealth the blessings on the remaining wealth are increased by Allah (SWT) and the remaining wealth is purified in this way. *Zakāh* is liable to be paid on agricultural produce, animals, gold and silver, and merchandise according to the specifically given rates.

The payment of *Zakāh* has three-fold effect on the society; it has a positive effect on the psychology of the donor by cleansing the heart from greed, stinginess, and love for wealth. At the same time, it creates sentiments for generosity whereby contributing to the spiritual development of that person. Lastly, it reduces as well as removes jealousy and hatred by the poor towards the rich (Philips, 2005). Technically, *Zakāh* is a poor-tax or regular charity and it is a fixed portion of one's wealth which is obligatory to give annually for the benefit of the poor (Qureshi, 1978).

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[1]Similarly, the Multidimensional Poverty Index (MPI) declined from 0.292 in 2004/05 to 0.197 in 2014/15. Source: Economic Survey of Pakistan 2015-16 with the technical support of UNDP and OPHI.
[2]https://bit.ly/2lTkhfu

The two conditions are necessary for a person to be eligible to pay *Zakāh* on wealth excluding agriculture produce and animals: [3]

1) One must possess surplus wealth above or equal to the threshold called *Niṣāb*. This threshold is the lowest amount on which *Zakāh* is due.

2) The possession of such wealth should be for a period of one lunar year.

Information on the *Zakāh*-Rate, Timing, Eligibility, and Obligation

In terms of *Zakāh* Ordinance, 1980, *Zakāh* is compulsorily recoverable in Pakistan on 11 types of assets [4] (*Amwāl al-ẓāhirīyah* - assets listed in the First Schedule of the Ordinance) from every person who had been a *ṣāḥib-e-niṣāb* for the whole of the preceding *Zakāh* year terminating on the valuation date (Janjua, 2003). Those having the accumulated wealth greater than or equal to the *niṣāb* are liable to pay 2.5% of the wealth every year to the poor. Officially, *Zakāh* is deducted at the rate of 2.5% on all savings and other accounts having a balance greater than or equal to the *niṣāb* on the first day of the month of *Ramaḍān* in the lunar calendar. However, many Muslims prefer to pay *Zakāh* privately preferably in the holy month of *Ramaḍān* to get higher rewards from Allah (SWT)).

Niṣāb is greater-than-or-equal-to condition, so it divides the individuals into two groups (*Zakāh*-payers and *Zakāh*-receivers). However, as the people themselves are determining their status, it is possible that some eligible *Zakāh*-payers might not be paying. Similarly, if the reach-out of the *Zakāh* system is poor, some people who are eligible *Zakāh*-recipients might not be receiving. [5]

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LITERATURE REVIEW

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We review some of the recent studies on impact of *Zakāh* on poverty. However, none of the earlier or recent studies explore the impact of *Zakāh* on multidimensional poverty (as defined by the United Nation Development Program). These studies solely focus on money-metric measures of poverty or consider other dimensions not included in standard Multidi-

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[3]If the conditions for the payment of *Zakāh* are met then the concerned person is required to pay 2.5% of the wealth (gold, silver, currency, trade goods, and jewelry) to the needy and the indigent. The *niṣāb* and rate are different for animals and farm (agricultural) produce. There is, however, no limit on the amount received by a poor (a person below the *niṣāb*)

[4]These assets included Savings Bank Accounts, Notice Deposit Receipts and Accounts, Fixed Deposits Receipts and Accounts, Savings/Deposit Certificates, receipts and accounts, NIT Units, ICP Mutual Funds Certificates, Government Securities other than bonds, securities and shares, Annuities, Life Insurance Policies and Provident Fund Credit balances (Janjua, 2003, Chapter on Islamization of the Economy).

