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Missing public funds and targeting performance: Evidence from an anti-poverty transfer program in Indonesia ☆

Daniel Suryadarma [a], Chikako Yamauchi [b,*]

[a] Arndt-Corden Department of Economics, Australian National University, Coombs Bldg., Fellows Road, Canberra, ACT 0200, Australia
[b] National Graduate Institute for Policy Studies, Tokyo and Australian National University, Australia

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ABSTRACT

This paper investigates how failing to consider missing funds in public resource delivery can lead to misleading conclusions on the nature and correlates of targeting performance. Combining administrative data on disbursement and household survey data on receipt under Indonesia's anti-poverty program, *Inpres Desa Tertinggal* (IDT), we find that only 69% of disbursements were actually received by the intended beneficiaries. When these missing funds are ignored, the distribution of IDT benefits is pro-poor, and better targeting is found in districts with higher per capita expenditure. However, when the missing funds are taken into account, the distribution of IDT benefits in fact becomes less pro-poor than universal, equal distribution, and better targeting is correlated with a higher proportion of female village heads and a higher level of villagers' human capital. These results underscore the importance of considering the size and allocation of missing funds in the analysis of targeting in public resource delivery.

1. Introduction

A loss of public resources because of corruption and mismanagement hampers public spending efficacy, by reducing any possible effect that lost public resources might have had on the welfare of the intended beneficiaries. Recent empirical studies suggest that the magnitude of such a loss is significant in developing countries. For instance, Reinikka and Svensson (2004) and Olken (2006) have reported that only 20% and 82% of public resources reached intended beneficiaries in Uganda and Indonesia, respectively. Although there has been an increase in the number of studies on the use of public resources, only a few have been able to present evidence on the amount of missing resources.[1]

More important is the gap between the literature on public resource delivery and that on targeting. The issue of targeting concerns whether relatively poor households receive more public resources compared to non-poor households. The common methods for computing targeting performance rely only on the distribution of benefits reported in a household survey, and does not take into account the possibly missing funds that are not claimed by anyone in the survey. We demonstrate that failing to take into account the missing public resources could produce a misleading conclusion on the nature as well as correlates of the distribution of program resources. More specifically, we compute the share of disbursed funds that in fact reached selected beneficiary villages in one of Indonesia's anti-poverty programs, *Inpres Desa Tertinggal* (IDT, Presidential aid for poor villages). Using the estimated amount of missing funds, we examine how a commonly used targeting

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* Corresponding author at: National Graduate Institute for Policy Studies, 7-22-1 Roppongi, Minato-ku, Tokyo 106–8677, Japan. Tel.: +81364396000; fax: +81364396010.
E-mail addresses: daniel.suryadarma@anu.edu.au (D. Suryadarma), c-yamauchi@grips.ac.jp (C. Yamauchi).

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[1] Other studies that have provided evidence includes Francken et al. (2009), who found little leakage on average in Madagascar's education sector, and Xiao and Canagarajah (2002), who found that in Ghana, only about 20% of non-salary public health expenditure and 50% of non-salary public education expenditure were received by the respective facilities.

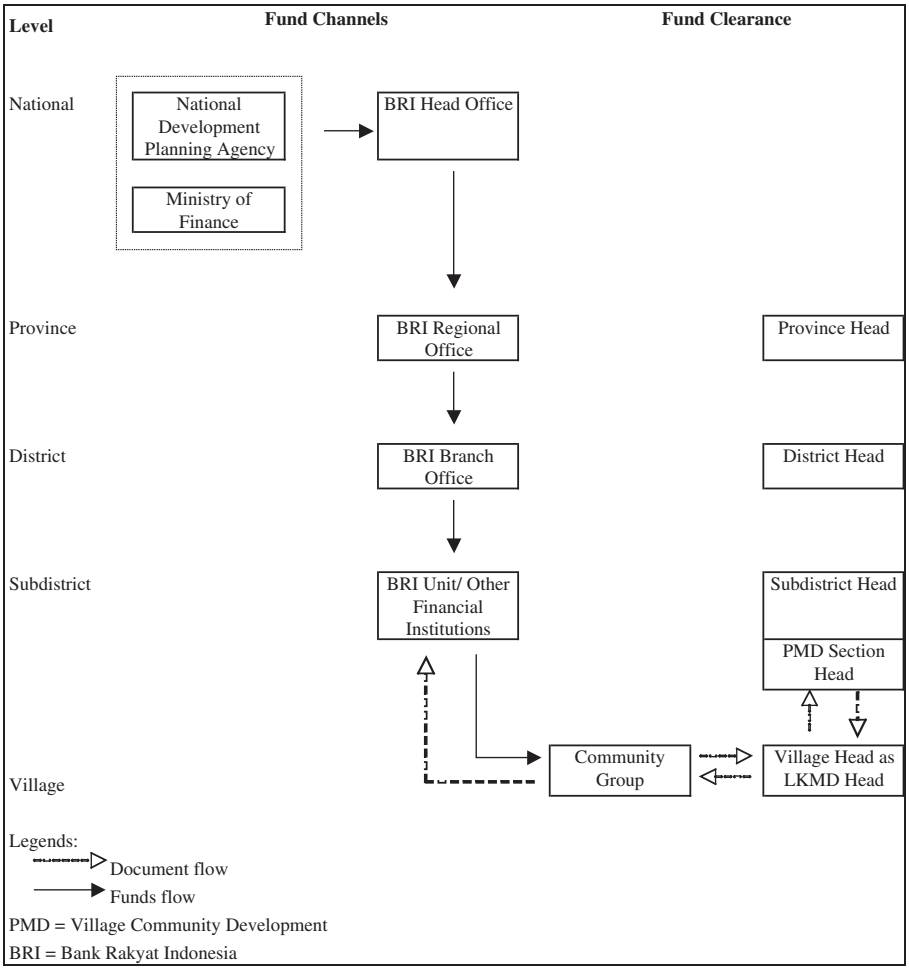

Fig. 1. Channels of IDT funds distribution.
Source: Badan Pusat Statistik (BPS), 1994.

measure and its correlates change, with and without taking into account the missing funds.

The possibility that missing public funds distort the nature of targeting has been pointed out in the literature. For instance, missing rice is more prevalent in areas with lower per capita household expenditure in Indonesia (Olken, 2006). In Uganda, regions experiencing an increase in the average household expenditure also attain higher receipt of grants for nonwage spending in education (Reinikka and Svensson, 2004). However, the quantitative evidence is still lacking on how commonly used targeting measures, such as the funds accruing to the poorest quintile,[2] as well as the correlates of such a measure, are altered when missing funds are ignored. Our study fills this gap in the literature by using Indonesia's IDT as a case study.

Our results suggest that households in selected villages received only 69% of IDT funds on average. Without taking the loss into account, the conventional targeting measure suggests a pro-poor distribution, where the poorest quintile of households receives more than one-fifth of the funds. However, when the loss is included, the same measure with a realistic assumption on who received the missing funds indicates that the poorest quintile receives significantly less than one-fifth of the funds. Moreover, failing to take into account the missing funds results in misleading conclusions on regional characteristics associated with targeting performance. Overall, these findings underscore the importance of direct, quantitative evidence of public resource delivery.[3]

The rest of the paper is organized as follows. The next section describes the IDT in detail. Section 3 describes the data, and Section 4 provides the estimates for the amount of missing funds. Taking these estimates into account, Section 5 discusses IDT's targeting performance. Section 6 illustrates the correlates of the share of receipt and targeting performance. Finally, Section 7 concludes.

2. Background

2.1. Indonesia and IDT

Indonesia is considered to be one of the most corrupt countries in the world. Transparency International's Corruption Perception Index ranked the country 100th out of 183 countries in 2011, and Indonesia's international standing as a corrupt country has been unchanged since 1990s. The IDT program therefore provides an opportunity to examine

[2] The share of funds accruing to the poorest 40 and 20% of the population are used in a meta-study comparing the performance of 122 anti-poverty programs from 48 countries based on the fact that most programs provided the necessary information (Coady et al., 2004).

[3] This in turn links to a broader literature on corruption and public spending efficacy. For example, the loss in public spending in the distribution system may explain why the size of public spending is not as correlated with development outcomes as one might expect (Barro, 1991; Filmer and Pritchett, 1999; Landau, 1986). It also provides an insight into why countries that are perceived to be corrupt tend to have worse development outcomes (Mauro, 1995; Azfar and Gurgur, 2008), and why the effects of public expenditures on related outcomes are hampered in places with more corruption (Rajkumar and Swaroop, 2008; Suryadarma, 2012).

how much public spending reaches intended beneficiaries in a setting where corruption is prevalent.

Under IDT, the government provided selected poor villages with lump-sum grants designated for small business loans.[4] These selected villages were instructed to choose relatively poor households that would be eligible for IDT loans based on village-level meetings, which were facilitated by the village head and a local government agency called *Lembaga Ketahanan Masyarakat Desa* (LKMD, Village Community Resilience Board). The selected households were formed into community groups (*pokmas*, or *kelompok masyarakat*). Each group contained about 20 households, and elected a head, a secretary, and a treasurer. The treasurer then received funds from local branches of banks or other government-appointed financial institutions. These *pokmas* leaders were also responsible for managing loan activities within their groups (BPS, 1994).

The manner in which program funds were channeled from the national government to selected villages, shown in Fig. 1, suggests little scope for regional governments to siphon off IDT funds. The flow of money shows that program funds did not go through layers of regional government officials. Instead, they were directly transferred from the central government to the local branches of government-appointed financial institutions. However, Fig. 1 indicates that the distribution system is likely to have left ample room for local leaders (such as *pokmas* heads, secretaries, treasurers, and village government officials) to steal part of the program funds. The flow of documents indicates that each *pokmas* provided the village head and subdistrict government with a loan proposal, which contained information on the names of members, their projects, and requested loan sizes. When the proposal was certified, the treasurer of each group was able to exchange the certificate with the requested amount of funds according to the proposal. Thus, if IDT funds were not entirely received by residents, the loss is likely to have occurred at the village-level, after the funds left bank branches.

