School committees versus centralized targeting.[*]

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Abstract

Two alternative ways to select beneficiaries of a cash transfer program implemented in Mexican high-schools are contrasted. One method follows the ranking of applicants suggested by a school committee while the other is based on a centrally-formed needs-based ranking. Of the beneficiaries selected, 62% would have been chosen regardless while 38% depend on the procedure randomly assigned to their school. Evidence suggest that committees: (i) sacrifice poverty of the grantees in exchange of merit, (ii) better identify falsification of information and (iii) follow a procedure that is not possible to replicate using a classification algorithm. If assigned via committees, school outcomes show a 3.1 p.p. increase in dropout rates, which contrasts with a 0.18σ increase in GPA and a 5.5 p.p. increase in passing grades. These effects are totally driven by beneficiaries who depend on the targeting procedure assigned.

Keywords: Targeting, education, cash transfers, school committee.
JEL classification: I38, I22, I28, H75.

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1 Introduction

A wide literature analyzing the effects of cash transfers programs conditional on school attendance has shown positive results on schooling outcomes .[1] These programs work under the premise that the economic restriction is the most relevant constraint that hinders schooling enrollment. To identify households affected by such constraint, programs usually rely on a centralized targeting system which gathers information about potential beneficiaries and calculates a generic poverty index as a proxy for their economic condition (Coady et al., 2004). This method is not exempt from risks, such as false reports of information (Camacho and Conover, 2011; Martinelli and Parker, 2009), or inability to assess specific vulnerability conditions that are hard or very costly to measure (Alatas et al., 2012). Moreover, recent research done in the context under study has found mixed to negligible impacts of cash transfer program (Dustan, 2018; Peña, 2013). A potential explanation is that this poverty-targeting strategy oversees other relevant causes of school dropout that could possibly be prevented with monetary incentives. In such a context, targeting strategies that defer the selection decision to individuals with greater knowledge of the local context and the conditions of potential recipients might yield important advantages towards the established goal of the program. A concern of such a design, however, is the risk of the private capture of resources (Basurto et al., 2017).

This paper contributes to the literature by comparing the implementation of an administratively centralized targeting system with respect to a local one. To provide rigorous evidence, an RCT was implemented in the context of a cash transfer program that seeks to reduce school dropouts. At the central administration level, it was randomly defined that the beneficiaries of the program in a given school would be determined following that school committee's recommendations or the ranking centrally-defined using a poverty means-test index. The evidence gathered from the program's applications and school administrative information shows that: (i) a high proportion of beneficiaries depend on the format used; (ii) when selecting recipients, school committees sacrifice economic needs in favor of school merit; (iii) evidence from the

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[1]Some (out of many) influential studies in this literature include Angrist et al. (2002); Baird et al. (2011); Behrman et al. (2011); Duflo et al. (2017); Filmer and Schady (2014); Kremer et al. (2009). To dig deeper see Glewwe and Muralidharan (2016) and Parker et al. (2008) for reviews.

application forms' completion does not allows me to disregard the possibility of information manipulation; (iv) dropout rates decrease as a result of using the centrally-based targeting system; but in exchange (v) beneficiaries selected under the committee display a better school performance, measured through their grades.

The local targeting literature stresses the tradeoff between better information and risk of capture of resources when comparing both targeting methods. Basurto et al. (2017) show how the risks involved in this tradeoff can be counterbalanced with a more productive use of resources which, if ultimately are shared, does not necessarily lead to a reduction in welfare. In the context of an agricultural and food distribution program, they find that deferring the beneficiary selection to local chiefs yields a grade of nepotism[2] that is compensated with higher productivity. Vera-Cossio (2017) studies the same local versus centralized selection with the allocation of loans. This case is particularly interesting since targeting has a clear indicator of success: repayment. The author finds suggestive evidence of favoritism through the analysis of networks, but such mistargeting outcome is partially offset by the supply of informal credits. Alatas et al. (2012) compare the use of a community-based targeting approach to a centralized (and a hybrid between the two). Their findings suggest that even though the community approach delivers worse selection results, this might be explained by the fact that the objective function (i.e. selecting the poor) could be conceived differently by the community. Finally, although not local versus central decision-making, Barrera-Osorio and Filmer (2016) contrast the two targeting formats most frequently used in scholarship programs: needs-based versus merit based scholarships. They find that both strategies improve enrollment, but only merit based scholarships improve grades also. They attribute this to the framing of the scholarship rather than the recipients selection.

In the education literature, this paper also contributes to the work in local governance (or school-based management). Papers in this literature exemplify how the involvement of school-committees influence (or not) educational outcomes through their participation in different aspects of school decision making. Pradhan et al. (2014) study the impact of school commit-

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[2]Chiefs were instructed by the program's guidelines to select beneficiaries based on a wide definition of vulnerability (e.g. elderly, orphans, HIV-positive).

tees whose role was to give recommendations on aspects like school expenditure and teacher qualifications by promoting community engagement. They find limited effect on educational outcomes except when a strong link to a village council was implemented. Similarly, Duflo et al. (2015) finds positive effects on student performance when school committees influence the contract renewal of teachers and participate on their evaluation. Khanna (2015) analyzes different levels of decentralization in the decision-making of the use of resources. He finds that decentralization benefits literacy levels given the decisions of school construction. In the present paper's context, Santibañez et al. (2014) evaluate a program (*Quality Schools Program*) that gives school councils decision-making power upon the use of public funds in the school (as opposed to centralized decisions). They find positive effects on learning through the use of a difference in difference estimation, which are likely driven by infrastructure improvements.