[5]There are incentives to under-report savings for those who are not very religiously conscious. One way of avoiding official *Zakāh* payment is to withdraw the deposits just before the date of levy since in Pakistan the official management of *Zakāh* collection works by crude imposition of actual bank balance on the day of official levy, which the state has decided to be 1st of *Ramaḍān*. Again, the measurement of *Zakāh* avoidance and the separate impact of this avoidance is neither the focus of this paper, nor the HIES data lend any information on it. The impact we get of *Zakāh* is the overall impact, amalgamating and including all the effects of management, organization, incentives, payment schemes, amount received, extent of distribution, leakages, etc. as they are right now.

mensional Poverty Index (MPI). Moreover, these studies do not apply standard methods of impact evaluation.

Kasri (2017) studies the impact of *Zakāh* by identifying the determinants of poverty amongst the *Zakāh* recipients in Greater Jakarta, Indonesia using logistic regression. He finds that lower age, lower education, less formal occupation, smaller household size and non-economic *Zakāh* assistance are related to a higher probability of being poor relative to non-poor.

Ahmed, Johari and Abdul Wahab (2017) estimated the headcount poverty index, poverty gap index, and multidimensional index of standard of living in Southwest Nigeria and identified the hardcore poor, moderately poor, and just poor (the needy) among the *Zakāh* recipients. The study recommended a *Zakāh*-based poverty threshold to improve the effectiveness of *Zakāh* for poverty alleviation.

Beik and Arsyianti (2016) analyzed the impact of *Zakāh* program on four dimensions-welfare, material poverty, spiritual poverty, and absolute poverty in two regions of Indonesia by comparing pre- and post-*Zakāh* program levels of these four dimensions. The study found significant impact of *Zakāh* on these dimensions.

Abdullah, Mat Derus and Al-Malkawi (2015) formulates a Basic Needs Deficiency Index (BNDI) to examine the effectiveness of *Zakāh* in alleviating poverty in Pakistan. Data estimates on poverty for the year 2005/2006 were gathered through data provided by Pakistan Integrated Household Survey (PIHS). Data on *Zakāh* funds was sourced from the *Zakāh* collected at the State Bank of Pakistan for the year 2005/2006. Through computation of BNDI, they conclude that *Zakāh* is a very effective way to rid of severe poverty. The *Zakāh* efficiency index (BNDI) includes consumption on basic needs like food, clothing, housing, medical, and education, and the amount of official *Zakāh* disbursement. In this way, it attempts to measure shortfall between the amount of *Zakāh* disbursement and the minimum consumption amount required for a decent livelihood. However, the study does not control for other factors contributing to reducing income poverty. This study is a good attempt to measure the shortfall, but not the effectiveness of *Zakāh*.

Akram and Afzal (2014) used descriptive and empirical data relating to the existing system of *Zakāh* disbursement in Pakistan since 1980. They used the ARDL approach to evaluate both the short and long-term impacts of *Zakāh* disbursement on alleviating poverty with some macroeconomic variables as controls. They concluded that *Zakāh* disbursement in Pakistan had a significant impact for poverty alleviation.

An important and a pioneering study to explore the potential of *Zakāh* to eliminate poverty is by Kahf (1989). Relatively more recently, Shirazi and Fouad Bin Amin (2009) estimated *Zakāh* potential in the OIC-member countries. Shirazi (1996) and Arif (2006) studied targeting, coverage, and contribution of *Zakāh* in poverty alleviation. However, these studies focused on income-poverty only. Arif (2006) somehow discussed non-income poverty, but not strictly in standard multidimensional context. The present study applies impact evaluation methodology for the first time to study the impact of *Zakāh* on multidimensional poverty in Pakistan.

Earlier studies did not consider treatment and control groups to analyze the impact of *Zakāh*. Since we are using observational, rather than experimental data, we need to be very careful in interpreting the results of an observational study because there is a chance of confounding factors. The present study takes care of the limitations of observational data by choosing a better research design to evaluate the impact of *Zakāh*.