In fact, Pribadi (1998) noted that *pokmas* heads were probable corruption actors. He documented a *pokmas* head handing out IDT funds to other parties, including those who were ineligible for the funds. Other possible corrupt actors are group treasurers or village officials. Since each group was allowed to have its own rules (Kimura, 1999), some of the funds might have been retained as compulsory savings by those actors.[5]

While it is theoretically possible that low demand for credit discouraged the eligible households from taking up loan opportunities, the take-up rates from bank branches were very high. Table 1 shows that, on average, 99% of entitled funds were withdrawn from these branches in the first two years (Bappenas, 1998). This is consistent with anecdotal evidence that suggests a pressure from the sub-district governments to use up all the entitled funds (Kimura, 1999).

In sum, the implementation procedure for IDT implies that major allocation decisions were made at the village level. Thus, the main outcome variable in this study, the share of receipt, is likely to reflect the loss of IDT funds that occurred at the village level.

2.2. Scope of IDT

IDT provided a large amount of public money to relatively poor villages. Between 1994 and 1997, 41.2% of urban and rural villages were funded at least once. Each of the funded villages received a lump-sum grant of Rp.20 million per annum (Indonesian rupiah; $8932 using the 1995 average exchange rate of Rp.2239 per 1995 U.S. dollar), with the average total grant value amounting to Rp.45 million. For comparison, the median and 90th percentile of the annual per capita expenditure in funded villages was Rp.514 thousand and Rp.999 thousand, respectively.[6] Therefore, unscrupulous local agents may have found stealing some IDT funds worthwhile.

Table 1
Take-up rates under IDT.
Source: Bappenas, 1998.

Province	1994	1995
Aceh	100.00	92.40
North Sumatera	100.00	100.00
West Sumatera	100.00	100.00
Riau	100.00	100.00
Jambi	100.00	100.00
South Sumatera	100.00	99.10
Bengkulu	100.00	100.00
Lampung	100.00	100.00
DKI Jakarta	100.00	100.00
West Java	100.00	100.00
Central Java	100.00	100.00
Yogyakarta	100.00	100.00
East Java	100.00	100.00
South Kalimantan	100.00	100.00
West Kalimantan	100.00	100.00
Central Kalimantan	100.00	100.00
East Kalimantan	100.00	100.00
South Sulawesi	100.00	92.42
North Sulawesi	100.00	92.47
Central Sulawesi	100.00	100.00
Southeast Sulawesi	100.00	100.00
Bali	100.00	100.00
West Nusa Tenggara	100.00	100.00
East Nusa Tenggara	100.00	100.00
East Timor	100.00	99.73
Maluku	100.00	100.00
Irian Jaya	99.71	71.38
Average	99.99	98.06

Note: The take-up rate indicates the share of IDT funds that were withdrawn by group treasurers from financial institutions appointed by the central government.

For households in these villages, IDT provided an opportunity to obtain a loan of a substantial amount, relative to their standard of living. By January 1997, 28.3% of households in Indonesia were eligible for a loan (i.e., *pokmas* members), and most of them received at least one loan. In villages covered by IDT at least once, the 1994–1996 cumulative grant value, divided by the number of households as of 1993, was Rp.135 thousand. Among households receiving loans, the average cumulative loan size was Rp.373 thousand, which represents 80.8% of their average annual household per capita expenditure.

2.3. Targeting and corruption

There are two possible sources of missing funds under IDT. One is that the IDT funds might have been transferred to the village and upper-level (particularly the sub-district level) government officials. That is, *pokmas* leaders who wanted to allocate some of the IDT funds to ineligible households might have made payments to the governmental officials who were monitoring IDT, so that their inappropriate allocation of funds was overlooked. In this case, the payments can be viewed as bribes from *pokmas* leaders to public officials. According to Rose-Ackerman (1999), "payments are corrupt if they are illegally made to public agents with the goal of obtaining a benefit."[7] The other source of missing funds is

[4] See Alatas (2000) for details of the selection criteria.

[5] Some of those compulsory savings might be included in our measure of receipt, because the *Survei Sosial Ekonomi Nasional* (SUSENAS, National Socioeconomic Household Survey) enumerators were instructed to record the value of retained funds divided by the number of members if IDT funds were explicitly retained by *pokmas* (possibly for the purpose of purchasing goods for the members).

[6] The funding rate and average grant values are for villages observed in the IDT administrative data and 1993 *Potensi Desa* (PODES, Village Potential Statistics). Each year, approximately 30% of villages were funded. A small proportion of villages were dropped out of the funding list, while additional villages were designated for funding in later years. The per capita expenditure values are based on the 1997 SUSENAS. The total grant values and per capita expenditure values are in 1995 prices.

[7] Payments might have been made from ineligible households to *pokmas* leaders as they had large discretion over the allocation of IDT funds. Though *pokmas* leaders were not government officials, they played the role of public agents under IDT, and thus the payments can be viewed as bribes as well.

Table 2A
Overall share of receipt in districts funded by IDT (1994/95–1996/97).
Sources: 1997 SUSENAS and IDT data.

	Upper bound					Lower bound				
	Unweighted average		Weighted average		Difference between (3) and 1: t-value	Unweighted average		Weighted average		Difference between (3) and 1: t-value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Disbursement (Rp.million)	4648	4641				4648	4641			
Receipt (Rp.million)										
(A) VIP distribution assumed [preferred estimates]	3310	5371				3244	5326			
(B) Equal distribution assumed	3579	5792				3506	5743			
(C) VIP distribution assumed, leakage to non-IDT villages added	3356	5406				3287	5362			
(D) VIP distribution assumed, alternative sampling weight used	3186	5476				3125	5445			
(E) VIP distribution assumed, without data cleaning	3584	5847				3502	5761			
Overall share of receipt										
(A) VIP distribution assumed [preferred estimates]	0.72	0.87	0.69	0.60	8.34	0.70	0.87	0.68	0.61	8.69
(B) Equal distribution assumed	0.78	0.95	0.76	0.66	5.91	0.77	0.95	0.75	0.66	6.28
(C) VIP distribution assumed, leakage to non-IDT villages added	0.74	0.88	0.70	0.61	7.95	0.72	0.88	0.69	0.61	8.31
(D) VIP distribution assumed, alternative sampling weight used	0.66	0.85	0.64	0.54	10.95	0.65	0.85	0.62	0.55	11.28
(E) VIP distribution assumed, without data cleaning	0.79	1.14	0.75	0.79	5.08	0.78	1.13	0.74	0.78	5.54
Number of districts	268					268				

Notes:

- The overall share of receipt is the value of funds reported to have been received by households between April 1994 and March 1997, divided by the value of funds disbursed by the government during the same period.
- The preferred specification used in Row A assumes that the pattern of resource distribution within a fiscal year followed the one observed in an infrastructure program, VIP. The alternative assumption is that an equal amount of resources was allocated across quarters (Row B).
- The preferred specification also uses the SUSENAS weights when the district-level receipt is estimated from the household-level receipt information. An alternative sampling weight used in Row D is the ratio of the number of surveyed households in IDT villages to the total number of households in those villages. See Section 4.1 for more details.
- Figures in Row E show the estimates without the data cleaning, whose necessity is less obvious than the other data cleaning processes discussed in Appendix A.
- Columns 1 and 2 show the simple average, while Columns 3 and 4 indicate the weighted average of the share of receipt across districts. The weighted average places a larger weight on the estimated share for districts with many more observations in the data, as they are more accurate.

the unrevealed receipt among private individuals who were ineligible for IDT loans, also known as "local capture." It is likely that ineligible recipients concealed their benefits in a household survey. Such secretive transfers would reduce the share of receipt. Note that if these ineligible recipients reported what they received in the survey, their receipts would be included in our measure.[8]

Knowledge of the amount of missing funds allows us to examine how it affects targeting performance. If missing funds were invested in a way that benefited all village residents, their positive effect might have equally benefited the poor and non-poor. However, it appears unrealistic to assume that all the concealed transfers were utilized in such a manner. On the other extreme, all the missing funds might have been used for the private consumption of those who are ineligible. In this case, the larger the amount of missing funds, the more the distributive goal of the program, which is to provide benefits to relatively poor households in selected poor villages, is hampered. Later, we employ these two extreme scenarios, and show that the implication for the nature of targeting under IDT could change when missing funds are taken into account in a conventional measure of targeting.[9]

3. Data

Our analysis draws on the following four datasets. The first is the 1993, 1996, and 1997 SUSENAS, which is a nationally representative, annual cross-section data. We use the 1996 and 1997 SUSENAS to estimate the value of IDT funds received by households for each district,[10] and the 1993 SUSENAS to obtain information on pre-existing average household characteristics. We also use the 1993 SUSENAS to estimate the relationship between the per capita household expenditure and household characteristics, and predict the poverty level in the targeting analysis. The second data source is the 1997 *Survei Seratus Desa* (SSD, Hundred Villages Survey), which is a household survey of 100 villages. We use this source to obtain supplemental information on receipt.[11] The third data source is an administrative record, which we use to determine each village's grant receipt status between 1994/95 and 1996/97. The final data source is the 1993 PODES, which is a village census dataset that contains information on village government and population. We use this source to extract pre-determined village characteristics.

[8] For example, some villages might have democratically decided that all households were poor, and thus eligible for IDT loans. In such villages, even relatively wealthy households are likely to feel legitimate to receive benefits and thus reveal their receipt honestly in the survey.

