ON THE TARGETING PERFORMANCE OF NUTRITIONAL PROGRAMS IN PERU: IS IDENTIFYING THE POOR THE MAIN PROBLEM?

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Abstract

This study analyzes the targeting performance of three public nutritional programs for children in Peru: the Vaso de Leche (VL - glass of milk), the School Breakfast (SB) and an aggregate of programs (ECHINP) that focuses on the nutrition of children under 3. I find these programs to have large leakages with between 40% and 50% of their beneficiaries falling outside the target group either because they are not poor or because they are outside the age range. These leakages are larger for the VL program (50%) and in urban areas, where poverty rates are relatively lower.

The robustness analysis presented here argues against putting too much priority on the improvement of poverty maps and means-tested instruments, and in favor of redefining delivery protocols that are consistent with the program's objectives and in addressing political distortions in their management so that proper exit rules for old beneficiaries become feasible. I first find the age restriction to be very important for programs that allow for consumption within the household, (the VL program and the ECHINP aggregate) so that omitting that restriction changes the relative ordering significantly. The VL program stops being the one with the worst targeting performance and the ECHINP aggregate becomes by far the program with lowest leakage. (17%) This result can be argued to be not bad if we consider that poverty and nutritional vulnerability is not an individual but a family problem. The policy implication comes from the fact that ignoring these intra-household arrangements reduces the size of the transfer per capita and limits the possibility for them to have a nutritional impact on the target population. Second, I find that the SB and VL programs have a very pro-poor behavior at the margin despite having a very mediocre targeting performance on average. This result suggests the need to be cautious about making decisions based on the average targeting performance of programs, because they could show large leakages on average, but a cut (expansion) could still damage (benefit) the poor more than proportionately. An additional policy implication is that improving the targeting of these programs requires changes in the political base that supports them.

I. Introduction

How well do social programs reach the poor has been the long withstanding question about social policy in developing and developed countries. As characterized by J.S. Mill, the key issue in the design of policies to alleviate poverty effectively is about "giving the greatest amount of needful help with the smallest amount of undue reliance on it"[2]. The question is not only about who receives the transfers but also about what is their impact on the objective variables and the cost incurred to obtain it. These concerns pertain not only to the poor that are in urgent need of cash or in-kind transfers, but also to the non-poor that have to pay for it, and whose support can be very important for the political sustainability of social programs.

The answer to such a question requires a definition of who is the neediest, what is that they need the most, and what is the best way to provide it to them. But the complications do not end there. One of the next steps is to identify the neediest, which is not as simple as it may seem at first. Being concerned about the costs of the programs, we cannot just ask people about who belongs to the group defined as the neediest, say the poor, those whose income do not allow them to purchase a basket of basic needs. Would we do so, many non-poor would be tempted to report themselves as poor to receive the corresponding transfers, cash or in-kind. Alternatively, though, the cost of finding out who is truly poor may be too costly, so that program officers need to live with imperfect solutions. The consideration of incentives and administrative costs leads us to the notion of

an *optimal* level of targeting that is not perfect[3]. Tullock (1992) adds another reason in favor of a less-than perfect targeting. The non-poor tend to have more political power, so some leakage may be necessary to avoid eroding the political base that sustains a social program. This argument is very controversial, but is very relevant for the current debate, especially in reference to old programs.

Several targeting instruments have been developed to target the poor at a reasonable cost. Proxy means-tested programs are used to identify the poor based on observable easy-to-collect information such as the neighborhood of residence, characteristics of the dwelling, family size and age composition, among others. This method is cheaper than the ideal of trying to collect unbiased income or expenditure information, but in practice seems to be still very expensive. Also, sometimes is very complicated to exclude certain individuals within a locality from the benefits of a program, especially when program officers do not agree with the results of the proxy-means instrument. Poverty maps are also used to identify neighborhoods where the neediest concentrate and can reduce costs even further, while at the same time avoiding the dilemma for program officers to exclude a group of individuals and families. Finally, programs can affect the design so that the non-poor are discouraged to participate. The possibilities go from affecting the nature of the transfer itself, low-wage jobs or low income-elasticity goods such as food, or establishing certain procedures to receive them, such as long lines, among others[4]. The use of these

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[2] As cited by Besley and Kanbur (1993).

[3] See Besly and Kanbur, op. cit.

[4] See Alderman and Lindert (2003).

instruments varies across programs, and the targeting performance of one is often the result of a combination of them.

This discussion on targeting is very relevant for the current Peruvian context, where the reorganization of the social policy is an objective shared by several important sectors within the public administration and the civil society. Many of the advances have concentrated on restructuring public food programs under the Program for the Integral Protection of Childhood, which is now administrated by the *Programa Nacional de Asistencia Alimentaria* (PRONAA)[5]. This institution was then in charge of organizing the transfer of these programs to local governments. Over the past two years, PRONAA itself, and the Vaso de Leche Program, have faced several media scandals that relate to corruption but also to large leakages of the benefits to the non-poor. Finally, several evaluations of different kind have been done about the different kind of leaks affecting these programs, which reflect the increasing importance of the issue in Peru[6].

In this paper, I analyze the targeting performance of a subset of the targeted public food programs in Peru, based on the information available in the Living Standards Measurement Studies (LSMS) surveys. The programs are the Vaso de Leche (VL), the School Breakfast (SB) and several small early childhood nutritional programs with similar objectives and procedures that are aggregated in the ECHINP category. Unlike most

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[5] See DS No. 034-2002-PCM. The norm does not include the Vaso de Leche Program that is administrated at the municipality level.

[6] See Stifel and Alderman (2003), Alcázar et. al. (2003) that focus on the Vaso de Leche Program. For a general evaluation of all public food programs, see Instituto Cuánto (2001) and STPAN (1999).

previous studies, I focus here on individual data about who benefits from the program, which allows checking not only the extent to which transfers reach poor families but also whether transfers are indeed received by the age groups for which they are intended to. In addition, I follow two interesting methodological lines that provide important insights for the evaluation of the targeting performance of these programs. One explores the sensitivity of estimated targeting errors to changes in the poverty line, and the second analyzes the extent to which the targeting performance of different programs changes with their size and timing. It is important to mention that, unlike previous studies, the marginal analysis presented here for the SB and VL programs compares the information of two years (1997 and 2000) so that individual data can be used instead of regional averages.

The paper is organized in five sections including this introduction. Section II describes the characteristics of the data used and the nature of the analyzed public health programs. Section III discusses some of the key issues surrounding the measurement of targeting errors and describes the methodologies used in the empirical analysis. Section IV presents the empirical results and discusses the implications of changes in the poverty line and in the timing and size of the different programs in determining their relative targeting performance. We conclude with some remarks on the policy implications and limitations of the performed analysis.

II. The programs and the data

Public food programs are receiving increasing attention in Peru after the large increase they experienced during the nineties. During that period, these programs grew not only in

budget, but also in number. Several new programs were created that were run by different government agencies, with confusing or overlapping objectives and lack of coordination[7].