EVALUATION DESIGN

Sample
In order to evaluate the impact of *Zakāh* on the poor in multiple dimensions in terms of living standards, education, health, etc. we have used Pakistan Social and Living Standards Measurement (PSLM) survey, which has been designed to monitor and evaluate progress towards Millennium Development Goals (MDGs). The PSLM data are collected on various socio-economic aspects like demographic characteristics, employment, income, education, health, water and sanitation, housing, consumption patterns, etc. The households covered during 2014-15 survey were 78,635 using two-stage stratified sampling. This dataset has also been used by OPHI to construct Pakistan's MPI for the year 2015. However, this and earlier similar datasets of PSLM (district level) do not contain information on *Zakāh* since PSLM at district level collects information only on social indicators, whereas surveys at provincial levels collect information on social indicators as well as on consumption and income. The number of social indicators at provincial level is smaller than that is available at district level. The dataset used in our study is PSLM (Social & HIES) 2013-14 (provincial level) which contains the information on *Zakāh* [6]. This survey covered 17,989 households which comprised 121,839 household members. The latest data available for Social & HIES, called HIICS, is for the year 2015-16; but this dataset does not have questions on health [7]. Therefore, we resort to PSLM (Social & HIES) 2013-14 survey. The use of same/single year survey can highlight the differences between the two groups-treatment and control and can show the short-run impact of *Zakāh* on multidimensional poverty but it cannot be used to evaluate the long-run impact.

Outcome Variables
The structure of the Alkire-Foster Measure (AFM) used in the study is like the Global MPI. More specifically, an adjusted headcount ratio (M^0) will be computed using the Alkire and Foster (2011) methodology. [8] We use the indicators, the deprivation cut-offs, weights, and poverty cut-off that are like those used in the construction of Pakistan's National MPI (PN-MPI) by OPHI for the sake of comparison with our results since the PSLM survey dataset is common in both studies. [9] However, all social indicators are not available at provincial level, as mentioned earlier. We have used total weighted deprivation and deprivation in each

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[6] Data source: http://bit.ly/2mho7PD
[7] HIICS stands for Household Integrated Income and Consumption Survey.
[8] See Alkire and Foster (2011).
[9] See Section 2.1 (measurement design) of the report on Multidimensional Poverty in Pakistan.

indicator of each household member as outcome variables for comparing the treated and control groups. The unit of analysis is household member.

Empirical Strategy for Impact-Evaluation

Since this is an observational (non-experimental) study using cross-sectional data, the ideal methods of impact evaluation like Randomized Control Trials (RCT) or Difference-in-Difference (DID) methods may not be directly applicable. The main feature of observational study is that treatment status is not randomized. That means, treatment and outcome may not be independent. However, propensity score matching (PSM) methods can be used to create similar treatment and control groups with the difference of only intervention (*Zakāh* transfer) to treatment group. Generally, three parameters are used to measure the effect of a treatment on an outcome: Potential-Outcome-Means (POMs), Average Treatment Effect (ATE), and average treatment Affect on the Treated (ATET). These parameters may be estimated by various estimators like Regression Adjustment (RA), inverse-probability weighting (IPW), doubly robust methods (Augmented IPW and IPWRA), and matching methods.

We create treatment group of *Zakāh* recipients and the corresponding control group. The control group is identical to the treatment group with respect to all relevant characteristics, except for the treatment status, i.e. receiving the benefit (*Zakāh*). Both groups have net savings less than the threshold (*Niṣāb*). We compare censored headcount index of both groups to determine the impact of *Zakāh* receipts on multidimensional poverty of *Zakāh*-recipients and non-recipients.

There are many possible reasons for a control group not receiving *Zakāh* despite eligibility; the person may not have access to or information about local *Zakāh* office or private donors, flaws in the distribution, lack of accurate data, those who want to give *Zakāh* are not reaching out to deserving people, etc.

The Indicators Used for the PSM Methodology

The controls we would like to use for the PSM are: gender, marital status, age, dwelling type, present occupancy status, location (province and urban/rural), occupation and industry, employment status, and working hours. These are used to control for confounding factors that could mix up with the impact of *Zakāh*.

The following indicators with their deprivation cut-offs are used (see Table 1). We have tried to make our cut-offs as close as possible to the cut-offs used in the construction of PN-MPI.

TABLE 1
Dimensions of Poverty with their Indicators and Definitions

Dimension	Indicators	Definition
Education	Years of schooling	Deprived if no man or no woman in the household above the age of 10 years has completed 5 years of schooling.
Health	Immunization	Deprived if a child in the household has not been immunized

TABLE 1: Continue..