[9] It is worthwhile to note our focus on the distributive issue in this paper. One might consider that IDT funds given to ineligible households with profitable investment plans are likely to yield higher returns than funds given to eligible households with less profitable plans. This is an important issue, related to the broader discussion of whether governments should, for the purpose of poverty alleviation, provide subsidized credit to the poor, returns to which could be lower than the market rate. However, such discussion is beyond the scope of this paper.

[10] District is the most disaggregated level in which the SUSENAS is still representative.

[11] The advantage of the SSD is its representativeness at the village level. On the other hand, the SSD's sampling scheme means that it is not nationally representative, as it was collected from a set of villages selected in an ad hoc manner from different regions in Indonesia. Also, in the regression analysis, some of the covariates must be cross-sectional, not pre-determined, because few SSD villages are matched with villages contained in the 1993 SUSENAS. In addition, though there are 100 villages in the SSD, only 57 villages were covered under IDT. These factors suggest that a careful interpretation is necessary in comparing the estimates based on the SSD and those based on the SUSENAS. The same questions are used in the SUSENAS and SSD to extract information on IDT benefits.

4. Missing funds under IDT

4.1. Estimating the value of missing funds

The main outcome variable is the district-level share of receipt, which is constructed as follows. First, we compute the value of disbursed grants in a given district and year (1994/95, 1995/96, and 1996/97) as the number of funded villages in each district and year, multiplied by the grant value, which was Rp.20 million per annum for all selected villages. Second, we use the 1996 and 1997 SUSENAS to estimate the total amount of IDT funds received by households in IDT villages for each district and year. Since the data are surveys, not censuses, we use the SUSENAS survey weights to inflate the household-level IDT benefits.[12] We use nominal values to facilitate the comparison of disbursement and receipt. Third, we calculate the share of receipt by dividing the value received by households using the value disbursed by the government. Therefore, our outcome variable takes the value of zero to indicate a complete loss of disbursed funds and one to indicate full receipt.[13] The rest of this subsection provides the details of the estimation of the value of receipt.

We gather the value of received funds from the following information: whether a household received an IDT loan, year in which a recipient household obtained a loan, total annual loan size, and source of the loan for each retrospective year of 1994, 1995, and 1996.[14] Other than cases of corruption or mismanagement, it is unlikely that households had any incentive to distort their responses to these questions for the following two reasons. First, their responses were not used by the central government to decide the funding status of the village in the coming years.[15] Thus, households are unlikely to have had an incentive to pretend to be poor or to have received little. Second, the repayment rate, as low as 19%, suggests that households did not perceive strong repayment obligation.[16] Thus, they are also unlikely to have had an incentive to pretend that their loans (and thus repayment obligation) were small. As discussed above, our measure of receipt is reduced by the hidden capture by ineligible recipients. That is, if they (correctly) answered that they were not a *pokmas* member, they were not asked whether they received IDT loans, and thus, their capture was not included in the measure of receipt. In the case where *pokmas* leaders captured some of the IDT funds, but also received a loan from the remaining IDT funds, whatever they indicated as their benefit value is included in the measure of receipt. Thus, the capture unrevealed to survey enumerators creates a gap between our measures of receipt and disbursement.

We take into account the fact that the source of loans included direct funds, rotated funds, and unknown sources. To avoid double accounting of funds that were repaid and then lent to another household, we include only non-rotating loans. For a small proportion of households that received loans from multiple sources per year—either direct and rotated sources or direct and unknown sources—we make two types of assumptions and create upper and lower bounds for the outcome variable (See Appendix A for details).

We further adjust the district-level value of receipt for the fact that the reference period for benefit receipt does not perfectly match the official period of disbursement. IDT funds for a certain fiscal year were disbursed between April of that year and March of the following year. However, the SUSENAS provides information on the size of loans received in a calendar year. For example, the initial reference period was January through December 1994, while the initial disbursement period was from April 1994 to March 1995. In addition, receipt in the first quarter in 1997 should also be included in calculating the overall receipt across 1994, 1995, and 1996 to match the disbursement between April 1994 and March 1997. To account for this, we assume that the allocation of IDT funds within a fiscal year followed the pattern observed for a related project called Village Infrastructure Project (VIP, 1995/96–1996/97). Under VIP, a subset of IDT villages received additional grants, specifically for infrastructure development. Though IDT funds were for loans and VIP funds for infrastructure, both programs necessitated several meetings within villages. Thus, the speed of resource allocation is likely to be similar. The allocation pattern under VIP suggests that 90 (97) percent of funds were spent by the end of December in the first (second) program year. An alternative, probably extreme, assumption is the equal allocation across quarters. We show that the choice of the assumption does not significantly change the estimated share of receipt.[17]

Finally, we also adjust the value of disbursement by reducing it, if the take-up rate was less than 100% (Table 1), to focus on the loss that occurred after IDT funds were withdrawn from government-appointed financial institutions.[18]

4.2. Amount of missing funds in IDT

Table 2A shows the resulting estimates for the share of receipt on the basis of various assumptions. First, the mean overall disbursement is Rp.4.6 billion. According to our preferred specification, the mean overall receipt is Rp.3.3 billion, which uses the upper bound estimate on the basis of the VIP allocation pattern. The simple, unweighted average across districts indicates that 72% of disbursed funds were received (Column 1). The weighted average share of receipt, using the number of surveyed households as a weight, is slightly smaller: 69% (Column 3). We focus on the weighted average because the estimated share of receipt is likely to be more accurate for districts with many more observations. On the basis of the alternative assumption of the equal across-quarter distribution, the average overall receipt is Rp.3.6 billion (76%, Column 3). While this is larger than 69%, the estimates are not significantly different from each other. Since the equal

[12] We also use an alternative weight for the 1997 SUSENAS for robustness check: the total number of households in a district (available in the 1996 PODES) divided by the number of households surveyed in the SUSENAS, without including villages that were not covered under IDT. The results do not vary by the choice of these weights.

[13] The village-level data on receipt is similarly constructed from the 1997 SSD. The weight is created as the ratio of the total number of households in a surveyed village and the number of households surveyed in the 1997 SSD in that village.

[14] All the households answered the following question: "Has the head or member of a household ever been a member of community group *(pokmas)* in the IDT program?," and households which answered "yes" to this question were further asked the following: "Have you ever received IDT funds?" Those who answered "yes" to this question were asked to specify the "Amount of fund and source" by the year of loan receipt. Household enumeration was conducted in January for the 1996 and 1997 SUSENAS (BPS, 1996, 1997).

[15] The government instead used the village-level census similar to the PODES, which focused on village infrastructure and general living standard.

[16] This is based on a calculation from the 1998 SUSENAS. It is the share of households that had repaid a loan as of the beginning of 1998 among those receiving a loan in 1996.

[17] Suppose that the true (unknown) value of allocation within IDT villages in the fiscal years of 1994/95, 1995/96, and 1996/97 are R_{94}, R_{95}, and R_{96}, respectively. Also suppose that the (known) value of allocation in the calendar years of 1994, 1995, and 1996 are r_{94}, r_{95}, and r_{96}, respectively. If the pattern of resource allocation under VIP holds for IDT benefits, it suggests the following: $0.9*R_{94}=r_{94}$, $0.1*R_{94}+0.97*R_{95}=r_{95}$, and $0.03*R_{95}+0.97*R_{96}=r_{96}$. Solving these three equations provide the estimates for R_{94}, R_{95}, and R_{96} as the functions of the known values of r_{94}, r_{95}, and r_{96}. These estimates are used for yearly receipt. For overall receipt, only the receipt in the first quarter of 1997 is estimated from $0.03*R_{96}$, which is combined with the estimated receipt in 1994, 1995, and 1996. Under the alternative assumption, for 1994, we use the sum over the 1994 receipt value and a quarter of the 1995 receipt value; for 1995, we use the sum over three-quarters of the 1995 receipt value and a quarter of the 1996 receipt value; and for 1996, we use the original value. The adjustment for the last year implicitly assumes that the receipt for the first quarter of 1997 followed the same pattern as that observed in 1996.

[18] The 1996 disbursement value was not adjusted because information on the final take-up rate is unavailable.

Table 2B
Overall and yearly share of receipt in districts funded by IDT (1994/95–1996/97).
Sources: 1997 and 1996 SUSENAS, 1997 SSD, and IDT data.

[VIP distribution assumed, upper bound]	SUSENAS 1997			SUSENAS 1996			Difference between SUSENAS 96 & 97: t-value	SSD 1997			Difference between SUSENAS 97 and SSD: t-value
	N. of districts	Mean	SD	N. of districts	Mean	SD		N. of villages	Mean	SD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Overall											
Disbursement (Rp.million)	268	4648	4641					57	55.8	11.8	
Receipt (Rp.million)	268	3310	5371					57	33.5	20.1	
Share of receipt (unweighted)	268	0.72	0.87					57	0.61	0.33	1.50
Share of receipt (weighted)	268	0.69	0.60								
1994/95											
Disbursement (Rp.million)	255	1563	1793	252	1586	1794		50	20.0	0.0	
Receipt (Rp.million)	255	1169	2122	252	1129	2055		50	12.4	12.7	
Share of receipt (unweighted)	255	0.77	1.33	252	0.71	0.99		50	0.62	0.63	1.48
Share of receipt (weighted)	255	0.78	0.98	252	0.75	0.80	0.41				
1995/96											
Disbursement (Rp.million)	263	1578	1659	256	1618	1664		52	20.0	0.0	
Receipt (Rp.million)	263	948	1646	256	616.4	1153		52	11.0	11.3	
Share of receipt (unweighted)	263	0.59	0.87	256	0.42	0.59		52	0.55	0.57	0.57
Share of receipt (weighted)	263	0.60	0.64	256	0.41	0.55	3.52				
1996/97											
Disbursement (Rp.million)	266	1608	1435					57	20.0	0.0	
Receipt (Rp.million)	266	1198	2101					57	12.6	9.4	
Share of receipt (unweighted)	266	0.77	1.11					57	0.63	0.47	1.10
Share of receipt (weighted)	266	0.72	0.78								

Notes:

- The upper bound estimates for the overall and yearly share of receipt are shown based on the preferred specification and using different datasets. The yearly share of receipt is the estimated value of funds received by households between April of that year and March of the following year (corresponding to one fiscal year), divided by the value of funds disbursed by the national government during the same period.
- The number of observations is larger for the overall estimates, as they are based on all the districts that had at least one village receiving a grant at least once over the three-year period, while the estimation of yearly receipt excludes districts which did not have a treated village in that year.
- The unweighted share of receipt is the simple average over sample districts/villages, while the weighted average share of receipt is the weighted average over sample districts with the number of sampled households used as a weight. No weighted average is computed for the SSD because the number of sampled households is common across villages.