The program under study is of particular interest since its purpose is clearly established in its regulation (SEP, 2017), and even explicitly mentioned in the program's name: Grants Against Dropouts (*Becas Contra el Abandono* in Spanish). In this program, students fill a pre-application at their school, which includes a letter describing the reason to apply[3] plus a socio-economic and demographic survey. A school committee ranks applicants based on their *dropout risk* and files the final application to the central administration, which makes the awards based on the recommendations, the application content and the available budget. This method contrasts with another format that the central administration employs, which consists of directly receiving the applications from the students and using socio-economic information to decide awards based on their need. The latter format does not involve an intermediary and employs a different targeting method. In the context of this paper, the intermediary will always be involved.

An RCT was implemented to evaluate the impact of following the committee-based targeting (hereon CBT) with respect to using the centrally-based algorithm, which assigns scholarships based on the poverty-proxy index (hereon PMT). Applications sent by the committees were gathered by the central authority. Implementing the PMT, the number of scholarships

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[3]The letter is not mandatory, but suggested. Nonetheless, only 17% of the applications verified under this project included a list of motives.

to be assigned to a given school was defined. Then, scholarship decision were made depending the randomization result: PMT schools kept the needs based assignment and CBT schools followed the committee ranking. Applicants can be classified in four types depending on the interaction between the targeting strategies: (a) *Always receivers* would be applicants that under both strategies would be selected to receive the scholarship; (b) *CBT benefactors* would be selected only if their school employs CBT; (iii) *PMT benefactors* on the contrary would only be eligible if their school uses PMT; and (iv) *Never receivers* would not be selected to receive a scholarship regardless of the targeting followed. *CBT* and *PMT benefactors* can be thought of as *compliers* since they are influenced by the random assignment. In my sample, the applicants are distributed as follows: 24% of the applicants are *always receivers*, 15% are *CBT benefactors*, 15% are *PMT benefactors* and 46% are *Never receivers*.

The results of this paper are divided in two parts. First, a comparison of the beneficiaries selected under each targeting strategy is provided. Differences are driven by the contrast between the *CBT* and *PMT benefactors*. The evidence shows that committees tradeoff economic needs for student merit. *CBT benefactors* have lower levels of assets and services in their households, but surprisingly display a very similar distribution of (self-reported) income per capita, which raises the concern of misreport from the committees.

Second, using administrative data from schools, I evaluate the impact on educational outcomes. *PMT benefactors* benefit the most from PMT assignment since they decrease dropout rates by 3.1 percentage points, which is sizeable with respect to the 12.8% average dropout rate. *CBT benefactors* do not exhibit effects on dropout rates as a result of being assigned to a CBT school. However, interestingly they display improvement in academic performance in the order of 0.18 standard deviations in their math GPA accompanied by an increase of 5.5 percentage points in the likelihood having a passing grade. *Always* and *never receivers* do not display any significant effects on the educational outcomes collected.

The rest of the paper is organized as follows: section 2 describes the Mexican high school context, the program under analysis and details the experiment design; section 3 describes the data sources employed in the analysis; section 4 describes the differences between the profiles

of applicants selected under either targeting assignment; section 5 follows into the impacts on educational outcomes; finally, section 6 concludes.

2 The scholarship program and the high-school context in Mexico

2.1 Context

During the 2017-2018 school term, 5.2 million students were enrolled at the high school level in Mexico (i.e. 10th-12th grade).[4] The main challenges faced at this level are school dropouts and quality. Statistics indicate that on average 14% of students dropout each year, being this proportion concentrated in the first year of high school, in which dropouts reach 23%. As for quality, test score indicators show that in reading and math, 34% and 66% of students scored in the lowest level (out of four).[5] The 2011 National Dropout Survey indicates that 63% of students mention an economic reason as an important reason for quitting school. The second and third most common reasons mentioned are not passing and marriage/pregnancy mentioned by 42% and 27% of students, respectively.[6]

Established in 2013, the *Grants Against Dropouts* program has awarded more than one million cash transfer awards to high-school students with the purpose of preventing dropouts. Applicants that are receiving scholarships from other sources (e.g. Progresa) are non-eligible. To apply to the program, students must submit an application at their schools which includes: (1) a letter describing their motives to request the cash support, and (2) a survey with socio-economic and demographic information.[7] The applications are revised by a school committee

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[4]Administratively, this is a complex level in Mexico since schools are organized in systems which comprise different formats of schooling, mainly technical (i.e. terminal education), distance, adults, TV-broadcast and regular schooling.

[5]For reading this is described as inability to identify an authors' point of view and to express in their own words the content of a text. For math it means that students struggle with simple equations and operations with fractions.

[6]Students were asked to enumerate all the reasons that might have explained dropout. The percentages do not sum up to 100%

[7]The survey completed by the students is widely used by the Ministry of Education. It asks for number of individuals in the household, latest total monthly income, parent's characteristics (e.g. age and schooling), household assets (e.g. refrigerator, washing machine, computer) and characteristics (e.g. water supply, electricity, dirt floor).

which ranks students according to their evaluation of *dropout risk*. Committees are composed of seven members, which include the school principal, the vice-principal, three teachers and two parents. The committee then submits a package of applications, which includes the information delivered by the students and their suggested ranking of potential recipients to the Federal Ministry of Education. The package is electronically filed and must include: (i) names, position, IDs and signature of the committee members; and (ii) a ranked list of the applicants. The ranked list must include the names, address, email, telephone, grade, GPA, risk of dropout (ranked between 1 and 5), and household income per capita of the applicants.[8] To form such ranking, the Ministry of Education provides guidelines of socio-economic and demographic information (e.g. income per capita, gender, pregnancy status) that are employed in other scholarship programs. However, the guidelines establish also that the committee has the ability not to follow those suggestions and to order students as they best consider. The Ministry of Education then decides based on the available budget and the amount of applications, the grants to be awarded.