The programs analyzed in this study are the largest public programs that target the health and nutrition of children in Peru. The total combined budget for the SB, VL and the ECHINP aggregate was US $ 195 million in the year 2000, and represented more that 80% of the total public resources allocated to food programs. (Table 1) The VL is the largest food program with an annual budget of US $ 93 million in 2000, closely followed by the SB program. (68 million) The ECHINP aggregate is significantly smaller with a budget of US $ 35 million.

Table 1: Total Budget for Food Programs in Peru (thousands of US $)**:**

	1998	1999	2000
Vaso de Leche (VL)	97,645	90,273	93,159
School Breakfast (SB)	68,013	73,547	67,935
Child Oriented Food Programs (ECHINP)	38,324	55,471	34,673
Sub-total	203,982	219,291	195,767
Total budget food programs	234,565	266,967	240,278

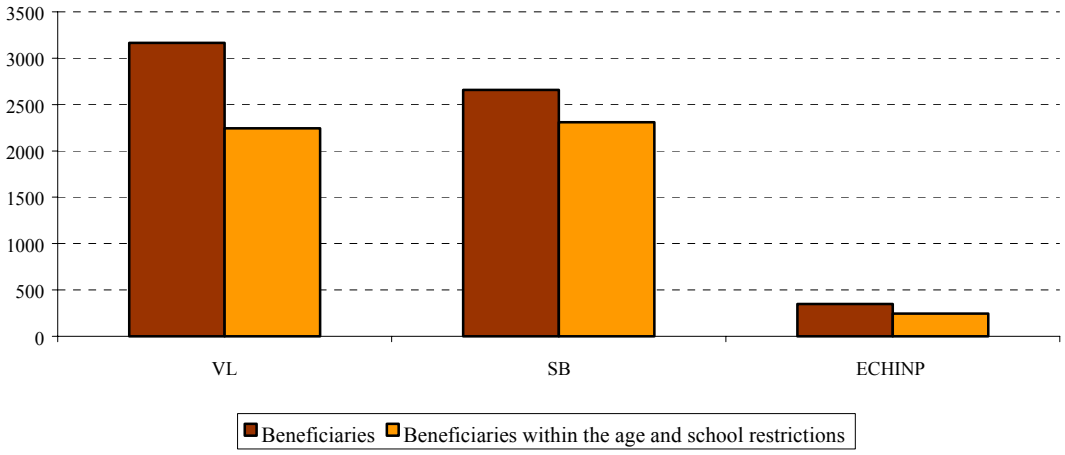
Source: 1998-1999, STPAN (1999). 2000, Instituto Cuánto (2001).

With the household-level information coming from the 2000 LSMS, we can also compare the size of the programs by the number of individuals that report themselves as beneficiaries of the program. (see Figure 1) The largest program, based on the number of

[7] See Instituto Cuánto (2001) or STPAN (1999) for a detailed description of these programs and their evolution over time. In 2002, though, the regulation and supervision of most of these programs were unified under the National Institute of Health (NIH), which is part of the MoH. Later, such responsibility was transferred to PRONAA, which is a dependency of the Ministry for the Promotion of Women and Human Development. (PROMUDEH)

beneficiaries, was the Vaso de Leche (VL), followed by the School Breakfast (SB). The VL program has 3.1 million beneficiaries, while the SB program has about 2.6 million. It is interesting to see that the number of SB beneficiaries match closely to the number of beneficiaries reported by the program, while that is not the case for the VL program. STPAN (1999) indeed reports that the VL programming is based on a total of 4.9 million beneficiaries. Nevertheless, the same study reports that some case studies found that the programming beneficiaries may be overestimated by as much as 100%.

Figure 1: Size of programs by number of beneficiaries
(thousands)



Source: 2000 LSMS.

In addition to having the smallest budget, the ECHINP aggregate also appears as the smallest in terms of the number of beneficiaries, with an even larger difference, suggesting that per capita transfers are also larger for the programs involved. In what follows, I present a brief description of each program included in the analysis.

The School Breakfast (SB) Program

The School Breakfast Program is a nutritional program that targets public primary school children. It was created in 1992 with the general objective to improve the nutritional level of children between 4 and 13 years old so that they can enhance their educational achievements and attendance. This program is funded by the central government, through two public institutions: the National Food Assistance Program (PRONAA) and the Social Investment Fund (FONCODES). There did not seem to be much coordination between the two agencies, but FONCODES tended to concentrate much more in rural areas.

Delivery of breakfast rations occurs within public schools during one of the recreational breaks, and is organized by local committees formed by the mothers[8]. In principle, the ration consists of a cup of a milk-like beverage, fortified with cereals, and six small fortified biscuits, and is the same for all children regardless of their age. In practice, though, local committees make adjustments to incorporate local inputs, mainly milk and grains produced in each area[9].

PRONAA and FONCODES identified beneficiary schools based on the poverty level of the district in which they are located, and the number of students registered in primary levels determines the number of rations.

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[8] See Cueto et. al. (1999). They find that most breakfasts are delivered between 9 am and 11 am because children are hungrier by that time compared to the moment they arrive to school.

[9] Changes in the regulation have encouraged these adjustments, inserting purchases to local producers as part of the objectives of the program.

Vaso de Leche (VL)

The VL program started in 1984 and was designed to target children under 6 years old and pregnant or breast-feeding women, but has large leakages towards older children (from 7 to 13 years old) and the elderly[10]. In that sense, it has a significant overlap with the school breakfast program. Funding comes from the treasury to the municipalities, which organize the purchase of the inputs that are then transferred to the registered local mothers' committees. The mothers' committees organize distribution to registered households. This often implies the reduction of individual rations when they increase the number of registered beneficiaries.

The distribution occurs in the municipal building, another community building, or the house of the elected local leaders. The ration varies by committee but it tends to include 250ml of milk, cereals and other products, and is often delivered without preparation.[11] This is a key difference with respect to the SB program, and facilitates that the food is allocated among household members according the preferences of the mothers or household head, regardless of the indications of the program.

The size of the transfer to the municipalities is based on the poverty level of the district, but the transfer received by the household is affected by the number of committees registered in the municipality, and the number of families registered in the committees.

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[10] Actually, the law indicates that older children, (up to 13 years old) elders and TB patients should be served, after the needs of the younger children and mothers are covered.

[11] See Alcázar et. al., (2003). Local mothers' committees argued that they do not prepare the product because of lack of organization/resources, but also because it is too burdensome for

These committees are in charge of verifying the poverty of the families in their neighborhoods and the presence of children in the age range. There are no clear rules for the updating of the information and it is often claimed that many families that are not longer poor, or do not have children in the corresponding age, remain as beneficiaries.