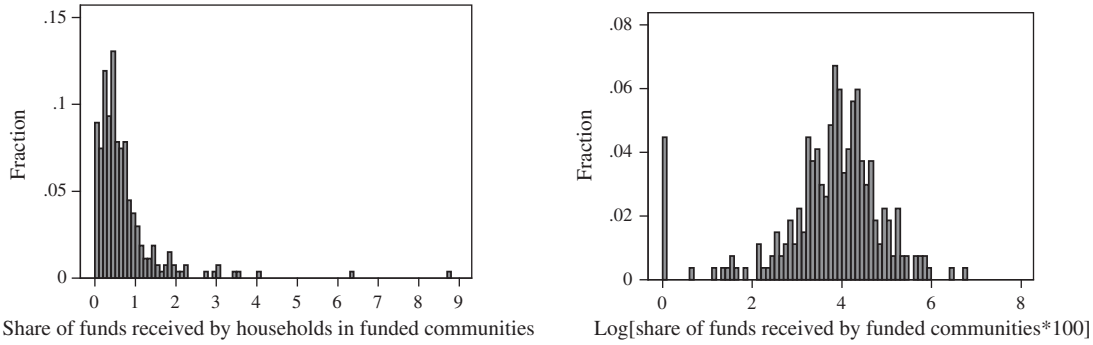

Fig. 2. Distribution of overall (1994–1996) share of disbursed funds that were actually received by households in selected villages.
Notes:

- The value of disbursement is based on the administrative data and provincial level take-up rate (Table 1). The value of receipt is the upper bound estimates based on the preferred assumptions indicated in Row A, Table 2A.
- The sample consists of districts with at least one village, which was funded under IDT and surveyed in the 1997 SUSENAS.
Sources: 1997 SUSENAS and IDT administrative data.

across-quarter distribution is less likely, we keep using the VIP allocation pattern and examine the following three alternative cases. First, the receipt of IDT benefits reported in non-IDT villages is added. This does not change the estimated receipt very much because there were only few such reports.[19] Second, the SUSENAS weight is replaced with our alternative weight (see footnote 12). The estimated receipt decreases, but only slightly, to Rp. 3.2 billion (64%). Third, receipt is estimated without the data cleaning, whose necessity is less obvious than the other data cleaning discussed in Appendix A. This increases the estimate to 3.6 billion (75%), which is still significantly smaller than the value of one, or a full receipt. The equivalent set of lower bound estimates (Column 8) indicates a consistent picture, reflecting the fact that most households stated loan sources that did not require differential assumptions (Appendix Table 1). Overall, the mean estimates are significantly smaller than a full receipt, regardless of the choice of specifications.

The estimates based on the different datasets are also generally in the ballpark (Table 2B). The overall share of receipt is 69% and 61% on the basis of the 1997 SUSENAS (Column 2) and 1997 SSD (Column 9),

[19] We thank one of the referees for suggesting the addition of the receipt of IDT benefits reported in non-IDT villages. Receipt in non-IDT villages is likely to have happened because IDT administrative officers were unable to identify selected IDT villages using their addresses, and households that were initially in IDT villages moved to non-IDT villages.

Table 3
Targeting performance with and without the consideration for missing funds.
Sources: 1997 SUSENAS and IDT data.

Overall share of receipt by the poorest quintile of households	SUSENAS1997			Difference between (2) & 0.2: t-value	SSD1997			Difference between (6) & 0.2: t-value
	N	Mean	SD		N	Mean	SD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(A) Conventional measure: denominator = sum of receipt reported by all households	256	0.246	0.102	7.25	56	0.242	0.122	2.61
New measure: denominator = disbursement								
(B) Scenario 1: 20% of missing money went to the bottom quintile	256	0.232	0.106	4.77	56	0.227	0.054	3.72
P-value for the equality between (A) and (B)			0.109				0.387	
(C) Scenario 2: no missing money went to the bottom quintile	256	0.171	0.178	−2.60	56	0.150	0.084	−4.39
P-value for the equality between (A) and (C)			0.000				0.000	

Notes:

- The targeting indicator is the share of program funds accruing to the households whose predicted per capita household expenditure falls in the bottom 20% of the distribution within each village.
- The value of missing funds in each district is estimated using the preferred specification. Its summary statistics are shown in Table 2A.
- The baseline targeting measure cannot be estimated in 12 districts because there is no sample household that participated in IDT even though the districts received an IDT grant; that is, the denominator is missing. For comparison, the mean targeting measures are reported based on scenarios 1 and 2 for those 256 districts for which the conventional measure is estimated.

respectively, which are statistically indistinguishable (Column 11). On the other hand, the yearly estimates are only partially consistent across datasets. Between the 1997 SUSENAS and SSD, all the yearly estimates are indistinguishable. However, between the 1996 and 1997 SUSENAS, which are both nationally representative, the 1995/96 estimate is statistically different. Nevertheless, all three datasets indicate a similar pattern of fluctuation: a decline between 1994 and 1995, which is reversed later as shown in the 1997 SUSENAS and SSD.

These results indicate that the overall estimates are more likely to be reliable. The overall estimates from the 1997 SUSENAS and SSD are indistinguishable, and the results in Table 2A suggests that various sources of bias are unlikely to significantly affect the overall estimates, such as the assumption on the treatment of IDT benefits whose source is unknown, the mismatch in the reference period between the disbursement and receipt data, and the leakage to non-IDT villages. This is consistent with the fact the adjustment for the mismatch between the reference periods of disbursement and receipt data is less important for the estimation of the overall share of receipt (see footnote 17). On the basis of these considerations, in the following analysis we focus on the examination of the overall share of receipt.

Measurement errors might still be included in the overall share of receipt if certain proportion of recipient households simply forgot to report their benefits. However, the estimated gap seems too large to be entirely explained by a systematic underreporting. For example, if 10% of IDT funds are forgotten by recipient households, the reported receipt should be 90% of the disbursement. However, the preferred estimate (upper bound, 69%) shown in Table 2A is significantly lower than 0.8. Though the size of a typical systematic error is unknown, it would seem quite large if as much as a fifth of the funds is forgotten. More importantly, if misreporting is the major source of missing funds and the probability for a household of forgetting to report an IDT loan is constant across districts (say, 10%), then all the districts are likely to indicate the same share of receipt (90% in this case). However, Fig. 2 suggests that there is a large, asymmetric variation in the distribution of the share of receipt. The Kolmogorov–Smirnov test also rejects the equality between this empirical distribution and the normal (as well as degenerate) distribution with the mean share being 0.1, 0.2, 0.3, …, 0.9 with the p-value of 0.001. These provide suggestive evidence implying that a systematic underreporting is unlikely to be the driving source of the variation in the share of receipt.

In sum, the estimates for the overall share of receipt range between 0.64 and 0.76, on the basis of the 1997 SUSENAS. Among those, our preferred estimate suggests that 31% of public funds went missing. This is much smaller than the case in Uganda, where 80% of public funds were lost to corruption (Reinikka and Svensson, 2004), and larger than the rate in Indonesia's *Operasi Pasar Khusus* (OPK), where at least 18% of subsidized rice went missing (Olken, 2006).

5. Missing funds and targeting performance

The large size of missing public funds has significant implications for the targeting performance of IDT. In the literature of targeting, a commonly used measure of targeting performance is the proportion of public resources provided to the poor.[20] In general, targeting performance is computed from a household survey, where individuals report whether they received benefits and how much the benefits were. In this method, a targeting measure is calculated as the value of benefits received by the poor (for example, the bottom quintile in terms of per capita household expenditure), divided by the sum of the value of benefits accruing to all households. However, this method does not take into account the possibility that the denominator is underestimated because the missing funds are ignored. As a result, it might be misleading to draw a conclusion on the nature of the distribution of benefits based solely on survey responses.

In this section, we show that even a qualitative conclusion on the distributive nature of a program could change once one takes into account missing public funds. For this exercise, we define the poor as households that fall into the bottom quintile in each village in terms of the predicted level of per capita household expenditure.[21] For estimating the value of missing funds, we use the upper bound based on the preferred specification shown in Table 2A. Since we do not know

[20] See Coady et al. (2004) for a meta-analysis based on this targeting measure, and Duclos et al. (2005) for a theoretical demonstration of cumulative program benefits in evaluating the targeting performance of different transfer programs. Another set of measures is the share of the poor who fail to receive benefits ("undercoverage") and the share of the non-poor who receive benefits ("leakage"). Undercoverage is not affected by failing to taking into account missing funds. However, leakage is underestimated to the extent there is a gap between the sum of the receipt and the total disbursement, and the gap is due to the capture by the non-poor.