The alternative method used by the Ministry of Education to award scholarships is to gather socio-economic and demographic information directly from students and employing socio-economic information to rank applicants with their poverty condition to decide such award. This format is the most widely used in scholarship programs and is motivated by the fact that the economic is the main reason to dropout of school. Every year approximately $370,000$ scholarships are awarded by the Ministry of Education using that format under the *Scholarships for Continuation* program. In the latest years, students were selected based on their self-reported household income per capita.

The *Grants Against Dropouts* provide a monthly stipend between US$ 35 and US$ 48, depending on grade (more for higher grades) and gender (more for women). This amount is equivalent to 18%-24% of Mexico's average income per capita and compared to Progresa's (now known as Prospera) current amounts gives 22% to 25% lower cash disbursements (although compared to Progresa it is not capped). Selected applicants receive their cash install-

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[8]The rules of the program indicate that committee members cannot nominate a direct nor indirect relative to be a program recipient.

ments through the telegraph network (which is employed in several social programs to distribute cash) and must collect their transfers individually at most 45 days after the bi-monthly payment. If the applicants or committee falsify information to get resources, the scholarship is suspended and any cash disbursement that has been paid is requested back.[9]

2.2 The experiment

The purpose of the experiment is to compare the two possible targeting strategies: (i) committee based targeting (CBT) and (ii) proxy-means based targeting (PMT). Random assignment was done at the school level: 497 schools were assigned to CBT and 502 to PMT. On average, each school submitted 60 applications. The randomization took place after the applications were received, which means that school committees were not aware ex-ante of the experiment. Therefore, the committee ranking and the PMT ranking is available for both treatment groups. The number of scholarships to be awarded was determined using the needs-based algorithm. That is, the PMT was calculated using the socio-economic and demographic information submitted by the applicants and they were ranked employing this indicator.[10] The Ministry of Education defined that, given their budget, they would be able to award in total 23, 302 scholarships out of a total of 59, 996 applications received. The proportion of applicants in a school that received awards was on average 55% and varied between 1% and 100%.

If a school was selected to be in the PMT group, the previous assignment was used to award scholarships. If a school was part of the CBT group, the scholarships available in that school were awarded following the committee ranking. *Figure 1* gives an example. Imagine that given the PMT ranking, 2 applicants out of 4 from school *X* were defined as eligible by the PMT ranking (applicants 1 and 2 in Figure 1). If this school is selected to be a PMT

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[9]In addition, Mexican laws establish that falsifying documents to appropriate public resources can be punished (if proven and prosecuted) with 4 to 8 years of prison. This would be applicable either to the applicant and/or committee. The rules of the program indicate that the authority of the program (i.e. Ministry of Education) can request access to the beneficiaries household and documents to make a verification of the truthfulness of the information in their application.

[10]Specifically, the PMT was constructed with: (a) locality-level characteristics, mainly a marginality index and a dummy indicating if the locality is part of a poverty program against hunger (Cruzada contra el Hambre); (ii) household assets, including TV, cable TV, washing machine, refrigerator, vehicle, boiler, gas stove, mobile phone; (iii) household characteristics, including dirt floor, sewage, electricity, internet, ratio of room per individual; and (iv) applicant characteristics, including being pregnant, having a disability and being indigenous.

school, those applicants would receive the scholarship. However, if the school is selected to be a CBT school, the 2 scholarships available at that school would be assigned to the highest ranked applicants according to the committee (applicants 1 and 3 in Figure 1). In this example, applicants 2 and 3 are sensible to the randomization outcome, and represent cases in which the committee and PMT ranking do not agree. Meanwhile, applicants 1 and 4 are not affected by the randomization. Given that information is available for the PMT and committee ranking for all schools, I was able to calculate the proportion of each applicant type. Hereon, I will refer to these applicant's profiles as follows:

(1) *Always receivers.* These candidates are like individual (1) in *Figure 1*. They always get awarded the scholarship, regardless of the targeting method used. In the experiment, 24% of applicants are of this type.

(2) *PMT benefactors.* These candidate are like individual (2) in *Figure 1*. These applicants would receive the scholarship if the PMT targeting is employed, but would not be eligible if the CBT targeting is followed. In the experiment, 15% of applicants correspond to this type.

(3) *Committee benefactors.* They are represented by individual (3) in *Figure 1*. They are the opposite to the previous group: they would be selected under the CBT targeting and would not under the PMT. Given that type (2) and (3) substitute each other, they also represent 15% of the sample.

(4) *Never receivers.* They correspond to individual (4) in *Figure 1*. regardless of the targeting method, they never receive the scholarship. They add 46% of the applicants in the experiment.

The previous numbers imply that out of the pool of students receiving the scholarship, 38% are sensitive to the targeting method employed. This high proportion means that the committees are probably using a different logic to select applicants and/or that there is high risk of private capture of resources. In section 4 I will provide evidence of the characteristics related to this selection.

3 Data

The main data sources used in this paper include the information from the applications and administrative data gathered directly from schools. Both have been provided by the Ministry of Education.

Scholarship applications. In total, $72,319$ applications from $1,410$ schools were received. Out of those, 999 schools were selected for the experiment favoring the likelihood of accessing administrative data to collect the outcomes.[11] *Table 1* gives descriptive information coming from the applications and shows the balance of applicants resulting from the randomization. The applications include the rank of committee and a brief description of the motives described by the students in their letters of intent that are delivered with the application to the schools. Interestingly, a small proportion of applicants in my sample are reported to send such letter (only 17%). The scholarship applications also include the names and positions (e.g. teacher, parent, principal) of the committee members as well as the forms that they deliver as part of the application process.

Education outcomes. Administrative information was collected from schools about student dropout (during the school year and across grades), dropout reason, grades (including general GPA and math GPA), dummies for failing courses, indiscipline (measured through conduct reports), and absenteeism. Given the complexity of the high school system administration, collecting the information was quite challenging, and 37.5% of the schools (which amounts to 38.7% of applicants) did not respond.[12] *Table A.1* in the appendix gives evidence of attrition. As indicated there, there is selective attrition resulting from poorer applicants responding with lower probability. However, the attrition was not different across treatment groups. *Table 2* shows descriptive statistics from the educational outcomes. Interestingly, dropout rates are much lower compared to national statistics. A comparison was done to the general dropout rates at the schools in the sample (i.e. including also non-applicants) and data suggests XXXX.