Early Childhood Nutritional Programs (ECHINP)

Within the early childhood nutritional programs category, I have selected and aggregated five relatively small programs with similar objectives and target populations. All of them focus on children under 3 years of age. Four of them have exclusive nutritional objectives: the Nutritional Assistance Program for High-Risk Families (PANFAR), operated by the MoH[12], the Infant Feeding Program (PAI), operated by PROMUDEH, and two other programs run by NGOs (Niños and Nutrición Infantil). The fifth included program is the PROMUDEH integral childcare program, *Wawa-Wasi*, which also targets poor children under 3.

All these programs deliver precooked food rations for children under three years old (*papillas*), but use different locations to distribute them[13]. PANFAR uses MoH health facilities and personnel, while the distribution mechanisms of the other programs are

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individuals leaving in remote places to come daily for their ration. This way, they have to come only once a week (or once a month) and pick the ration for the whole period.

[12] PACFO is another nutritional program run by the MoH but it is not included as a separate alternative in the LSMS questionnaire. It has same objective and target population so that it is possible that some of the households that report benefiting from PANFAR are actually PACFO beneficiaries.

heavily based in the participation of the mothers of the beneficiaries, and often use the community center or pre-school buildings.

In the case of MoH programs, public health facilities are responsible for the identification of the socio-economic status of the family. Some health centers have developed means-testing instruments but others rely more on the subjective impression of social assistants. Beneficiaries are also recruited through the centers' extramural activities in which they register information on the socio-economic characteristics of the families and search for newborns and pregnant women. Rules vary by center, but if they are classified as poor or indigent, then they are offered the baskets of the program that applies. Still, the subjectivity of the process allows for significant leakage.

The objective of these programs is to help children that face nutritional vulnerability, but each one uses a different operational definition for nutritional risk. In the case of PANFAR, for instance, they were searching for families with parents with at most primary education or unstable employment status, pregnant and breast-feeding women at nutritional risk and/or who have recently given birth, or having more than three children under five (see Gilman, 2003). A family is eligible if they have four of the above characteristics, or if some of the children under five are undernourished. Eligibility is reviewed every six months, and the subsidy is retired if no child under five is undernourished, which generates a pervasive incentive for which anecdotal evidence is often cited.

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[13] An important difference is that the PANFAR basket does include some food for adults, (oil, rice, etc.) since it understands that is the economic situation of the family that puts the children at nutritional risk.

Table 2 summarizes the key characteristics of the food programs analyzed in this study. As indicated above, the empirical analysis uses the information available in the Peruvian LSMS surveys. The LSMS is a multipurpose household survey with a representative sample at the national level as well as for 7 regional domains. It collects information on many dimensions of household well-being, such as consumption, income, savings, employment, health, education, fertility, nutrition, housing and migration, incomes, expenditures, and use of public social services.

The benefit incidence information comes from module of social programs (module 12) in the LSMS questionnaire. The first question asks to the key informant whether any member of the household benefited from each program in the 12 months prior to the date of the survey. If the answer is positive, she is asked to identify the members of the household that did. For the most part, I use the 2000 LSMS, which includes a sample of 3997 households and 19,957 individuals. For the marginal incidence analysis, though, I compare two rounds of the LSMS (1997, 2000) which have different sizes but similar sampling procedures and questionnaires in the relevant modules.

Table 2:Summary of Public Food Programs analyzed

	School Breakfast (SB)	Vaso de Leche (VL)	ECHINP
Start of the program	PRONAA: 1992 FONCODES: 1993	December 1984	PANFAR: 1988 Wawa-Wasi: 1994
Type of transfer	Food ration (prepared)	Food ration (pre-cooked)	Food ration (pre-cooked)
Delivery mechanism	public schools	Mother's clubs	MoH facilities
Primary Target Group	Children between 4 and 13 years old attending to public primary schools	Children under 6 and pregnant and breast feeding woman	Children under 3 at nutritional risk
Secondary Target Group	None	Children between 7 and 13, TB patient and elders	None
Geographic targeting	Yes	Yes	No
Household / Individual	No	No	Yes
Target population size* 1/	5´159,807	8´802,312	2´074,662
Target population size* 2/	3,439,627	5,651,974	1,384,366

*Source: 2000 LSMS

1/ Target population within the age and school restriction of each program.

2/ Target population within the age and school restriction of each program, who are poor.

III. Measurement issues and methodology

A lack of sufficient resources for social spending is the norm in developed and developing countries worldwide, though needs differ substantially in size and nature. In this context, most public programs are forced to clearly identify a target group based on needs or urgency. When referring to nutritional programs, priorities are often defined in terms of vulnerability, which is related to income, age and gender. Thus, in developing countries, poor children and poor women of reproductive age tend to be identified as the most vulnerable groups. In this context, it is always relevant to know to what extent public programs are attending individuals or families outside the target population, (type I error, leakage) and to what extent they are leaving part of the target population without the corresponding transfers. (type II error, undercoverage) To estimate the magnitude of these errors, though, we need to define, among other considerations, who is poor and which is the most vulnerable age. Some of those decisions may have a significant impact in the way we evaluate the targeting performance of public health programs. I discuss these issues in this section.

The poor can be defined as any individual or household that cannot afford the value of a consumption basket, identified as a basic need by a group of local experts. In Peru, for instance, most poverty studies work with a basic consumption basket and a basic food basket. The first one identifies the poor and the second the extremely poor.

With a household survey, we can estimate the level of expenditures or income made by all household members, and use it to determine if they are poor, assuming that resources

are pooled within the household. A usual practice is to estimate per capita income or expenditures and compare it to the value of an individual consumption basket[14]. We can use the poverty indicator to define the measures of leakage and undercoverage, but for many programs poverty is not the only criteria to define a target group. In fact, all the programs analyzed here specify children of different ages as the priority target population[15]. To enforce that priority can be somewhat problematic if the program allows for food intake within the household because household heads can easily decide to distribute the food according to their preferences rather than the one established by the program. In that sense, we report here two measures of leakage. The first one considers a leakage to be any case with a beneficiary that is non-poor, out of the age range or does no attend a public school. The second one only considers non-poor beneficiaries as leakage.

We can use the two measures of targeting errors to evaluate the performance of a particular program over time or to compare two or more programs. If program A has a lower leakage rate and a lower undercoverage rate than program B, then we can say that program A has a better targeting performance than program B. The evaluation is more complicated if program A has a lower leakage rate but a higher undercoverage rate. Some

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[14] In some cases, though, adjustments are made by household composition, understanding that there are consumption economies of scale and differences in the needs of household members by age and gender. (see Deaton and Zaidi, 1999) We disregard this practice based on Valdivia (2002) who reports a negligible effect for these adjustments when the value of relevant parameters remains within a reasonable range. Actually, it is the ranking of households that does not change much, but poverty levels may still change substantially with these adjustments if we keep the poverty line fixed. We deal with that issue below when discussing the effect of movements in the poverty line over the estimated targeting performance of the analyzed programs.