[21] The predicted value is used because receiving IDT funds may shift a household's place in the distribution. The predicted value is constructed as follows: first, the OLS estimates are obtained from regressing per capita household expenditure on a number of household characteristics (the head's age, gender, education, and marital status; household size and composition; housing quality; and urban and provincial dummies) using data from 1993 (before IDT started). Second, those coefficients and data from 1997 are used to derive the predicted level of per capita household expenditure as in 1997. The targeting measures are not strictly comparable with those shown in Yamauchi (2010), which conducts the village-level analysis without including urban communities.

how the missing funds were distributed, we consider two extreme scenarios between which the reality is likely to lie. In Scenario 1, we assume the missing funds were distributed equally among benefit recipients in each district. That is, the bottom quintile in a district is assumed to have received 20% of the missing funds in that district (Scenario 1). This might be plausible if all the missing funds were lost due to negligent mismanagement by local officials. On the other hand, Scenario 2 assumes that none of the missing funds went to the households in the bottom quintile. This would make more sense if local leaders and non-poor households siphoned off the IDT funds.

The results are shown in Table 3. Row A shows the targeting measures when the total value of disbursement is assumed to be the sum of benefits reported in the survey (that is, the common method in the literature). They suggest that the allocation under IDT was pro-poor. Both estimates based on the SUSENAS and SSD indicate that 24–25% of IDT funds went to the poorest 20% of the households in IDT villages. Therefore, the loans given to the bottom quintile was 23% ((24.6–20)/20) larger under the targeted IDT distribution compared to the "universal" distribution or an equal distribution to every household, and the difference from the value of 0.2 is statistically significant.

However, once we take the missing funds into account, IDT's targeting performance becomes less pro-poor. Under Scenario 1, the figures in Row B, Columns 2 and 6, indicate the overall share accruing to the bottom quintile is about one and a half percentage points lower. The relative improvement over the equal distribution is now 16%, down from 23%. Under Scenario 2, IDT turned out to be not pro-poor. As shown in Row C, households in the bottom quintile only received 17 (15) percent of IDT funds according to the SUSENAS (SSD). This implies that, even though IDT was supposed to target the relatively poor within funded villages, its targeting performance was significantly worse than a program that equally distributes its resources. The measures under Scenario 2 are significantly different from the conventional measures with a p-value of 0.000. Taking our results to a broader context, the nature of targeting performance could be drastically changed once one takes into account the amount of missing funds.

6. The correlates of receipt and targeting performance

6.1. Empirical strategy

Next, we investigate pre-determined characteristics in 1993 that are correlated with the overall share of receipt and targeting performance, and show that not taking into account the missing funds leads to misleading conclusions on the correlates of receipt and targeting performance. These correlates are important because they can shed light on the on-going debate on the necessary conditions for the successful implementation of decentralized public resource distribution. Some argue that local institutions, such as the local government, can enhance the accuracy of targeting if they are in charge of the distribution of resources, because they can utilize local knowledge. However, previous theoretical and anecdotal evidence suggests that local elites, who are often not the intended beneficiaries, could capture public resources. Therefore, the outcome of decentralized distribution depends on local conditions such as the political awareness of residents (Bardhan and Mookherjee, 2000, 2005; Conning and Kevane, 2002; Crook and Manor, 1998; Mansuri and Rao, 2004). The limited administrative skills of community leaders have also been suggested as a factor that could offset possible benefits of a decentralized distribution system (Coady et al., 2004; Conning and Kevane, 2002). Following these studies, we consider four sets of local characteristics: the capability of local administrative institutions, residents' general human capital, and socio-economic and geographic characteristics (see Table 4 for the summary statistics). For the indicators for local administrative institutions, we use the share of villages with "good" and "excellent" administrative capability [22] as well as the average characteristics of village heads, such as age, gender, and education. Second, the general human capital of residents is characterized by the principal component of the number of years of education, proportion of adults aged 20–60 who can read and write, and proportion of adults who have read the newspaper in the previous week.[23] For socio-economic status, the level of living standards is characterized by the log of the median household per capita expenditure (PCE), and the within-village inequality is captured by the average coefficient of variation in the household PCE. Lastly, geographic characteristics are captured by the proximity to the district capital, density, population size, and degree of urbanization. We also control for the share of villages funded under infrastructure programs that supplemented IDT. The incentive to use IDT funds for purposes

Table 4
Summary statistics for independent variables.
Sources: 1993 SUSENAS and 1993 PODES.

Variables	Mean	SD
Log of median household per capita expenditure (PCE, in thousand Rp)	10.30	0.29
Average coefficient of variation within village in household PCE	0.38	0.09
Average year of education among adults aged 20–60	5.16	1.63
Share of adults aged 20–60 who can read and write alphabet	0.76	0.17
Share of adults aged 20–60 who read a newspaper in a week previous to the survey	0.13	0.12
Average village size (the number of households)	631	1213
Average village density (population per hectare)	11.94	44.91
Share of urban villages	0.15	0.27
Average village distance from the district capital (km)	62.90	64.89
Share of villages with good administrative capabilities	0.31	0.30
Share of villages with excellent administrative capabilities	0.30	0.20
Average age of village heads	43.94	3.71
Average tenure of village heads	5.54	2.49
Share of villages with female heads	0.02	0.03
Share of villages with heads who attained high school or above	0.35	0.24
Share of villages funded under infrastructure programs	0.07	0.07
Number of districts	268	

Notes:

- The sample consists of districts that contain at least one village funded under IDT at least once between 1994/95 and 1996/97.
- The household PCE, years of education, share of adults who can read and write, and share of adults who read newspaper are computed from the 1993 SUSENAS. The share of villages funded under infrastructure programs is obtained from the administrative data for those programs. The rest of the variables are computed from the 1993 PODES. For the computation of the variables from the SUSENAS and PODES, we use villages or households in villages that were funded under IDT. For the panel dataset, different sets of funded villages are used according to their funding history in order to compute the district-level characteristics for each year.
- LKMD is a village government, which is categorized into relatively organized and less organized based on self-reported evaluation. See footnote 22 for details.
- The number of years of education is calculated using information on an individual's completed education level.

[22] We define a village to have "good" administrative capability if the village government (LKMD) is self-reported to "be able to develop and conduct work projects utilizing grants from the national government matched with contributions of community members." A village is defined to have "excellent" administrative capability if its LKMD is reported to be able to "form village development plans, keep reports in order, and have well-functioning sections" in the PODES. Omitted categories are either "LKMD does not exist," or it "only exists in a very basic form." The LKMD is a national institution operating at the village level. It was created in the early 1980s as a vehicle to implement national programs for villages. Its members are usually local residents appointed by the village head (Antlov, 2003).

[23] These three indicators are correlated with each other and each partial correlation cannot be separately identified. We also have information on the proportion of adults who have listened to a radio in the seven days previous to survey. However, since this information is not correlated with the outcomes, we do not include it in the final specification.

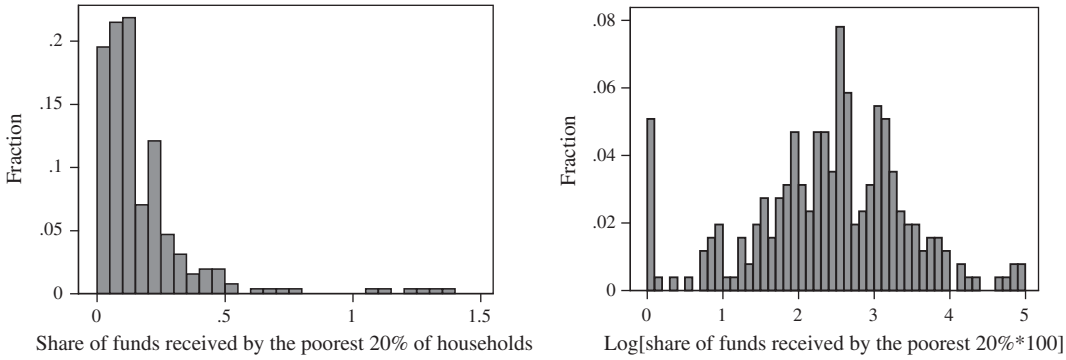

Fig. 3. Distribution of overall (1994–1996) share of disbursed funds that were received by the poorest 20% of households in selected villages.
Notes:

– The poorest 20% is determined based on the predicted per capita household expenditure.
Sources: 1997 SUSENAS and IDT administrative data.

other than loans, including infrastructure, might have been lower if those programs met the demand for infrastructure.[24]

It is useful to examine the distribution of the outcome variable, the share of receipt. The left panel of Fig. 2 shows that receipt was larger than disbursement, or the share exceeds the value of one, in 48 districts (18%). In addition, the estimated receipt was zero for 12 districts (4%). This is not surprising given that the values of received funds are estimates.[25] However, since these are measurement errors in the outcome variable, they would not bias the estimates in the regression analysis, to the extent that they are of the classical type. While there are two outliers, the regression results with and without these outliers are qualitatively consistent. We also check the robustness of the regression results by using the logarithm of the share of received funds, whose distribution is shown in the right panel of Fig. 2.[26] Since the distribution of the share of funds accruing to the poorest 20% of households is also skewed, we examine the level and logarithm of this outcome as well (Fig. 3).

6.2. Results for the correlates of overall receipt

Table 5 indicates the cross-sectional correlates of the overall share of receipt under the Tobit specification (Column 1).[27] The results indicate that a larger proportion of disbursement was received in districts that initially had a higher human capital index based on years of schooling, literacy, and newspaper readership. While the partial correlation of each factor included in the principal component cannot be separately identified, each of them shows a significantly positive association when included by itself (not shown). The positive association between receipt and newspaper readership is consistent with the finding by Reinikka and Svensson (2011). Moreover, receipt was higher in districts that initially had many villages headed by females and villages with "excellent" administrative capabilities. On the other hand, receipt tended to be lower in districts where funded villages were more likely to be urban, distant from the district capital, and funded under the infrastructure programs. Robust relationships among these are the ones between residents' human capital and higher receipt, as well as lower receipt and the proportion of urban, remote villages with the infrastructure programs (see Appendix B).