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[11]*Table XX* in the appendix shows how the applicants from selected schools compare to applicants from those schools left out. Also, Table XX in the appendix uses administrative information to compare the schools in the experiment to high schools in general. As can be seen...

[12]At the time of writing, information is still being gathered and processed.

With respect to GPA, it is important to note that it should be taken as a measure of performance and not necessarily related to learning since the test scores employed are non-standardized.[13]

4 Effects of targeting on beneficiaries' profile

As *Figure 1* shows, the targeting method selected is quite relevant for the selection of beneficiaries. The proportion of applicants whose award assignment depends on it amounts to 30% (or 38% of the awarded applicants). In this section I focus on understanding the differences in the discrimination process.

To begin, *Figure 2(a)* shows the distribution of the PMT index for the four different types of applicants (according to the definitions established in section 2). It should not be surprising that there is little overlap between the distribution of applicants receiving the scholarship under the PMT (i.e. *Always receivers* and *PMT benefactors*) since the PMT itself is employed for the assignment of the scholarship. Nonetheless, two facts can be highlighted. First, I would have expected the distribution of *Always* and *Never receivers* to be more concentrated to the extremes, since those applicants have their award clearly defined in spite of the targeting strategy. *PMT* and *Committee benefactors* indeed have a more concentrated distribution toward the middle compared to these extreme groups, but not as much as could be expected. In other words, the overlap between these groups is important. Second, and probably more striking, is that the distribution of income per capita (*Figure 2(b)*) does not reflect what the PMT index distribution displays. It is true that the *Never (Always) receiver* has the distribution most concentrated to the right (left), however, it is surprising that the *PMT* and *Committee benefactors* display a very similar distribution. A possible explanation is that the committee might be underreporting income per capita to justify their proposed ranking. It is important to mention that income per capita is explicitly included in the package that the committee fills electronically, while the assets used in the PMT are only contained in the survey filled by the applicant.

A similar comparison can be done with the committee ranking used to determine the schol-

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[13]At the time of writing the Ministry of Education is processing information from the 2017-2018 PLANEA test. This test is a standardized test for math and reading. All high-schools participate, however, just a sample of students is selected. it is yet unclear the proportion of applicants for whom I will have data from PLANEA.

arship recipients under CBT targeting. *Figure 2(c)* shows the histogram of the ranking value, where (1) corresponds to the rank of the applicant with the highest order of preference (i.e. the individual with the highest need). It is expected again that the *always receiver* and the *committee benefactor* will have a distribution concentrated to the left. However, it is surprising the considerable overlap between the *PMT benefactor* and the *never receiver*. In other words, I was expecting a more segmented distribution based on the applicant's types.

Table 3 focuses the comparison for the two groups of applicants sensitive to the targeting method: *PMT* and *Committee benefactors*. Resulting from the difference in the PMT index, the committee seems to be sacrificing having poorer beneficiaries. The proportion of assets and services held is on average 25 and 16 percentage points higher for *Committee benefactors*. Similarly, *committee benefactors* are distributed in schools in less rural and poor localities. Following the result from *Figure 2*, the average difference between both groups in the PMT index amounts to almost 2 standard deviations, while the income per capita difference only amounts to 0.1 standard deviations. Interestingly, committees seem to favor merit: *committee benefactors* display a GPA 0.05 standard deviations higher than their *PMT benefactor* counterparts. *Figure 2(d)* shows also that the *committee benefactors* first order stochastically dominate *PMT benefactors* in the secondary GPA distribution. Nonetheless, committees do not seem to reward effort in the students applications, since the proportion of students submitting a letter and the letters' length (measured with average number of words) are not significantly different between both groups. Travel distance (measured in self-reported time) does not seem either to be used to discriminate by the committees.[14] These are relevant measures since motivation to continue studies and distance to the school are two aspects measured with high frequency as causes of dropout. Finally, it is also surprising that in the dropout risk classification (1=lowest risk and 5=highest), the *committee benefactors* do not first order stochastically dominate the *PMT benefactors* given that this classification is reported by the committee.

A topic highly frequented in the literature is the possibility of the private capture of resources (Basurto et al., 2017; Vera-Cossio, 2017). This possibility could be perfectly consistent with

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[14]At the time of writing, the author is geo-referencing the school and student's address to measure this with greater accuracy.

the evidence of the PMT and income per capita distribution incompatibility. At the time of writing, evidence about the committee members last names and about lying in the socio-economic survey is being gathered.

5 Impact on schooling outcomes

Few papers in the literature provide evidence of different targeting strategies on the actual outcomes that they seek to improve (Basurto et al., 2017). Here, I employ the administrative information collected from high schools to analyze the results of the different targeting strategies on dropout rates (the objective of the program) and other relevant educational outcomes, like performance (measured with GPA). Some possible mechanisms are explored using data about absenteeism and discipline.

To begin, I show the differential impact of the scholarships on actual recipients by estimating:

$$Y_{ij} = \alpha + \tau_1 \, CBT_j * Award_{ij} + \tau_2 \, CBT_j * (1 - Award_{ij}) + X'_{ij} \, \beta + U_{ij} \qquad (1)$$

where Y_{ij} represents the educational outcome of applicant i in school j, CBT_j is a dummy indicating if the committee targeting strategy was randomly assigned to school j, $Award_{ij}$ is a dummy indicating if the student received the scholarship, X_{ij} are controls and the error is clustered at the school level. In this estimation, τ_1 and τ_2 are the relevant parameters and estimate the impact of the targeting strategies distinguishing between being an actual recipient of the program or not.