Dimension	Indicators	Definition
	Pre-natal care	Deprived if no prenatal consultation for a pregnant woman available.
	Assisted delivery	A woman in a household is deprived if she is not assisted in delivery by trained midwife (*dā′ī*), doctor, or nurse.
Standard of living	Water	Deprived if the household has no access to improved source of drinking water (time consumed to fetch water is more than 30 minutes round-trip).
	Electricity	Deprived if there is no electricity connection.
	Sanitation	Deprived if the household has no flush toilet facility available.
	Land	A household is land deprived if it owns less than 3 acres of irrigated and non-irrigated land. The dataset does not have distinction between irrigated and non-irrigated land.

RESULTS AND DISCUSSION

The MPI we have constructed is closer to Pakistan's National MPI (that is used by OPHI) which focuses on three dimensions, namely, standard of living, health, and education. However, the indicators used to capture these three dimensions were constrained by the available set of survey questions and the sufficient number of observations. The deprivation in education is captured by three indicators in PN-MPI: years of schooling, child school attendance, and school quality. However, the last two indicators are not available in national level PSLM (social and HIES) 2013-14. Hence, we have used only the first indicator for deprivation in education.

There are four indicators of health in PN-MPI, but we have questions on three indicators and sufficient data is available on only two indicators in the PSLM. Similarly, there are eight indicators for the deprivation in standard of living in PN-MPI, but we have questions related to four indicators and sufficient observations are available on two indicators in the PSLM. Hence, our MPI consists of five indicators: one for education and two each for health and living standard. The weights are adjusted accordingly. The total number of households who received *Zakāh* were 17,988 (14.76%) in PSLM 2013-14. Out of these, 17,253 had income less than the *niṣāb* of Rs. 38,810 for year 2014. The MPI and PSM estimates are calculated for households having net income less than the *niṣāb*.

Zakāh-Targeting

Table A2 in the appendix shows various MPI statistics [10]. Using the OPHI's standard poverty cut-off of 0.33, the value of MPI (0.134) in the treatment group (eligible and received *Zakāh*) indicates that poor people in Pakistan experience 13.4% of the deprivations that would be experienced if all Pakistanis were deprived in all indicators [11]. The MPI is the product of

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[10]For the calculation of MPI statistics, we used Stata command developed by Pacifico and Poege with svysubpop. It can be accessed from http://bit.ly/2lPdCCQ0.

[11]The MPI is a censored deprivation count-a deprivation count after applying the cut-off to an uncensored deprivation count

incidence (H) and intensity (A) of poverty. The value of H (0.322) indicates that 32.2% of people are identified as multidimensionally poor. The value of A (0.417) shows the average percentage (41.7%) of dimensions in terms of which poor people are deprived.

Similarly, at the poverty cut-off of 0.33, the value of MPI (0.131) in the control group indicates that poor people in Pakistan experience 13.1% of the deprivations that would be experienced if all Pakistanis were deprived in all indicators. The value of H (0.328) indicates that 32.8% of people are identified as multidimensionally poor. The value of A (0.399) shows the average percentage (39.9%) of dimensions in which poor people are deprived.

It is obvious that differences between two groups are very small. We expect that this insignificant difference between the two groups obtained due to the nature of indicators used in the construction of MPI; most of the indicators used are those that are not likely to be affected by *Zakāh* in the short-run, but only in the long-run, like education, electricity, and immunization. However, this study highlights that the *Zakāh* recipients are not only income poor but also multidimensionally poor relative to eligible non-*Zakāh* recipients (see Graph 1). Since MPI of treatment group is higher than MPI of control group at different poverty cut-offs, it shows the accuracy of *Zakāh*-targeting rather than the effect of *Zakāh* in a very short period (one year). In case of unidimensional (income) poverty, accuracy of targeting the poor is assessed by constructing income quintiles or deciles (see, for example, Sherazi, 1996; Arif, 2006).