The cross-sectional correlation between the share of receipt and pre-determined characteristics might have changed across program years. The results in Columns 2–4 in Table 5 test this across-time stability of the coefficients.[28] The results suggest that the pre-existing human capital was correlated with higher receipt in the initial year, but not in the later years. One explanation for this might be that information on IDT benefits was disseminated better in places with high education levels, literacy, and newspaper readership, albeit other places caught up with these places eventually. On the other hand, districts with many urban villages experienced lower receipt initially, but this effect dissipated gradually. The positive association between receipt and female village heads also disappears toward the end of the program year.

6.3. Results for the correlates of targeting performance

The significant correlates of overall receipt are also important in explaining the differences in the correlates of targeting measures. Columns 5 and 6 in Table 5 demonstrate the results of estimating the Tobit model for the two indicators of targeting performance: the conventional measure and measure based on Scenario 2, where no missing funds are assumed to be given to the poorest 20% of the households. The results reveal that the estimates for the conventional measure provide misleading evidence not only on the nature of targeting but also on the correlates of targeting performance. Using the targeting measure based on Scenario 2, two of the correlates of receipt—the human capital indicator and the proportion of villages headed by females—are positively associated with

[24] There were two infrastructure programs: VIP for Java, and Rural Infrastructure Project for outer Java. While the share of receipt could have also been affected by the demand for credit, we find no significant relationship between the outcome and the indicators for the availability of other credit sources and access to credit sources outside the village. Also, previous studies show that ethnic fragmentation and a high proportion of Catholics or Muslim population are correlated with inferior governance (Olken, 2006; La Porta et al., 1999). However, we find that Hehfindahl indices of religion and citizenship homogeneity (created from the 1990 census) are uncorrelated with the outcomes. Information on ethnicity is unavailable in the census. These variables are therefore not included in the specifications.

[25] Districts whose overall share of received funds is larger than one are generally not different from the other districts in terms of observable characteristics. While they have more educated adults and village heads serving for a longer time, other characteristics included as the explanatory variables in the regression analysis are not significantly different.

[26] We use the log of the share expressed as the percent. For example, if a district receives 25% of disbursement, the log of 25 is used instead of the log of 0.25. For districts that indicate zero receipt or receipt of smaller than 1%, we assign the value of zero for the log of the share of received funds, and include the dummy variable indicating these observations in the regression analysis.

[27] The results do not change very much when covariates are included one by one (Appendix Table 3).

[28] Note that the estimation does not rely on variation over time in the explanatory variables. Instead, it tests for the stability over time in the coefficients. The predetermined covariates vary slightly across years according to the change in the composition of districts included in the sample, but most districts are included in all the three years. The results shown are from OLS with island dummies. The results with the district-level fixed effects are qualitatively similar.

Table 5
Share of receipt, targeting performance, and pre-existing local conditions in Indonesian districts covered under IDT (1994/95–1996/97).
Sources: 1997 and 1993 SUSENAS, 1993 PODES and IDT administrative data.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Outcome =>	Overall share of funds received by households in selected villages	Yearly share of funds received by households in selected villages			Overall share of funds received by the bottom quintile within selected villages		
		94 bench-mark	Change in coefficient between		Conventional	Worst scenario	Difference
			94 & 95	94 & 96			
Specification =>	Tobit		OLS		Tobit	Tobit	
Log of median PCE (in thousand Rp)	−0.289	−0.461	0.354	0.365	0.061*	−0.064	
	(0.200)	(0.392)	(0.311)	(0.412)	(0.036)	(0.061)	
Average coefficient of variation within village in household PCE [standardized]	−0.026	−0.113*	0.077	0.145*	−0.008	−0.011	
	(0.045)	(0.063)	(0.053)	(0.084)	(0.008)	(0.014)	
Principal component of years of schooling, literacy and newspaper readership	0.143***	0.180**	−0.130*	−0.091	0.001	0.031**	*
	(0.048)	(0.086)	(0.067)	(0.098)	(0.008)	(0.014)	
Log of average village size (number of households)	−0.064	0.031	−0.092	−0.320**	−0.007	−0.031	
	(0.088)	(0.108)	(0.097)	(0.131)	(0.016)	(0.027)	
Log of average village density (population per hectare)	−0.055	−0.002	−0.022	−0.034	0.000	−0.015	
	(0.051)	(0.074)	(0.063)	(0.091)	(0.009)	(0.015)	
Share of urban villages	−1.040***	−1.075**	0.938**	0.519	0.032	−0.169	
	(0.330)	(0.520)	(0.390)	(0.509)	(0.060)	(0.103)	
Log of average distance from the district capital	−0.158**	−0.074	0.006	−0.075	0.002	−0.024	
	(0.066)	(0.099)	(0.090)	(0.124)	(0.012)	(0.020)	
Share of villages with good administrative capabilities	−0.001	0.026	−0.019	0.058	0.013	0.006	
	(0.061)	(0.085)	(0.071)	(0.090)	(0.011)	(0.018)	
Share of villages with excellent administrative capabilities	0.106*	0.059	−0.037	−0.008	0.012	0.029	
	(0.063)	(0.103)	(0.087)	(0.098)	(0.011)	(0.019)	
Average age of village heads	−0.022	−0.034	0.003	0.035	−0.001	−0.002	
	(0.016)	(0.036)	(0.025)	(0.036)	(0.003)	(0.005)	
Share of villages with female heads	3.093*	4.307	−1.554	−6.165*	0.221	1.263**	*
	(1.630)	(3.119)	(1.614)	(3.395)	(0.291)	(0.499)	
Average tenure of village heads	0.042*	0.087	−0.025	−0.096*	0.002	0.002	
	(0.024)	(0.058)	(0.030)	(0.049)	(0.004)	(0.007)	
Share of villages with heads who attained high school or above	−0.310	−0.094	−0.256	0.368	0.059	−0.020	
	(0.315)	(0.573)	(0.432)	(0.649)	(0.057)	(0.097)	
Share of villages funded under infrastructure programs	−1.154*	−1.066	0.008	0.004	0.063	−0.290	
	(0.628)	(0.885)	(0.794)	(1.049)	(0.111)	(0.189)	
Number of districts	268		784		256	256	
Number of districts censored at zero	12		12		8	8	
Log likelihood	−261.60		−882.71		180.79	50.61	
F-stat			1.79				
p-value for the joint significance of the differences in the coefficients							0.00

Notes:

- The outcome variable used in Column 1 is the overall share of receipt in the fiscal years of 1994/95 through 1996/97. The sample consists of districts with at least one village receiving an IDT grant at least once during those years.
- The outcome variable used in the regression whose results are shown in Columns 2–4 is the yearly share of receipt for each fiscal year.
- The outcome variable used in Columns 5 and 6 is the share of funds received by the poorest 20% of households within selected villages in each district.
- The set of island dummy variables classifies the sample districts into six regions: Sumatera, Java, Kalimantan, Sulawesi, a group of Bali and Nusa Tenggara islands, and a group of Eastern islands.
- For the Tobit models, the estimated marginal effects on the underlying outcome variable are shown.
- The specification shown in Columns 2–4 control for island-specific year trends.
- Standard errors in parentheses. + $p<0.10$, * $p<0.05$, ** $p<0.01$, and *** $p<0.001$.

the share of funds accruing to the poorest 20%. These associations are not significant in the estimates based on the conventional measure of targeting. In addition, per capita household expenditure is positively correlated with the conventional measure of targeting but not with the targeting measure based on Scenario 2.[29] Thus, the analysis solely based on the conventional measure would incorrectly lead to the conclusion that the level of per capita household expenditure, which is often used as a proxy for the income level, is an important correlate, and would also fail to find the positive correlation between targeting and human capital as well as the gender of local leaders.

[29] In general, these discrepancies are found across different specifications (see Appendix B).

7. Conclusion

In this study, we have investigated the amount of unaccounted public funds under IDT, a large-scale anti-poverty grant for lagging villages in Indonesia. Combining administrative records on disbursement and the survey data on receipt, our preferred specification has shown that on average, 31% of IDT funds went missing. Utilizing this information, we have demonstrated that a seemingly pro-poor distribution could turn out to be worse than an equal distribution to everyone, once the missing funds are taken into account. In addition, failing to take into account the missing funds leads to misleading conclusions on the correlates of targeting performance. Specifically, in the case of IDT, districts that initially had high human capital and many more female village heads exhibited both fewer missing funds and better targeting of the poorest 20% of the households. However, these findings would not have been found if one had not taken into account the missing funds.

Furthermore, one would also wrongly conclude that per capita household expenditure is positively correlated with better targeting.

These results have important implications. First, if corrupt payments to public officials and concealed receipt by ineligible private individuals tend to exist with pro-poor allocation of the funds that are left after the secretive transfers (for example, public agents and ineligible private individuals might prefer openly transferred funds to be concentrated among the poor to cover up their hidden transfers), the conventional targeting measures, which rely only on survey responses and thus possibly fail to take into account missing funds, are likely to result in a misleading conclusion on the nature of program resource allocation. Second, if certain local characteristics are correlated with such secretive transfers combined with pro-poor distribution of the left-over funds, those local characteristics will be incorrectly identified as potentially favorable conditions for pro-poor distribution. Similarly, if correlates include targeting method indicators, an analysis based solely on the conventional measure can incorrectly identify effective methods. To avoid these misleading assessments, it is important to utilize the information on disbursement in the evaluation of targeting performance. Though such information is often unavailable, taking into consideration a possible amount of missing funds would be imperative in investigating targeting performance.