The results of equation (1) are shown in panel (A) of *Table 4*. No significant effects are found in the different specifications. However, it is important to remember that in this specification the τ_1 parameter compares the targeting effect on actual scholarship recipients. For the CBT targeting, receiving the award gathers *Always receivers* and *Committee benefactors* whereas for PMT targeting it gathers *Always receivers* and *PMT benefactors*. For *Always receivers* no direct effect is evident; targeting would possibly affect them only through spillovers from their peers. As for the *Committee* and *PMT benefactors* comparison, the targeting effect is mixed

with a composition effect.

Therefore, a second specification is estimated by distinguishing the profile types and esti-mating for each profile the effect of the targeting method selected:

$$Y_{ij} = \alpha + \sum_{k=1}^{4} \Big(\gamma_k \, Type(k)_{ij} + \tau_k \, CBT_j * Type(k)_{ij} \Big) + X'_{ij} \, \beta + U_{ij} \qquad (2)$$

where $Type(1)$ to $Type(4)$ are dummies for the different applicants' profiles: *Always receiver*, *Committee benefactor*, *PMT benefactor*, and *Never receiver*.

The results are shown in panel (B) of *Table 4*. Two aspects are relevant to highlight. First, the committee targeting is worse than the PMT targeting with respect to the program's goal, which is to reduce dropout rates. As explained above, results were expected (if any) in the applicants with profiles that are sensitive to the targeting strategy. *PMT benefactors* benefit from their assignment to a PMT school and reduce dropout rates (across school years) by 3.1 percentage points (which represents 24% of the average dropout rate). In contrast, *Committee benefactors* do not display any significant effects and their point estimates are negligible. Second, in terms of school performance, GPAs increase when the committee targeting is em-ployed being this effect greater in the *Committee benefactors'* group. This type of applicants increase their general and math GPA in 0.068σ (NS) and 0.185σ, respectively. With respect to the possible mechanisms explored, no significant effects on absenteeism and indiscipline are found for either type. These results are robust to the addition of controls as shown in Panel (C). Difference in difference estimates were also calculated using as reference group the *Always receiver* group. In that exercise, the dropout effect on *PMT benefactors* is estimated in 2 percentage points (NS), while the effect on math GPA of *Committee benefactors* is reduced to 0.13σ (p-value=0.05).

6 Conclusion

The educational results in section 5 reflect part of the profile selection described in section 4. As I described, the evidence suggests that committees sacrifice selecting poorer applicants in favor

of merit. These students that at baseline have better GPAs are benefited by being in a system where committees do not focus only on economic need to distribute scholarships since they are more likely to receive the benefit and translate this into better school performance. Nonetheless, the committee sacrifices the retention of students in a larger risk (from their socio-economic perspective) of abandoning their studies.

At the time of writing I am collecting further information about the committees to test possible hypothesis about the selection of candidates. Private capture of resources (estimated with last names), better targeting based on how well the committee knows students (geographically and through school networks), and misreporting information are possibilities that will be explored. Also, test scores from national standardized tests will be released soon to test if the performance (estimated with GPA) translates into learning.

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The Effects of the Kalamazoo Promise Scholarship on College Enrollment and Completion
Timothy J. Bartik, Brad Hershbein, and Marta Lachowska

Figure 1: Scholarship assignment process
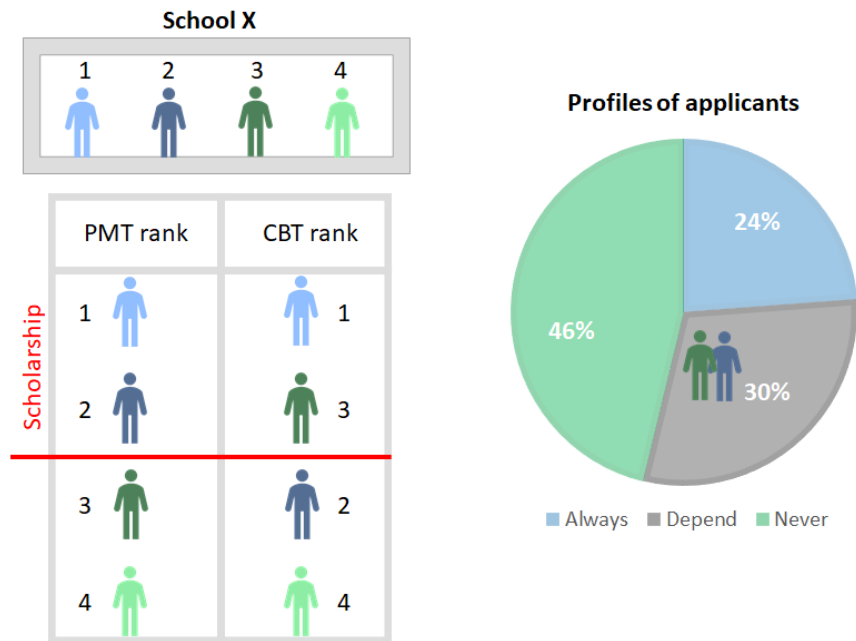
This Figure illustrates the scholarship assignment process under each possible treatment group: PMT or CBT. Here I assume that school X has been assigned 2 scholarships under the general PMT process in which applicants are compared across schools and those with the highest levels of poverty according to the PMT were selected for the scholarship. This is illustrated with the red line. In this school the PMT ranks applicant 1 as the poorest, followed by applicants 2, 3 and 4 , respectively. If the school was assigned to treatment PMT, applicants 1 and 2 would receive the scholarship. Here, the school committee rank does not totally agree with the PMT rank. The school committee ranks students in terms of *dropout risk*, and in the example indicates that applicant 1 has the highest risk, followed by applicants 3, 2 and 4, respectively. If the school is assigned to CBT treatment, applicants 1 and 3 would receive the scholarship. Note that the proportion of students 2 and 3 will be equally proportional wince one group substitutes the other. The plot on the right indicates the proportion of each type of applicant in the case of the experiment.