The MPI's from the treatment and control groups are compared at various poverty cut-offs ($k = 0.25, 0.33, 0.50, 0.75$) in Graph 1. The MPIs of treatment groups clearly dominate MPIs of control group, though the difference is small. The significance of the difference is checked through PSM. This clearly indicates that the *Zakāh*, whether it is from public or private sources, is not only targeting income-poor, but also multidimensionally-poor.
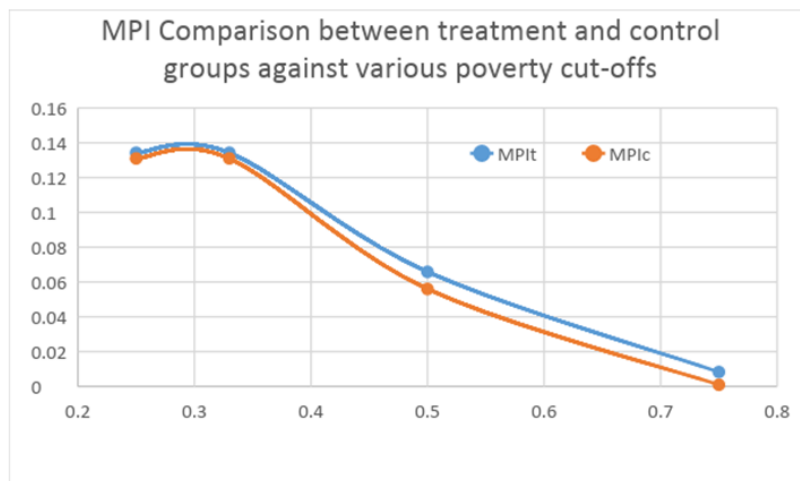
FIGURE 1. Accuracy of *Zakāh*-targeting

The greatest contribution to MPI in the treatment group is made by the indicators concerning deprivation in years of schooling (35.2%), sanitation (30.3%), and prenatal care (19.4%). If aggregated by dimensions, living standards contributes most to multidimensional poverty (41.8%), followed by the dimensions of education (35.2%) and health (23.0%). These statistics are slightly different from the MPI for Pakistan calculated by OPHI using district level

PSLM. The differences in statistics are due to the availability of a smaller number of indicators in national level PSLM used in the present study.

Similarly, the greatest contribution to MPI in the control group is made by indicators concerning deprivation in years of schooling (31.4%), sanitation (32.1%), and prenatal care (21.7%). If aggregated by dimensions, living standard contributes most to multidimensional poverty (44.6%), followed by the dimensions of education (31.4%) and health (24.0%).

Impact Evaluation: Treatment Effect Estimators

The statistical significance of the impact has been evaluated using various treatment effect estimators discussed below. We have used weighted deprivation scores and deprivations in individual indicators as the outcome variables. The treatment-effect estimation requires following conditions/assumptions for valid inference:

1) There is no simultaneous effect of unobserved factors on outcome and participation- the conditional independence assumption.

2) There is a large overlap (sizable common support) of propensity scores between treatment and control groups.

3) The treatment and control groups are identical in all aspects except the treatment.

The first assumption requires that the selection process is random. This assumption is generally satisfied when matching is done using all possible observed characteristics and there are no unobserved characteristics that affect both the participation and the outcome. The second assumption can be checked using the overlap plot. Graph 2 shows the overlap plot of propensity scores between those who received *Zakāh* and those who did not receive *Zakāh*, although they were eligible. The second assumption is satisfied as there is a sizable common support.
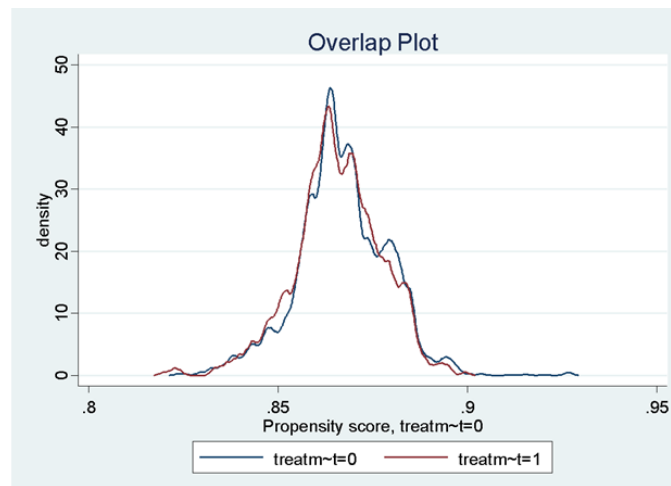
FIGURE 2. An overlap plot of propensity scores between those who received *Zakāh* and those who did not receive *Zakāh*, although they were eligible