[15] One exception is the Vaso de Leche program that also includes pregnant and breast-feeding mothers as part of their priority target population.

would only care about leakage and then program A would be ranked first. Nevertheless, it can be argued that it is easier for smaller programs (higher undercoverage) to have a lower leakage. That could be because operators are especially careful at initial or pilot stages of a program, but also because smaller programs tend to face less political pressures to distort their allocation procedures.

There are several issues that need to be considered when analyzing the absolute and relative targeting performance in search of policy implications. Here we discuss two of them. The first refers to the arbitrariness of the poverty line. The second is based on the fact that the size of the leakage is not necessarily a measure of the way that a program is going to affect the targeted population in the event of an expansion or contraction.

Targeting errors and the poverty line

A key issue with the use of the targeting errors defined above is that they do not look at the whole distribution of beneficiaries across the expenditure distribution but only if they are above or below the poverty line. There are at least two limitations of the poverty line approach. The first one refers to its arbitrariness, and is particularly important if it can be argued that some individuals above the poverty line are not significantly different from some of those below the poverty line in terms of variables such as their level of nutritional vulnerability. The second one refers to the fact that it would be important to differentiate a program that has many beneficiaries just above the poverty line from another one that has many beneficiaries further right.

With respect to the arbitrariness of the poverty line, it is important to keep in mind that program officers usually cannot observe the per capita expenditures of beneficiaries and are limited to proxies based on the characteristics of the locality (geographic targeting) or the dwelling and the family. In this sense, program's leakages may result from the fact that many of the beneficiaries just above the poverty line may have dwelling and family characteristics similar to some of those below the poverty line. More importantly, as a result of that, they may face similar nutritional risk too, so we can question the decision to identify such beneficiaries as a leakage.

These considerations lead us to explore the robustness of the measures of targeting errors defined above to changes in the poverty line, to see if the ranking of the programs changes significantly as we move the poverty line upwards or downwards. For these factors to be significant in aggregate terms they have to imply a systematic bias in the sense that many individuals above (below) the poverty line should be considered as proper (improper) beneficiaries. An additional condition is that there is a significant concentration of children, beneficiaries or not, around the standard poverty line.

One way to analyze the sensitivity of the presented measures of incidence focuses on the leakage rate, using the concentration curves to compare the targeting performance of the programs under analysis. A concentration curve for the beneficiaries of a program lets us know the proportion of beneficiaries that belong to any first expenditure or income

percentile of the population[16]. If we focus on one point of the expenditure distribution, say x, then we can use $1-C(x)$ as a measure of the leakage rate. In addition, if the concentration curve for program A is above the one for program B, then it can be said that program A has a lower leakage rate for all levels of the poverty line[17]. We need to be careful with these comparisons, though, because they could be somewhat misleading when we are comparing programs that focus on populations with different poverty levels.

Marginal incidence analysis

The proportion of poor and non-poor that benefit from a program at a given time may not be a good indicator of how an expansion, or contraction, would affect the poor. There are arguments for both, an early and a late capture by the non-poor, based on the presence of positive participation costs that differ for the poor and non-poor, and change with the scale of the program[18]. The higher costs related to reaching more remote areas is often raised as the typical argument in favor of early capture. Late capture could result from the fact that small pilot projects are more carefully monitored and face less political pressures. The expansions, though, would invariably transfer the program to line public officials, with lower expertise and less compatible incentives. Also, political pressures or bribes that distort resource allocations are more likely as the program expands.

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[16] The curve can be above or below the 45° line that starts from the origin. Being above (below) implies that the program has a pro-poor (pro-rich) bias.

[17] This ordering is incomplete, in the sense that not much can be said if concentration curves cross each other at some point.

[18] Lanjouw and Ravallion (1998).

Political distortions can also affect the dynamic properties of the selection of beneficiaries. A good system for the identification of beneficiaries can imply relatively low leakage rates at the beginning. Later, though, leakage increases because households that leave poverty or stop having children in the targeted age range cannot be excluded from the group of beneficiaries. After a while, the average leakage rate would be very high but the leakage for new areas, where the system for the identification of beneficiaries is applied properly again, could remain low.

All these arguments indicate the need to expand the analysis estimating the marginal incidence properties of the analyzed programs. Previous studies such as Lanjouw and Ravallion (1998) or Younger (2002) based their estimates on one cross-section, so they used the heterogeneity across regions to infer the marginal behavior. Here, I use the heterogeneity over time to estimate the impact of a program expansion or contraction for the poor, based on individual data[19]. The idea is to estimate the following equation:

$$D_{iqt} = \alpha_q + \beta_q p_t + \nu_{qt} \qquad q = 1, \ldots, 5 \tag{1}$$

where i indexes the individual, t indexes the year of the survey and q indexes the per capita expenditure quintiles. The dependent variable is the program participation dummy for each individual. The explanatory variables are quantile dummies and the interaction between these dummies and the program participation rate for a particular year. β_q can be interpreted as the marginal effect of an increase in program participation on the participation rate in a particular quintile, and $\beta_q > 1 \,(< 1)$ would indicate that a general

expansion (contraction) in coverage will cause a more than proportional increase (reduction) in participation for that quantile.

I estimate (1) imposing the following restrictions: $\sum_q \alpha_q = 0$ and $\sum_q \beta_q = 5$. This way, the estimated vector $\hat{\beta}_q$ is used to generate a concentration curve by plotting $\sum_j^q \beta_j \Big/ 5$ on q, so that we can check which program is marginally more pro-poor[20].

The key issue is to analyze to what extent the marginal ranking differs from the average ranking. Programs A and B may have the same average level of leakage, but the marginal performance of program B may be substantially more pro-poor than that of program A. If that is so, to cut (expand) program B will have a larger negative (positive) effect on the poor[21].

IV. Empirical results

The LSMS questionnaire asks a key respondent not only if the household receives transfers from a large list of public programs, but also to identify the members who benefit from it. It could be argued that individual identification is biased towards the age groups the programs target in the fear that surveyors could denounce them to the program. We are in no position to check this but can recall that the LSMS survey is now run by a private firm, Instituto

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[19] See Younger (2002) for a discussion of the advantages of such a procedure.

[20] Younger (2002) also suggests to run a model with fixed effects at the department (region) level, since departments of regions have different unobservable characteristics for department (region).

[21] Still, it needs to be clear that budget adjustments cannot be based solely on these estimates since they do not take into account the marginal benefit and costs of the program.

Cuánto, whose surveyors are trained to clarify to respondents that none of the information revealed to them would go to any government agency. In that sense, such bias may not be that important. Also, the results are very consistent with the characteristics of the delivery mechanisms of each program.

Table 3 shows participation rates by quintiles of the target population for each of the public programs under analysis. That analysis is done at the individual and household level[22]. At the individual level, the SB program obtains the largest coverage rate (44.7 %). Note that over 31% of school children in the richest quintile benefited from the SB program in the year 2000, compared to the 55% observed in the poorest quintile. The ECHINP aggregate shows the smallest coverage but also the largest pro-poor bias since the proportion of beneficiaries among the poorest is 5.4 times that of the richest quintile. At the household level, average global rates are very similar to those obtained at the individual level for all programs, but the differences by quintile are significantly different in the case of the VL program for which the household data indicate the program is more pro-poor than is the case with individual data[23].