Figure 2: Scholarship assignment process
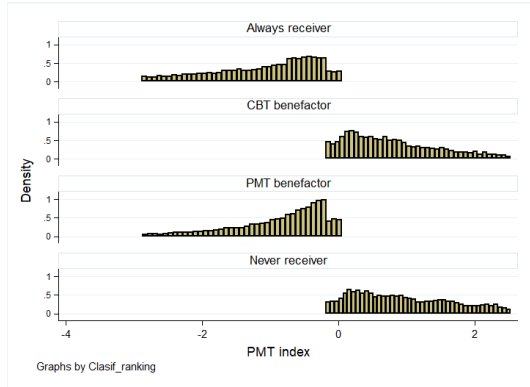
(a) PMT index
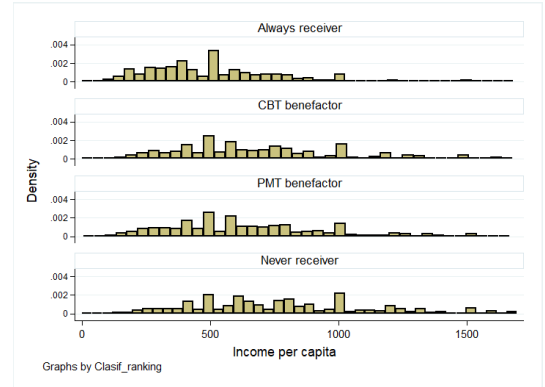
(b) Income per capita

(c) Committee ranking

(d) GPA CDF
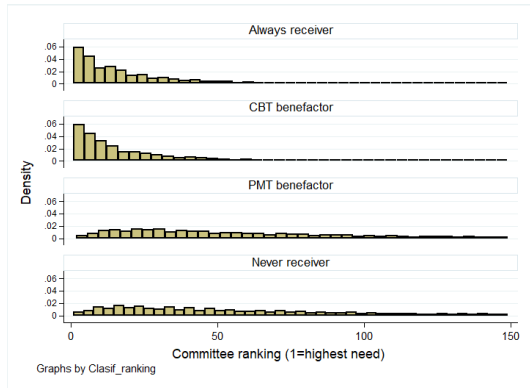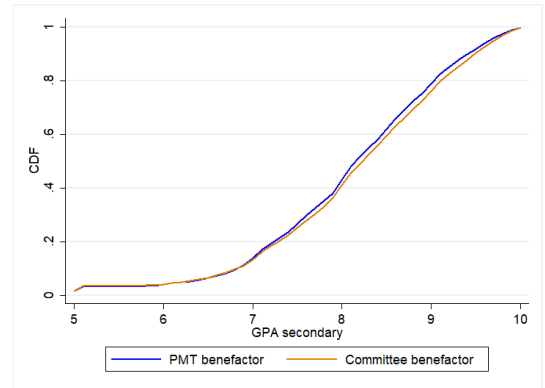
This Figure shows the distribution of two economic indicators, the committee ranking and the CDF of secondary GPA for the different type of applicants. Graph (a) shows the histogram of the PMT index used to target applicants based on their economic needs. The PMT index is constructed using locality characteristics (marginality index and dummy for participation in the hunger program), household asset ownership (TV, cable TV, washing machine, refrigerator, vehicle, boiler, gas stove, mobile phone), household characteristics (dirt floor, sewage, electricity, internet, ratio of individuals per room) and applicant's characteristics (pregnancy, disability, indigenous). Graph (b) shows the histogram of income per capita. Graph (c) shows the histogram of the ranking employed by the committee for the CBT targeting. Here (1) is the highest rank, that is, the individual with the highest need. Graph (d) pltos the cumulative density function of the applicant's secondary GPA. The different types of individuals are the following: (1) *Always receives* is an applicant that receives the scholarship regardless of the targeting strategy; (2) *Committee benefactor* is an applicant that receives the scholarship if the committee rank is used, but does not receive it if the PMT rank is employed; (3) *PMT benefactor* is an applicant that receives the scholarship if the PMT rank is employed, but does not receive it if the committee decides; and (4) *Never receives* is an applicant that does not receive the scholarship, regardless of the targeting used. The unit of observation is the applicant. Data employed for this graphs comes from the socio-economic survey filled in the application. Information from all applicants in either PMT or CBT treatment schools is used.

Table 1: Descriptive statistics and balance. Application data

Variable	Mean			Difference	p-value
	Overall	PMT	CBT		
(A) Locality characteristics					
Marginality index	-1.259	-1.271	-1.247	0.024	0.4497
Rural†	0.258	0.258	0.258	0.0003	0.9925
Hunger program†	0.654	0.676	0.631	-0.045	0.4269
(B) Household asset ownership					
TV†	0.818	0.831	0.805	-0.026	0.1944
Cable TV†	0.156	0.169	0.144	-0.025	0.2307
Washing machine†	0.324	0.340	0.309	-0.031	0.2144
Boiler†	0.302	0.296	0.307	0.011	0.7210
Vehicle†	0.220	0.227	0.213	-0.014	0.4971
Refrigerator†	0.882	0.884	0.880	-0.004	0.7386
Mobile phone†	0.774	0.779	0.768	-0.011	0.5883
Computer†	0.169	0.175	0.162	-0.013	0.4043
(C) Household services available					
Internet†	0.189	0.206	0.172	-0.034	0.1044
Electricity†	0.996	0.994	0.997	0.002	0.1072
Water†	0.749	0.750	0.748	-0.002	0.9396
(D) Household characteristics					
Dirt floor†	0.042	0.041	0.043	0.002	0.7677
Inhabitants per room	2.473	2.472	2.474	0.002	0.9664
PMT	0.041	0.085	-0.004	-0.090	0.4388
Income per capita	756.9	787.8	725.4	-62.45**	0.0446
(E) Applicant's characteristics					
Age	16.28	16.24	16.32	0.082*	0.0920
Female†	0.539	0.541	0.537	-0.004	0.7362
Disability†	0.038	0.040	0.036	-0.005	0.3486
High dropout risk	0.414	0.412	0.416	0.004	0.9393
Time to school	101.9	102.9	100.9	-2.011	0.3039
Letter of motives†	0.172	0.188	0.156	-0.032	0.3898
GPA secondary (Z)	-0.010	-0.016	-0.005	0.011	0.7899
Num. applicants	36,737	18,525	18,212		
Num. schools	625	313	312		