The third assumption is checked by regressing each covariate on the treatment. Each regression shows insignificant coefficient for the treatment variable. This indicates that on average all covariates in treatment and control groups are similar.

The treatment effects have been estimated by three Parameters-Potential Outcome Mean (POM), average treatment effect (ATE) and average treatment effect on the treated (ATET). Various estimation methods estimate these parameters. Among them regression adjustment (RA), inverse-probability-weights (IPW), inverse-probability-weighted regression adjustment (IPWRA), augmented inverse-probability weights (AIPW), and propensity-score matching (PSM), and nearest-neighbors matching (NNM) are used for the estimation and for robustness check. Generally, each treatment-effect estimation involves two models-one is outcome model and the other is treatment model. The outcome or treatment can be modelled using linear regression, logit, probit, heteroscedastic probit regression or multinomial logit regression depending upon the nature of outcome/treatment models (continuous, binary, multinomial).

The treatment (*Zakāh*) effect is analyzed using potential-outcomes or counterfactual framework. The potential outcome is the subject that did not receive *Zakāh*. We call it Z_0. What would Z be for the same subject if it had received *Zakāh*? We call it Z_1 the potential-outcome or counterfactual for that subject. Similarly, we have a counterfactual for those we did receive *Zakāh*. The POMs are the mean of Z_1 and the mean of Z_0 in the population. That is, the POM estimates the average outcome when no one receive a treatment in the treatment group i.e., it estimates a potential average outcome if we could turn all program participants into non-participants (a prediction or a counterfactual). The other counterfactual can be stated in same way. The ATE is the mean of the difference (Z_1-Z_0). That is, the ATE estimates impact on overall population that includes the effect on individuals for whom the program is never intended since it assumes that individuals in a population are randomly assigned to a treatment whereas the ATET is the mean of the difference (Z_1-Z_0) among the subjects that receive *Zakāh*. That is, ATET estimates the effect on those for whom the program is intended.

Since the main characteristic of observational data is that the treatment status is not randomized, it may imply that the outcome and the treatment are not independent. The objective of these estimators is to utilize covariates to make outcome and treatment independent. The results show (Table 2) that the POM is highly significant whereas both ATE and ATET are insignificant. The value of POM is 0.02777 for the non-recipients and it is 0.02745 for the recipients as compared to the value of 0.0039 for ATE and ATET respectively. The POM shows that the estimated average total weighted deprivation when no one receives *Zakāh* is 9.8% instead of 9.48% when everyone receives *Zakāh*. Though the impact is significant, but it is very small in the short-run. However, since POM is a prediction, this result is not surprising. We are more concerned with ATE and ATET estimates. It should be noted that the purpose of *Zakāh* is to fulfil the immediate needs. Hence, MPI indicators do not respond to the *Zakāh* transfer since these indicators are long-run variables. The ATE and ATET estimates show that there is statistically insignificant increase in weighted deprivation by 0.4 percent on average for those receiving *Zakāh*. As we observe in MPI calculations, this would show *Zakāh*-targeting rather than *Zakāh*-effect. Similarly, the statistical insignificant estimates for ATE and ATET show that the two groups are not much different in terms of

impact. It highlights insufficient coverage by *Zakāh* disbursement consistent with earlier studies in unidimensional poverty (Arif, 2006).