Appendix A. Data issues in the estimation of the share of received funds

The value of IDT funds received is computed based on survey responses from households about the size of loans by year and source. Before computation, we corrected the following three types of reporting errors in the 1997 SUSENAS. One is the conversion of loan sizes such as "9999999" into a missing value or an imputed value using the village-level mean loan size when it is available. Out of 260,509 households in the dataset, less than seven households were affected by this adjustment for each of the years of 1994, 1995, and 1996. The second correction concerns 327 loans whose sources were unreported. We found that the size of the majority of these loans ended with "1." This was a clear deviation from the distribution of the last digit of loan size, which was usually "0" or "5." Since the response to loan size was followed by the response to loan source on the questionnaire sheet, it is likely that the value indicating loan source was typed in as the last digit of loan size. We corrected these cases. The third data issue is related to 24, 17, and 223 loans in 1994, 1995, and 1996, respectively, whose sizes ended with "001" or "002." These cases were particularly concentrated in one province. While loan sources were available, the last digit of these loans was also removed. Compared to the first two types of reporting errors, it is less obvious whether this third data issue is due to reporting errors. Thus, we provided estimates based on with and without the last type of data cleaning in Table 2A. Both estimates indicate receipts that are significantly smaller than a full receipt.

After the data cleaning, we adjusted loan size depending on how the loan was obtained. A recipient answered whether the source of a loan was direct funds, rotated funds, unknown, a mixture of direct and rotated funds, or a mixture of direct and unknown sources. Appendix Table 1 shows that most recipients indicated only one loan source. The share of loans from the direct source declined over time, suggesting that recipients became to receive rotated funds in later years.

Appendix Table 1
Distribution of loans by source among recipients (%).
Source: 1997 SUSENAS.

	1994	1995	1996
Direct	85.33	73.88	73.21
Rotated	13.77	23.86	23.64
Unknown	0.81	2.12	2.20
Direct/rotated	0.08	0.13	0.95
Direct/unknown	0.00	0.02	0.00
Rotate/unknown	0.00	0.00	0.00

If a loan was directly extended from IDT grants, it was included in the amount of received funds. If a loan was extended from rotated (repaid) funds, to avoid double-counting, we converted the size of these loans into zero. For the rest of the cases, we made two types of assumptions and created the upper and lower bounds for the share of received funds. If a household received some of the loans directly from IDT funds and other loans from rotated funds, we divided the total value of the loans by two for the upper bound. This assumes that half of the loans were from rotated funds. On the other hand, we divided the total value of loans by three to create the lower bound, on the basis of the possibility that the first loan was smaller than loans received later. Similar adjustments were made for cases where some of the loans were directly from IDT funds and others were from unknown sources. Some households did not know loan source at all. In this case, for the upper bound, we left the loan size as it was, and for the lower bounds, we converted it to zero. These treatments are summarized below.

Appendix Table 2
Assumption on loan size by loan source.

Upper bound		Lower bound	
Source	Treatment	Source	Treatment
Direct	As it is	Direct	As it is
Rotated	0	Rotated	0
Unknown	As it is	Unknown	0
Direct/rotated	Divided by two	Direct/rotated	Divided by three
Direct/unknown	Divided by two	Direct/unknown	Divided by three

Further, we attempted to distinguish between the case where households received loans and the case where the community group (*pokmas*) received grants but loans have not yet been distributed at the time of survey. In the latter case, the grant value per group member was reported as loan size (SUSENAS 1996, Manual IIIA). This could be an overestimation of the value of funds because some of the grant might have never been given to member households. Unfortunately, we cannot identify these cases. One might consider examining the variance in loan size within a *pokmas*. However, it cannot be computed since we do not know which *pokmas* each surveyed household belonged to. Also, the lack of within-*pokmas* variation does not necessarily mean that no loan was given to households if a *pokmas* had a rule that each recipient obtained a loan of the same size.

Appendix B. Robustness check for the results on receipt and targeting performance

Appendix Table 3 shows that the results indicated in Columns 1 and 6, Table 5 do not change substantively when covariates are included one by one. Columns 1–9 in Appendix Table 4 use the same dataset as the one used in Table 5, but use different outcome variables or estimation methods. Tobit estimation is employed for the results in Columns 1–7. Those in Column 1 exclude the two largest outliers shown in Fig. 2. Those in Column 2 use the lower, instead of upper, bound for the outcome. The outcome variable in Column 3 is based on the alternative assumption for the across-time distribution of IDT loans, while that in Column 4 includes leakage to non-IDT villages within the same district. The outcome variable in Column 5 is computed using the alternative weight, and that in Column 6 is based on data without the final data cleaning. The outcome variable in Column 7 is the log of the share of receipt, multiplied by 100. Columns 8 and 9 show the results based on the OLS estimation using the outcome used in Table 5 and the log of the outcome multiplied by 100. Finally, Column 10 indicates the results based on the 1997 SSD using the same outcome variable and specification as the ones used in Table 5.

Appendix Table 3
Robustness check for the correlates of the share of receipt under IDT (1994/95–1996/97, Tobit model).
Sources: 1997 SUSENAS, 1993 PODES and IDT administrative data.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome =>	Overall share of funds received by households in selected villages				Overall share of funds received by the bottom quintile within selected villages			
Log of median PCE (in thousand Rp)	−0.072	−0.411**	−0.290	−0.289	0.027	−0.083	−0.070	−0.064
	(0.161)	(0.198)	(0.200)	(0.200)	(0.049)	(0.060)	(0.061)	(0.061)
Average coefficient of variation within village in household PCE [standardized]	−0.031	−0.025	−0.019	−0.026	−0.014	−0.012	−0.012	−0.011
	(0.043)	(0.043)	(0.043)	(0.045)	(0.013)	(0.013)	(0.013)	(0.014)
Principal component of years of schooling, literacy and newspaper readership		0.104***	0.142***	0.143***		0.033***	0.038***	0.031**
		(0.036)	(0.040)	(0.048)		(0.011)	(0.012)	(0.014)
Log of average village size (number of households)			−0.082	−0.064			−0.019	−0.031
			(0.079)	(0.088)			(0.024)	(0.027)
Log of average village density (population per hectare)			−0.044	−0.055			−0.008	−0.015
			(0.050)	(0.051)			(0.015)	(0.015)
Share of urban villages			−0.819**	−1.040***			−0.102	−0.169
			(0.324)	(0.330)			(0.102)	(0.103)
Log of average distance from the district capital			−0.152**	−0.158**			−0.027	−0.024
			(0.065)	(0.066)			(0.020)	(0.020)
Share of villages with good administrative capabilities				−0.001				0.006
				(0.061)				(0.018)
Share of villages with excellent administrative capabilities				0.106*				0.029
				(0.063)				(0.019)
Average age of village heads				−0.022				−0.002
				(0.016)				(0.005)
Share of villages with female heads				3.093*				1.263**
				(1.630)				(0.499)
Average tenure of village heads				0.042*				0.002
				(0.024)				(0.007)
Share of villages with heads who attained high school or above				−0.310				−0.020
				(0.315)				(0.097)
Share of villages funded under infrastructure programs				−1.154*				−0.290
				(0.628)				(0.189)
Number of districts	268	268	268	268	256	256	256	256
Number of districts censored at zero	12	12	12	12	8	8	8	8
Log likelihood	−280.30	−276.25	−269.28	−261.60	37.24	41.86	43.73	50.61

Appendix Table 4
Robustness of the correlates of receipt.
Sources: the 1997, 1996 and 1993 SUSENAS, 1997 SSD, the 1993 PODES and IDT administrative data.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dataset =>	97 SUS									97 SSD
Model =>	Tobit							OLS		Tobit
Outcome variable specification =>	No outlier	Lower bound	Alt. Distribution	Incl. leak	Alt. weight	No data cleaning	Log	Upper bound	Log	Upper bound
Log of median PCE (in thousand Rp)	−0.412**	−0.304	−0.298	−0.237	−0.257	−0.350	−0.609**	−0.268	−0.551**	−0.307**
	(0.185)	(0.200)	(0.220)	(0.202)	(0.180)	(0.259)	(0.260)	(0.201)	(0.260)	(0.139)
Average coefficient of variation within village in household PCE [standardized]	−0.018	−0.026	−0.026	−0.028	−0.006	0.007	−0.083	−0.028	−0.082	−0.020
	(0.042)	(0.046)	(0.050)	(0.046)	(0.041)	(0.059)	(0.058)	(0.046)	(0.060)	(0.035)
Principal component of years of schooling, literacy and newspaper readership	0.121***	0.141***	0.161***	0.134***	0.119***	0.163***	0.176***	0.138***	0.163***	−0.019
	(0.044)	(0.048)	(0.052)	(0.048)	(0.043)	(0.061)	(0.062)	(0.048)	(0.062)	(0.026)
Log of average village size (number of households)	−0.099	−0.081	−0.068	−0.059	−0.071	−0.091	−0.113	−0.045	−0.111	0.127
	(0.082)	(0.089)	(0.097)	(0.089)	(0.080)	(0.114)	(0.114)	(0.089)	(0.116)	(0.098)
Log of average village density (population per hectare)	−0.063	−0.053	−0.066	−0.057	−0.068	−0.064	−0.106	−0.065	−0.103	−0.039
	(0.047)	(0.051)	(0.056)	(0.052)	(0.046)	(0.066)	(0.066)	(0.052)	(0.067)	(0.031)
Share of urban villages	−1.022***	−1.015***	−1.149***	−0.900***	−0.708**	−1.527***	−0.480	−0.791**	−0.398	−0.041
	(0.306)	(0.331)	(0.362)	(0.331)	(0.298)	(0.428)	(0.440)	(0.325)	(0.441)	(0.117)
Log of average distance from the district capital	−0.136**	−0.158**	−0.174**	−0.143**	−0.101*	−0.316***	−0.086	−0.148**	−0.078	0.022
	(0.061)	(0.066)	(0.072)	(0.067)	(0.059)	(0.085)	(0.085)	(0.066)	(0.086)	(0.032)
Share of villages with good administrative capabilities	−0.006	−0.002	0.011	0.006	0.024	0.069	0.047	0.001	0.045	0.140***
	(0.056)	(0.061)	(0.067)	(0.062)	(0.055)	(0.079)	(0.079)	(0.062)	(0.080)	(0.036)
Share of villages with excellent administrative capabilities	0.116**	0.107*	0.110	0.092	0.142**	0.163**	0.128	0.074	0.111	0.048
	(0.058)	(0.063)	(0.069)	(0.063)	(0.057)	(0.082)	(0.083)	(0.063)	(0.083)	(0.035)
Average age of village heads	−0.010	−0.022	−0.023	−0.021	−0.022	−0.025	−0.017	−0.019	−0.015	−0.006
	(0.015)	(0.017)	(0.018)	(0.017)	(0.015)	(0.021)	(0.021)	(0.017)	(0.022)	(0.004)
Share of villages with female heads	3.317**	3.031*	3.133*	3.055*	1.687	2.103	2.507	2.508	2.380	
	(1.502)	(1.634)	(1.791)	(1.649)	(1.471)	(2.106)	(2.112)	(1.645)	(2.151)	
Average tenure of village heads	0.014	0.041*	0.043*	0.042*	0.042*	0.034	0.004	0.036	0.005	−0.025**
	(0.022)	(0.024)	(0.026)	(0.024)	(0.021)	(0.031)	(0.031)	(0.024)	(0.031)	(0.010)