This table shows descriptive statistics and balance of the random assignment. PMT corresponds to the schools that were randomly assigned to use the PMT-based centralized targeting. CBT corresponds to the schools that were randomly assigned to use the school committee ranking for the targeting. The unit of observation is the applicant. Data comes from the application socio-economic and demographic survey filled by the students to apply for the scholarship. † indicates that the variable is a dummy. Standard errors clustered at the school level. Asterisks indicate significance at the *** 1%, ** 5%, and * 10% level.

Table 2: Educational outcomes, Descriptive statistics

Variable	Mean	Std. Dev.	Num. obs
Dropout (within)[†]	0.078	0.268	36,737
Dropout (across)[†]	0.128	0.334	10,340
GPA overall	8.136	1.028	33,823
GPA math	7.662	1.326	33,305
Failing math[†]	0.192	0.394	36,737
Failed a course[†]	0.135	0.341	33,823
Num. courses failed	0.356	1.766	36,737
Absenteeism	14.099	12.865	33,885
Indiscipline[†]	0.05	0.217	33,823
Conduct reports	0.225	1.18	20,269
Scholarship[†]	0.405	0.491	36,737

This table shows the descriptive statistics of the educational outcomes. The outcomes used are the following: (1) *Dropout (within)* is a dummy variable indicating if a student abandoned school during the school year; (2) *Dropout (across)* is a dummy variable indicating if a student abandoned school between one school year and the next; (3) *GPA overall* is measured between 5 and 10 and represents an average of all the courses taken during the school year; (4) *GPA math* is measured between 5 and 10 and represent the average of all the math-related courses taken during the year; (5) *Failing math* is a dummy variable indicating if a student failed its math GPA; (6) *Failed a course* indicates if a student has failed a course; (7) *Num. courses failed* represents the number of courses that the student has failed; (8) *Absenteeism* is the total number of days that the student missed classes during the school year; (9) *Indiscipline* is a dummy variable indicating if the student has ever received a conduct report; (10) *Conduct reports* is the total number of conduct reports received by a student; and (11) *Scholarship* is a dummy variable indicating if a student received a scholarship as part of the program.

Table 3: Profiles of applicants sensitive to the targeting method

Variable	Mean		Difference	p-value
	PMT winner	Committee winner		
(A) Locality characteristics				
Marginality index	-1.218	-1.319	-0.101***	< 0.0001
Rural†	0.287	0.205	-0.082***	< 0.0001
Hunger program†	0.678	0.695	0.017***	0.0002
(B) Household asset ownership				
TV†	0.672	0.9277	0.256***	< 0.0001
Cable TV†	0.033	0.243	0.210***	< 0.0001
Washing machine†	0.081	0.466	0.385***	< 0.0001
Boiler†	0.126	0.404	0.279***	< 0.0001
Vehicle†	0.055	0.303	0.248***	< 0.0001
Refrigerator†	0.765	0.9774	0.213***	< 0.0001
Mobile phone†	0.649	0.867	0.218***	< 0.0001
Computer†	0.080	0.237	0.157***	< 0.0001
(C) Household services available				
Internet†	0.048	0.291	0.243***	< 0.0001
Electricity†	0.993	1.000	0.007***	< 0.0001
Water†	0.621	0.841	0.220***	< 0.0001
(D) Household characteristics				
Dirt floor†	0.066	0.002	-0.064***	< 0.0001
Inhabitants per room	2.900	2.186	-0.714***	< 0.0001
PMT index	-1.016	0.926	1.941***	< 0.0001
Income per capita	708.8	789.8	81.03***	< 0.0001
(E) Applicant's characteristics				
Age	16.29	16.17	-0.117***	0.0002
Female†	0.559	0.547	-0.013*	0.0668
Disability†	0.047	0.038	-0.008***	0.0041
High dropout risk†	0.444	0.444	-0.001	0.9369
Time to school	103.4	103.2	-0.265	0.7103
Letter of motives†	0.221	0.219	-0.003	0.6547
GPA secondary (Z)	-0.005	0.045	0.0500***	0.0011
Num. applicants	9,747	9,789		
Num. schools	791	785		

This table shows the comparison of applicants that benefit from either targeting strategy (CBT or PMT). The different types of applicants compared are the following: (1) *Committee benefactor* is an applicant that receives the scholarship if the committee rank is used, but does not receive it if the PMT rank is employed; and (2) *PMT benefactor* is an applicant that receives the scholarship if the PMT rank is employed, but does not receive it if the committee decides. The unit of observation is the applicant. Data employed for this graphs comes from the socio-economic survey filled in the application. Information from all applicants in either PMT or CBT treatment schools is used. † indicates that the variable is a dummy. Standard errors clustered at the school level. Asterisks indicate significance at the *** 1%, ** 5%, and * 10% level.