TABLE 2
Sensitivity of Treatment Effect to Various Estimators

Treatment-Effect Parameters	Treatment-Effect Estimators					
	RA	IPW	IPWRA	AIPW	PSM	NNM
ATE Treatment (1 vs 0)	-0.00034 (0.0013)	-0.00034 (0.0013)	-0.00034 (0.0013)	-0.00034 (0.0013)	-0.00012 (0.0014)	-0.0003 (0.0014)
ATET Treatment (1 vs 0) Pomean Treatment	-0.00029 (0.0013)	-0.00029 (0.0013)	-0.00029 (0.0013)	n.a	0.000002 (0.0014)	-0.000006 (0.0014)
0	0.02777*** (0.0005)	0.02777*** (0.0005)	0.02777*** (0.0005)	0.02777*** (0.0005)	n.a	n.a
1	0.02745*** (0.0012)	0.02745*** (0.0012)	0.02745*** (0.0012)	0.02745*** (0.0012)		

Notes: where *** stands for statistically significant at 1% level. RA means regression adjustment, IPW means inverse probability weights, IPWRA means IPW with RA, AIPW is augmented IPW, PSM is propensity score matching, and NNM is nearest-neighbour matching. The standard errors are given within parentheses beneath estimated coefficients. ATE is average treatment effect, ATET is average treatment effect on the treated, and PO mean is potential-output mean. All estimated parameters show percentage of weighted total deprivation.

Robustness of PSM results to various estimators is checked by estimating potential-outcome means (POMs), average treatment effects (ATEs), and average treatment effects on the treated (ATETs) using following estimators: augmented inverse-probability weighting, inverse-probability weighting, inverse-probability-weighted regression adjustment, nearest-neighbor matching, propensity-score matching, and regression adjustment. The results are robust to all estimators used.

CONCLUSION AND POLICY IMPLICATIONS

The accuracy of *Zakāh* targeting, coverage, and the impact of *Zakāh* on multidimensional poverty have been evaluated in the study using impact-evaluation methodology. The higher MPI for treatment group than that of control groups shows accuracy of *Zakāh*-targeting. The two out of three parameters of propensity score matching show insignificant short-run (instantaneous) impact. The potential mean shows small but significant impact. This is also interpreted as insufficient coverage. Since most of the indicators used in MPI do not change in the short run, it is difficult to find the impact of *Zakāh* on these indicators. Most of the studies on *Zakāh* show that the immediate impact of *Zakāh* is on consumption. Since MPI does not include consumption, it is not affected by the increase in consumption of goods and services not included in MPI indicators. However, the MPI statistics and PSM scores show

accuracy of *Zakāh*-targeting rather than the effectiveness of *Zakāh* distribution. This result might indicate that the existing MPI framework is not suitable for evaluating the impact of *Zakāh* on multidimensional poverty, particularly in short-run. The study also highlights that a significant number of eligible *Zakāh*-recipients do not receive *Zakāh*. This could be due to low payment from *Zakāh*-donors as well as insufficient coverage particularly in multiple dimensions of poverty, among other factors. These findings imply that public *Zakāh* authorities and private individuals and institutions should accurately target and cover multidimensional poverty for efficient utilization of *Zakāh* funds for the alleviation of poverty in multiple dimensions.

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APPENDIX

TABLE A1
Description and Descriptive Statistics for All Variables

Variable Name	Variable Label
Gender	Gender of person
Age	Age in complete year
Ms	marital status
Emp_status	What was the employment status?
Education	2hat was the highest class completed?
Immunization	Has the child been immunized
Delivery_assist	Who assisted you with this delivery?
Dwel_type	What is the dwelling type
Occup_status	What is your occupancy status?
Electricity	does your household have electricity connection
Water	how much time is consumed on a round trip to fetch the drinking water?
Sanitation	what type of toilet is used by your household?
Treatment	did you receive any income from *Zakāh*/usher in cash?

TABLE A2
Mpi Calculation

Poverty Cut-off	Treatment Group (eligible and received)			Control Group (eligible but not received)		
	H	A	M0	H	A	M0
0.25	0.322	0.417	0.134	0.328	0.399	0.131
0.33	0.322	0.417	0.134	0.328	0.399	0.131
0.50	0.117	0.563	0.066	0.102	0.545	0.056
0.75	0.010	0.833	0.008	0.001	0.833	0.001

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