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[22] At the individual level, I restrict the analysis to those individuals that are within the age and school restrictions set for each program. At the household, the analysis is restricted to those that have at least one member within the age/school restriction for each program. The comparison of these two levels of analysis is important to check consistency with the findings of previous studies that focus on household level data. (see Younger, 2002 and Stifel & Alderman, 2003)

[23] The household level results are consistent with those reported in Stifel & Alderman (2003), but not with those in Younger (2002). Unfortunately, I have not been able to identify the reasons for that discrepancy.

Table 3: Coverage of social programs, by quintiles of the socioeconomic variable [1/]

	I	II	III	IV	V	Total
Individual level						
School Breakfast (SB) [2/]	55.1	55.5	42.9	39.4	30.7	44.7
Vaso de Leche (VL) [3/]	31.4	26.7	30.8	23.5	15.0	25.5
Child Oriented Food Programs (ECHINP) [4/ 5/]	19.4	16.9	13.9	4.8	3.6	11.7
Household level [6/]						
School Breakfast (SB)	67.1	58.5	48.3	41.1	29.4	48.9
Vaso de Leche (VL)	48.1	41.7	35.7	28.6	14.8	33.8
Child Oriented Food Programs (ECHINP) [4/]	22.2	18.0	12.7	5.9	3.9	12.5

Source: 2000 LSMS

[1/] The socioeconomic status is established with household per capita expenditures

[2/] As a percentage of children between 4 and 13 years old who are actually attending a public school

[3/] As a percentage of children under 13 years old and women who are actually pregnant or breast feeding

[4/] Includes PANFAR, PAI, Wawa Wasi / PRONOEI / Cuna

[5/] As a percentage of children under 3

[6/] As a percentage of households with at least one member in the age / school restriction of each program.

Table 4 shows the individual-level leakage and undercoverage rates for the analyzed programs, by type of location (urban/rural). The largest leakage rate, that is the proportion of beneficiaries that do not belong to the target group, belongs to the VL program (49.5%), which is run by local municipalities that receive transfers from the central government according to their poverty level. The estimated leakage rates for the SB and the ECHINP aggregate are closer to each other at around 38-42%.

When differentiating by type of location, we find that most of the difference between the VL program and the others occurs in urban areas, while the performance is very similar in rural areas. Also, without exception, all programs show lower leakage rates in rural areas. The homogeneity of the leakage rates across programs in rural areas suggests that

such a feature is not a special merit of any program, but the result of the higher levels of poverty in those areas, which makes it harder for any program to reach the non-poor.

Table 4: Estimated Leakage and Undercoverage Rates for Each Program

	Leakage (1)			Undercoverage (2)		
	Global	Urban	Rural	Global	Urban	Rural
SB (a)	38.0	40.1	36.8	52.1	66.2	37.5
VL (b)	49.5	53.2	46.5	71.7	76.7	66.6
ECHINP (c)(d)	41.5	44.5	40.8	85.3	94.8	76.0

(1) As a percentage of the individuals within the restrictions of each program, who benefited.

(2) As a percentage of the individuals within the restrictions of each program, who were poor.

All other notes as in

Table 3: Coverage of social programs, by quintiles of the socioeconomic variable 1/

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At 52%, the lowest undercoverage rate belongs to the SB program while the largest belongs to the ECHINP aggregate. By separating according to type of location, it is observed that the SB program has a special bias towards rural areas, where the program covers about 62% of its target population. This result is not surprising considering that FONCODES is one of the providers of the SB program and that institution has had a mandate to focus in rural areas. The ECHINP aggregate shows a significant bias in favor of children in rural areas.

In conclusion, there does not seem to be any systematic relation between the size of the program, in terms of their number of beneficiaries, and its performance in terms of its leakage rate. The ECHINP aggregate has a leakage rate similar to that of the SB, despite the fact that the program is much smaller. But, before trying to interpret these results, we

should analyze their robustness. The first issue to consider is that the estimated targeting errors in Table 4 take as a leakage, not only a non-poor beneficiary, but also the cases in which the beneficiary does not fulfill the age and school restrictions. In the case of the VL program, for example, poor children above 13 are considered as a leakage.

Knowing that not all programs face similar additional restrictions, it is important to disentangle the effect of each source on the estimated leakages. Table 5 compares the leakage estimates in Table 4 with those that relax the definition of a leakage. First, notice that when using poverty as the only restriction, the largest leakage rate still belongs to the VL program (31.4%) but now the estimated rate is much closer to that of the SB program. In that case, the only program that differentiates from the other two is the ECHINP aggregate which has by far the smallest leakage of the analyzed programs (17%)[24].

Table 5 also shows that the age restriction is more important than the school restriction for the SB programs which delivers rations only in public schools. When omitting the age restriction, the leakage rate for the SB program drops five points to 33%, but the largest age effects are found with the VL and ECHINP programs. In the case of the former, the leakage rate drops 19 points to 31%, indicating that two fifths of their leaks reported in Table 4 for the VL program were indeed poor beneficiaries but older than 13 years[25]. For the ECHINP aggregate, the age effect is even more important since its omission

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[24] I do not report here a separated analysis by type of location but can provide them upon request. Observed patterns are similar in both urban and rural areas.

[25] This finding for the VL program is indeed consistent with the results of Alcázar et. al. (2003). They use two Public Expenditure Tracking Surveys (PETS) to analyze the channeling of resources from the VL program and the educational programs in Peru. For the VL program they find that the largest leakage occurs within the household because rations are actually distributed among all

implies a 25 point drop in the estimated leakage rate, meaning that almost three out of every five of their leaks were poor beneficiaries but above 3 years old.

Table 5: Leakage rates under alternative set of restrictions

	All restrictions	No age restriction	No school restriction	Only poverty restriction
Global				
SB	38.0	33.0	37.1	28.8
VL	49.5	31.4	49.5	31.4
ECHINP	41.5	17.1	41.5	17.1

Source: 2000 LSMS

In summary, the age/school restrictions are not relevant for the SB program, which is not surprising given that delivery occurs in the school. Also, the age restriction is significantly larger for the VL program and the ECHINP aggregate. This latter result is very important because it suggests that food programs that allow for consumption within the household allow them to reallocate the rations for the benefit of members that are not within the age restrictions set by the program[26]. Actually, it can be argued that such deviations should not be called leakage, but we need to keep in mind that lack of consideration of these intra-household reallocations by policy planners ends up reducing the possibility of the transfer achieving any real impact on the original targeted population

household members and not only among children under 6, pregnant and breast-feeding women. Only 41% of the ration assigned to the household actually reaches the target group.