(continued on next page)

Appendix Table 4 (*continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dataset =>	97 SUS									97 SSD
Model =>	Tobit							OLS		Tobit
Outcome variable specification =>	No outlier	Lower bound	Alt. Distribution	Incl. leak	Alt. weight	No data cleaning	Log	Upper bound	Log	Upper bound
Share of villages with heads who attained high school or above	−0.131 (0.292)	−0.306 (0.316)	−0.307 (0.346)	−0.264 (0.318)	−0.479* (0.285)	−0.818** (0.408)	−0.520 (0.413)	−0.169 (0.316)	−0.426 (0.415)	−0.081 (0.079)
Share of villages funded under infrastructure programs	−1.158** (0.578)	−1.151* (0.629)	−1.311* (0.690)	−1.077* (0.636)	−0.744 (0.567)	−1.840** (0.811)	−1.720** (0.808)	−1.134* (0.636)	−1.685** (0.823)	
1 if the dependent variable is zero							−20.884 (0.000)		−3.334*** (0.583)	
Number of districts	266	268	268	268	268	268	268	268	268	57
Number of districts censored at zero	12	12	12	10	12	12	12	12	12	1
Log likelihood	−236.96	−262.07	−285.81	−267.52	−235.12	−327.03	−317.16	2.09	5.32	4.91

Notes:

- The sample for Column 1 excludes two outliers (see Fig. 2).
- The outcome variable used in Column 2 is the lower bound. The outcome variable in Column 3 assumes that IDT funds were allocated uniformly across quarters within a year. The outcome variable in Column 4 includes the receipt observed in non-IDT villages as receipt for IDT villages in the same district. The outcome variable in Colum 5 is computed using an alternative sampling weight. The outcome variable in Column 6 is computed without a data cleaning process which is less obvious than other cleaning processes discussed in Appendix A.
- The outcome variable in Column 7 is the log of the share of receipt multiplied by 100. If the share is zero, a value of zero is assigned to the log outcome variable.
- The results shown in Columns 8 and 9 are based on the OLS estimation.
- The results in Column 10 are based on the 1997 SSD. The way the outcome variable is constructed is the same as that for the outcome variable used in Table 5.
- Standard errors in parentheses. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Appendix Table 5
Robustness of the correlates of targeting performance (Tobit model).
Source: SUSENAS1997.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Receipt variable specification =>	No outlier			Lower bound			No data cleaning			Log		
Outcome = Share of funds accruing to the poorest 20% based on:	Conventional	Worst scenario	Difference	Conventional	Worst scenario	Difference	Conventional	Worst scenario	Difference	Conventional	Worst scenario	Difference
Log of median PCE (in thousand Rp)	0.071** (0.035)	−0.028 (0.040)	*	0.062* (0.037)	−0.066 (0.061)	*	0.063* (0.035)	−0.084 (0.071)		0.064 (0.197)	−0.548* (0.300)	*
Average coefficient of variation within village in household PCE [standardized]	−0.010 (0.008)	−0.017* (0.009)		−0.007 (0.008)	−0.010 (0.014)		−0.009 (0.008)	−0.004 (0.016)		−0.087* (0.044)	−0.133* (0.067)	
Principal component of years of schooling, literacy and newspaper readership	0.002 (0.008)	0.033*** (0.009)	**	0.004 (0.009)	0.029** (0.014)		0.002 (0.008)	0.034** (0.017)		0.050 (0.047)	0.209*** (0.071)	*
Log of average village size (number of households)	−0.003 (0.015)	−0.011 (0.017)		−0.002 (0.016)	−0.038 (0.027)		−0.006 (0.016)	−0.040		−0.139 (0.031)	−0.217* (0.132)	
Log of average village density (population per hectare)	−0.001 (0.010)	−0.026*** (0.010)	*	0.002 (0.009)	−0.014 (0.015)		0.002 (0.009)	−0.020 (0.018)		0.007 (0.050)	−0.102 (0.076)	
Share of urban villages	0.020 (0.060)	−0.070 (0.068)		0.001 (0.062)	−0.168 (0.103)		0.020 (0.060)	−0.271** (0.121)		0.146 (0.334)	−0.561 (0.507)	
Log of average distance from the district capital	0.001 (0.012)	−0.013 (0.013)		−0.001 (0.012)	−0.024 (0.020)		0.002 (0.012)	−0.063*** (0.023)		0.028 (0.065)	−0.082 (0.098)	
Share of villages with good administrative capabilities	0.014 (0.011)	0.006 (0.012)		0.012 (0.011)	0.006 (0.018)		0.015 (0.011)	0.026 (0.022)		0.027 (0.060)	0.092 (0.090)	
Share of villages with excellent administrative capabilities	0.009 (0.011)	0.025* (0.013)		0.011 (0.012)	0.029 (0.019)		0.012 (0.011)	0.046** (0.023)		0.096 (0.063)	0.178* (0.096)	
Average age of village heads	−0.001 (0.003)	−0.003 (0.003)		−0.001 (0.003)	−0.002 (0.005)		−0.001 (0.003)	−0.003 (0.006)		−0.002 (0.016)	−0.013 (0.025)	

Appendix Table 5 (*continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Receipt variable specification =>	No outlier			Lower bound			No data cleaning			Log		
Outcome = Share of funds accruing to the poorest 20% based on:	Conventional	Worst scenario	Difference	Conventional	Worst scenario	Difference	Conventional	Worst scenario	Difference	Conventional	Worst scenario	Difference
Share of villages with female heads	0.228	0.635*		0.291	1.266**	*	0.268	0.993*		0.388	5.230**	*
	(0.298)	(0.341)		(0.300)	(0.498)		(0.289)	(0.585)		(1.608)	(2.446)	
Average tenure of village heads	0.003	0.002		0.004	0.002		0.003	−0.002		0.015	0.007	
	(0.004)	(0.005)		(0.004)	(0.007)		(0.004)	(0.008)		(0.023)	(0.035)	
Share of villages with heads who attained high school or above	0.045	−0.068		0.053	−0.016		0.052	−0.137		0.174	−0.415	
	(0.055)	(0.063)		(0.058)	(0.097)		(0.056)	(0.114)		(0.314)	(0.477)	
Share of villages funded under infrastructure programs	0.060	−0.182		0.030	−0.312		0.043	−0.460**		0.673	−1.345	*
	(0.108)	(0.123)		(0.114)	(0.189)		(0.110)	(0.221)		(0.613)	(0.931)	
Number of districts	250	250		256	256		256	256		256	256	
Number of districts censored at zero	8	8		8	8		8	8		8	8	
F-stat												
Log likelihood	184.34	154.93		173.47	50.81		182.71	11.56		−249.02	−346.65	
p-value for the joint significance of the differences in the coefficients			0.00			0.00			0.00			0.00

Notes:

- The outcome variable is the share of funds accruing to the poorest 20 percent. The conventional measure divides the funds received by the poorest quintile by the sum of receipt reported by all the surveyed households. The measure based on the worst scenario uses the same numerator as the conventional measure, but uses the disbursement from the government as the denominator.
- The receipt variable specification indicates how the district-level value of receipt is estimated. See the notes to Appendix Table 4 for definitions.
- Results based on the OLS model are qualitatively similar.
- Those based on the 1997 SSD (using either the Tobit or OLS model) indicate qualitatively similar findings for the positive association between the outcome and the per capita household expenditure.

It is not surprising that the results based on the SSD indicate a somewhat different picture because it is not nationally representative and there are other data issues. First, the first three explanatory variables are not pre-determined but measured in 1997. Since few villages in the SSD are matched with the 1993 SUSENAS, those variables have to be extracted from the SSD. Second, we cannot include the indicator for female village heads because no village had a female village head in 1993. Third, the receipt of the infrastructure program cannot be controlled due to a very low matching rate.

Appendix Table 5 tests the robustness of the rsults for targeting performance. The results shown in Columns 1–3 exclude the six observations exceeding the value of one (see Fig. 3), whereas those in Columns 4–6 use the lower, instead of upper, bound for the outcome. Those in Columns 7–9 use data without the final data cleaning, and the results in Columns 10–12 are based on the log of the share of receipt, multiplied by 100. The results based on the OLS estimation are qualitatively similar (not shown). Those based on the 1997 SSD indicate qualitatively similar findings for the positive association between per capita household expenditure and the outcome, using either the Tobit or OLS model (not shown).

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