Table 4: Profiles of applicants sensitive to the targeting method

	(1) Dropout (across)	(2) GPA gral (Z)	(3) GPA math (Z)	(4) Absent	(5) Conduct
Panel A: Effects on beneficiaries					
CBT x award	0.007	0.049	0.092	0.434	-0.006
	(0.0134)	(0.0563)	(0.0610)	(1.6060)	(0.0122)
CBT x (1-award)	0.007	0.004	0.076	1.316	-0.001
	(0.0150)	(0.0755)	(0.0829)	(2.2455)	(0.0143)
Panel B: Effects by type of applicant					
CBT x CBT benef	-0.003	0.068	0.185**	1.098	-0.005
	(0.0169)	(0.0698)	(0.0810)	(2.0539)	(0.0151)
CBT x PMT benef	0.031*	0.002	0.088	1.423	0.004
	(0.0179)	(0.0675)	(0.0824)	(2.0708)	(0.0148)
CBT x Always	0.010	0.051	0.042	0.062	-0.007
	(0.0174)	(0.0666)	(0.0680)	(1.6059)	(0.0122)
CBT x Never	-0.004	-0.005	0.064	1.239	-0.003
	(0.0193)	(0.0843)	(0.0881)	(2.4591)	(0.0155)
Panel C: Effects by type of applicant (with controls)					
CBT x CBT benef	0.002	0.049	0.160**	1.500	-0.007
	(0.0162)	(0.0550)	(0.0733)	(1.9424)	(0.0150)
PMT x PMT benef	-0.029*	-0.012	-0.085	-1.932	-0.003
	(0.0174)	(0.0530)	(0.0759)	(2.0061)	(0.0145)
CBT x Always	0.009	0.024	0.030	0.078	-0.007
	(0.0157)	(0.0414)	(0.0487)	(1.5834)	(0.0122)
CBT x Never	0.002	-0.005	0.057	1.453	-0.004
	(0.0175)	(0.0657)	(0.0767)	(2.2742)	(0.0154)
Observations	10,340	33,823	33,305	33,885	33,823
$\overline{Y}(control)$	0.128	0	0	14.1	0.05

This table shows the effects on educational outcomes of applicants that benefit from either targeting strategy (CBT or PMT). Panel (A) shows the impact of the targeting strategies divided by recipients of the scholarship (award dummy) and non-recipients. Panel (B) analyzes the impact by the different profiles of applicants: (1) *Always* is an applicant that receives the scholarship regardless of the targeting strategy; (2) *CBT benef* is an applicant that receives the scholarship if the committee rank is used, but does not receive it if the PMT rank is employed; (3) *PMT benef* is an applicant that receives the scholarship if the PMT rank is employed, but does not receive it if the committee decides; and (4) *Never* is an applicant that does not receive the scholarship, regardless of the targeting used. The outcome variables include: (1) *Dropout (across)* is a dummy variable indicating if a student abandoned school between one school year and the next; (2) *GPA gral* is the standardized measure of the average grades of all the courses taken during the school year; (3) *GPA math* is the standardized measure of the average grades of all the math courses taken during the school year; (4) *Absent* is the total number of days that the student missed classes during the school year; and (5) *Conduct* is a dummy variable indicating if the student has ever received a conduct report. The unit of observation is the applicant. Data employed for this graphs comes from the socio-economic survey filled in the application. Information from all applicants in either PMT or CBT treatment schools is used. [†] indicates that the variable is a dummy. Standard errors clustered at the school level. Asterisks indicate significance at the *** 1%, ** 5%, and * 10% level.

A Appendix

Table A.1: Attrition analysis

Variable	Mean		Difference	p-value
	Sample	Missing		
(A) Locality characteristics				
Marginality index	-1.259	-1.279	-0.020	0.4570
Rural[†]	0.258	0.198	-0.060***	0.0019
Hunger program[†]	0.654	0.778	0.124***	0.0014
(B) Household asset ownership				
TV[†]	0.818	0.828	0.010	0.5136
Cable TV[†]	0.156	0.175	0.019	0.2147
Washing machine[†]	0.324	0.363	0.039	0.1181
Boiler[†]	0.302	0.308	0.006	0.8101
Vehicle[†]	0.220	0.216	-0.004	0.7892
Refrigerator[†]	0.882	0.888	0.006	0.4995
Mobile phone[†]	0.774	0.800	0.026	0.1466
Computer[†]	0.169	0.213	0.045***	0.0012
(C) Household services available				
Internet[†]	0.189	0.253	0.064***	0.0011
Electricity[†]	0.996	0.998	0.002***	0.0091
Water[†]	0.749	0.774	0.025	0.1616
(D) Household characteristics				
Dirt floor[†]	0.042	0.033	-0.0095**	0.0438
Inhabitants per room	2.473	2.457	-0.0165	0.6317
PMT index	0.041	0.232	0.191**	0.0393
Income per capita	756.9	831.7	74.82***	0.0032
(E) Applicant's characteristics				
Age	16.28	16.33	0.049	0.2464
Female[†]	0.539	0.559	0.019**	0.0455
Disability[†]	0.038	0.038	-0.0001	0.9850
High dropout risk[†]	0.414	0.469	0.055	0.1992
Time to school	101.9	106.6	4.659***	0.0064
Letter of motives[†]	0.172	0.239	0.066*	0.0576
GPA secondary (Z)	-0.010	0.016	0.027	0.4081
Num. applicants	36,737	23,259		
Num. schools	624	375		

This table shows the analysis of attrition of applicants for which administrative information is not available. The different types of applicants compared are the following: (1) *Sample* is an applicant for which educational outcome variables are available; and (2) *Missing* is an applicant for which that information is not available at the moment of writing. The unit of observation is the applicant. Data employed for this graphs comes from the socio-economic survey filled in the application. Information from all applicants in either PMT or CBT treatment schools is used. [†] indicates that the variable is a dummy. Standard errors clustered at the school level. Asterisks indicate significance at the *** 1%, ** 5%, and * 10% level.