[26] Recall that most programs in the ECHINP aggregate deliver *papilla*, which are supposed to be specifically for children in their first months. Still, anecdotal evidence indicates that these *papillas*

since the per capita ration shrinks when distributed among more individuals than originally planned[27]. Furthermore, it should make us think about the justification for a program that imposes its preferences on households, especially if we consider that health and nutritional vulnerability is indeed determined at the household level.

Targeting errors and the poverty line

In section II, we presented two ways of analyzing the robustness of the comparison of two programs to changes in the poverty line[28]. The first one focuses on the leakage rate and uses the concentration curve to compare two programs along the whole expenditure distribution. Figure 2 plots the concentration curves for the 3 programs and shows that the ECHINP aggregate is the one with the best performance since its concentration curve dominates those of the VL and SB programs. It seems that the SB program has a slight better performance than the VL but no clear difference is observed especially around the first decile.

In conclusion, movements in the poverty line has a negligible effect on the comparison of the targeting performance of the three programs analyzed here, to the extent that the ranking remains intact when we omit the age restriction, in which case differences among programs are the largest. (see Table 5)

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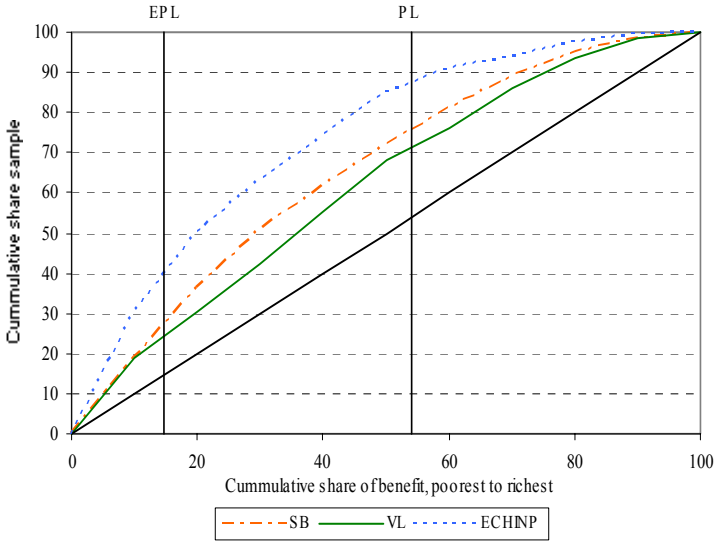
are dissolved in the preparation of beverages and soup that are also consumed by household members outside the age range.

[27] Actually, Stifel and Alderman (2003) do attempt to evaluate the nutritional impact of the VL program using a model with district fixed effects. They find no significant effect.

[28] Need to make clear that the analysis from here disregard the age restriction, defining a leak only when the individual is no-poor.

Figure 2: Concentration curves of the 3 Programs

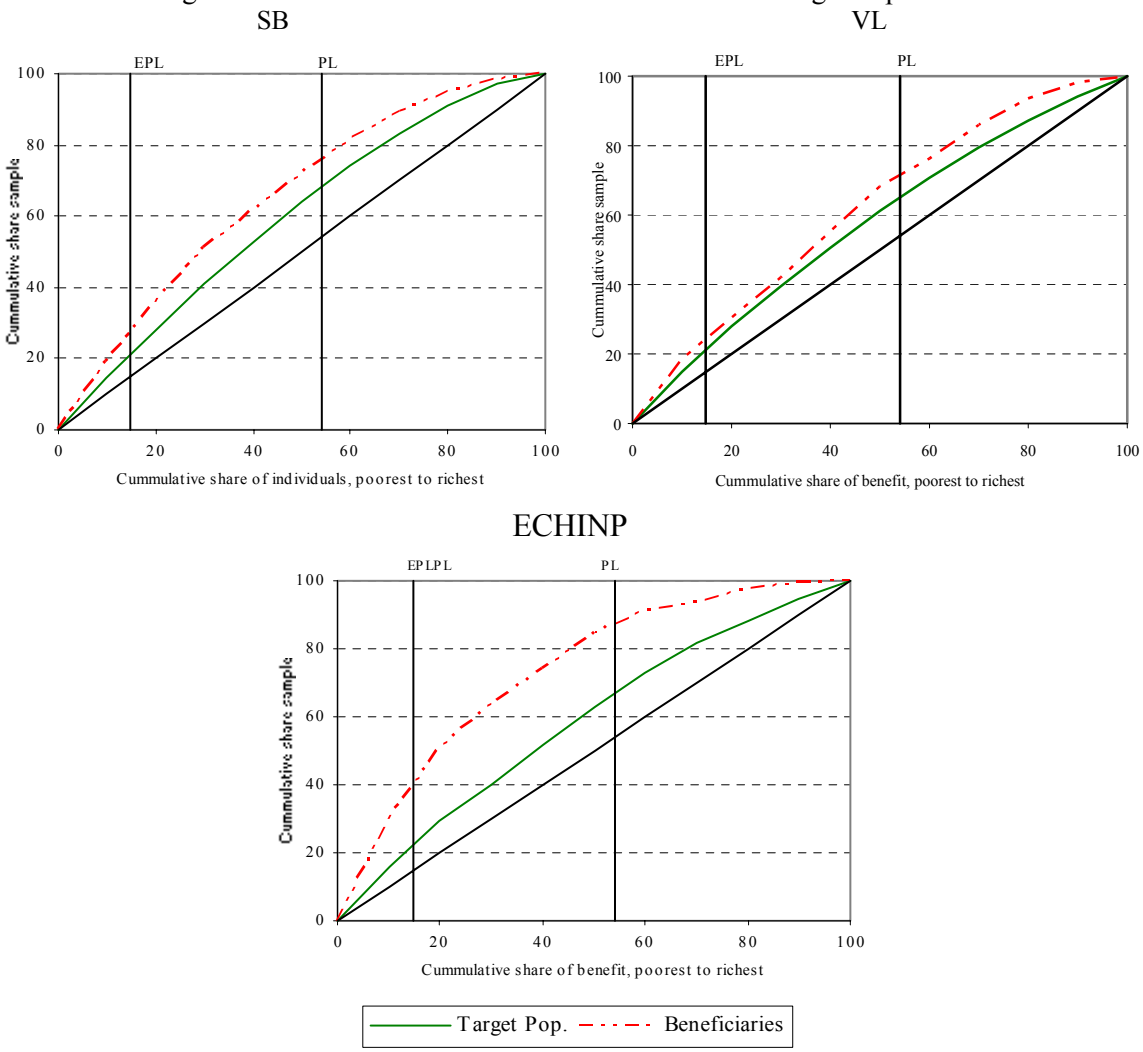


Several factors could explain the observed superiority of the ECHINFP aggregate. Recall that the ECHINP aggregate differentiates from the other two programs not only by the fact that they are the only ones that use an individual targeting instrument, but also by the fact that they focus on smaller children (0-3 years old), which tend to be me more concentrated in poor families[29]. One way to approximate the importance of the differences in the age groups attended by each program is by comparing the concentration curve of the beneficiaries of each program with that of the age target group. Figure 3 plots those two curves for each program. What we can see is that the pro-poorness of the ECHINP aggregate goes well beyond that one of the age group which they work with, since the two

[29] See description in section II.

curves for these programs are the furthest away from each other. In the case of the other 2 programs, the two curves are very close to each other, especially those of the VL program[30].

Figure 3: Concentration Curves of Beneficiaries vs. Target Population



The pattern observed in Figure 3 suggests that something other than the age of its target group has to explain the superior performance of the ECHINP aggregate. One of

[30] The other feature we can observe from Figure 3 is that the distribution of the target groups do not seem to differ much across programs.

these factors could be their use of a specific individual targeting instrument, that could be providing significant help despite the criticisms for their subjectivity and their sensitivity to political distortions. Nevertheless, our checks cannot be considered a proof, so the observed feature may still not be much a property of the programs in the ECHINP, as a result of the characteristics of the targeting procedures followed by the other 2 programs. The next sub-section focuses precisely on the targeting performance of the SB and VL programs.

Marginal Incidence Analysis for the SB and VL programs

In section II, I argued that the average incidence analysis may not provide us with enough information to adjust the scale of an antipoverty program since there are a number of factors that could generate early or late capture by the non-poor. With early capture, a program would have a large leakage rate, but still its reduction could have the greatest effect on the poorest. We can estimate the *marginal* effect by using the variation of the coverage programs across quintiles, and time.

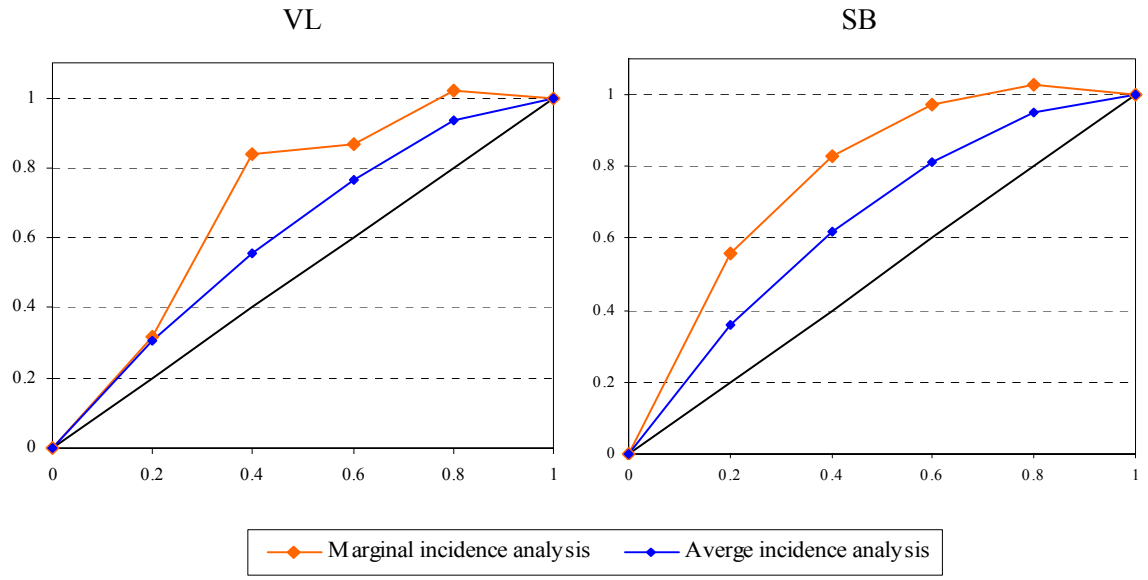
In this sub-section, I present the results of the marginal analysis proposed in section II for two of the largest and oldest food programs in Peru: the *Vaso de Leche* (glass of milk - VL) program and the School Breakfast (SB) program[31]. The exercise uses the information from the 1997 and 2000 rounds of the LSMS[32]. Figure 4 plots the concentration curves

[31] The marginal analysis for the other programs was not feasible because they were not singled-out in versions prior to the 2000 LSMS survey used here.

[32] Figure A.1 shows the coverage rates by quintile and geographical domain for both programs in both years.

associated with the marginal effects estimated using expression (1) and compare them with the average ones[33].

Figure 4: Marginal effects vs. average effects: VL and SB programs



The concentration curves for both programs show a stronger pro-poor bias at the margin than on the average, especially in the case of the SB program. The interpretation is that, in the case of an expansion of the VL program, about 32% of the new beneficiaries would belong to the poorest quintile, which means that the marginal behavior is not any different from the average one. Nevertheless, the estimates also suggest that 51% of the new beneficiaries would be in the second poorest quintile, which is much larger than the proportion of current beneficiaries in that quintile. (26%) In the case of the SB program,

[33] Table A.2 in the appendix shows the corresponding $\beta's$. Notice that the coefficients for the poorest three quintiles are significant.

58% of the new beneficiaries would concentrate in the poorest quintile while 23% would be concentrated in the second poorest. The average numbers are 38% and 22%, respectively.

The robustness of these results can be evaluated by looking at the result of repeating the analysis with regional averages instead of individual data, an approach followed by Lanjouw and Ravallion (1998), when using cross-sectional data. Table A.2 in the appendix includes those estimates. The estimates are very similar in the case of the SB program. For the VL program, the pro-poorness of the marginal effect is even larger for the 3 poorest quintiles. The pro-poorness of both programs at the margin is a very interesting result, since they suggest that two programs with a relatively mediocre targeting performance on average have a significantly greater pro-poor behavior at the margin That implies that cutting (expanding) them would damage (benefit) the poorest harder than the average leakage rate would suggest.

How can we explain this dramatically different targeting performance at the margin? As indicated in section II above, many researchers have argued that this difference could result from mechanisms that facilitate or promote early capture by the non-poor. (see, for instance, Lanjouw and Ravallion, 1998) One idea is that the less poor have more political power so they can influence public officials in order to be early beneficiaries. Later, as the program expands, the poor will inevitably benefit more. We cannot test this hypothesis properly in this document but want to state the possibility of an alternative one that has more to do with the dynamic properties of the list of beneficiaries for each program. As explained in section II, initial transfers are distributed according to the poverty level of the districts in which the schools or mothers' clubs are located. The point is that after a public

school is included in the registry, it is politically very difficult to exclude them later as poverty reduces in the corresponding neighborhood. The same occurs with the VL program, in which it is difficult to retire a mothers' club once it has already been registered as a beneficiary by the municipality. Also, one can imagine that once a family or household has been registered as a beneficiary by a mothers' club, it is unlikely that they are retired from the registry as they abandon poverty or stop having the same number of children in the corresponding age range[34]. If that is the case, a program will have increasing leakages as time passes, no matter how good their system for the initial selection (identification) of beneficiaries is.

Disentangling these two mechanisms would be very interesting, but the important thing is that either hypothesis would take the emphasis away from the enhancement of poverty maps and means-tested programs to identify the poorest. In the latter case, though, the focus shifts towards the design of enforceable exit rules from the list of beneficiaries, which needs to consider the political economy of the delivery mechanisms for programs that are managed on the ground by social organizations.

[34] There is growing anecdotal evidence in support of this hypothesis in Peru, with the media showing cases of beneficiaries of the VL program in neighborhoods that were slums in the past, but now have full residential status, while households in current slums do not receive any ration. It is clear that if an expansion of the program were to occur, these current slums would benefit the most and not the residential areas. The problem is that neighborhoods and households work their way out of poverty, but the political economy of the program does not allow for a proper revision of the list of beneficiaries.

V. Summary of results, policy implications and limitations

This study analyzes the targeting performance of the public food programs for the nutrition of children in Peru: the Vaso de Leche (glass of milk), the School Breakfast and an aggregate of programs (ECHINP) that focuses on the nutrition of children in their first 3 years. I find these programs to have large leakages with between 40% and 50% of their beneficiaries falling outside the target group either because they are not poor or because they are outside the age range. These leakages are larger for the VL program (50%) and in urban areas, where poverty rates are relatively lower. These numbers argue loudly for urgent policy intervention that can reduce these leaks. Nevertheless, a deeper look would suggest that the priority may not be in improving poverty maps and means-tested programs, but rather in defining delivery protocols that are consistent with the program's objectives and in addressing political distortions in their management so that proper exit rules for old beneficiaries become feasible.

In analyzing the robustness of those results, I explore three key adjustments to the original estimates: The first one refers to restricting the definition of leakage to the poverty level of the individual or household, thus disregarding the age of the beneficiary. The second one explores the effect of movements in the poverty line while the third one focuses on comparing the average with the marginal incidence estimates. With respect to the first adjustment, I find the age restriction to be very important, especially for programs that allow for consumption within the household (the VL program and the ECHINP aggregate) which questions the notion that in-kind transfers are preferable than cash transfers because they can be better directed to the target population. Indeed, when omitting the age

restriction, the VL program stops being the one with the worst targeting performance, and the ECHINP aggregate becomes by far the program with lowest leakage (17%). Furthermore, none of the analyzed programs have a leakage rate above 32% when we disregard the age restriction.

The importance of the age-related within-household leaks for the VL program and the ECHINP aggregate suggests that food programs that allow for consumption of the ration in the household are not able to impose their preferences on the distribution of the transfer across household members, regardless of the nature of the ration. It is hard to argue this is bad per se. On the contrary, the policy implication is that these intra-household reallocations need to be considered when defining the size of the transfer because otherwise, they imply a reduction in the size of the transfer per capita and limit the possibility of their having a positive nutritional impact on the target population.

With respect to changes in the poverty line, I find that its effect is relatively small for the purpose of ranking the targeting performance of the four programs analyzed here. That is, the ECHINP aggregate has the lower leakage no matter where we assume the poverty line program officers implicitly use is located. Also, the comparison of the concentration curve of each program with that of their target population suggests that the superiority of the ECHINP aggregate cannot be explained by the differences in the distribution of their target groups, which supports the notion that their targeting instruments perform better for some reason. What we do not know is to what extent this fact relates to the small size of the programs considered within the ECHINFP aggregate.

With respect to the marginal incidence analysis, I find that the SB and VL programs have a very pro-poor behavior at the margin despite having a very mediocre targeting performance on average. This result suggests the need to be cautious about making decisions based on the average targeting performance of programs, because they could show large leakages on the average, but a cut (expansion) could still damage (benefit) the poor more than proportionately[35]. The policy implication of this result is that it takes the emphasis away from improvements in the targeting instruments used by these two programs, shifting it into dealing with the political distortions that affect the selection of beneficiaries. It seems that a powerful avenue would be to work with the political economy behind the delivery mechanisms so that base organizations (mother's clubs) accept to insert proper exit rules for old beneficiaries as they leave poverty. Nevertheless, in the lines of Tullock arguments, it may be the case that these leaks to the non-poor are optimal, in the sense that they may be necessary to sustain the political support for the programs at the base. If so, changes in the political base for these programs are required before something can be done in this regard.

It is important to mention that further research is definitely needed before action can be taken, and all these results need to be taken cautiously given the limitations of the study. One important consideration is that we are implicitly assuming that all beneficiaries receive the same kind of transfer, which is often not the situation for several reasons. In the case of food programs that involve daily rations, two individuals may identify themselves as

[35] Obviously, though, the targeting performance at the margin is not sufficient to determine the expansion or shrinkage of these programs. The answer to that question requires an analysis of the

beneficiaries of the program, but one received more rations because she went more regularly to the community center where meals are delivered. Also, the content of the ration varies significantly by region, and often considerations are based not only on the cost-efficiency of its nutritional content but also on the convenience for local agricultural producers. We could try to homogenize transfers by assigning them a value, but it is often very complicated to assign a unit value to a transfer. A common solution is to use the unit production cost as the value of the transfer. Finally, another factor that would be important to consider when analyzing the distribution of the benefits of a program is that there may be other sources of large leaks that are associated with large administrative costs and/or corruption, and those may differ substantially among programs.

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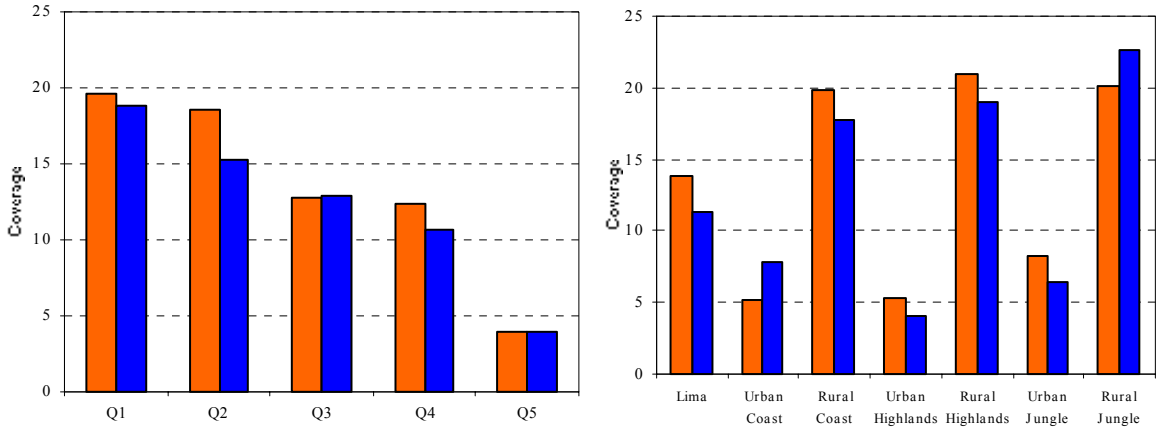
Appendix

Table A. 1: Targeting Errors and the Poverty Line

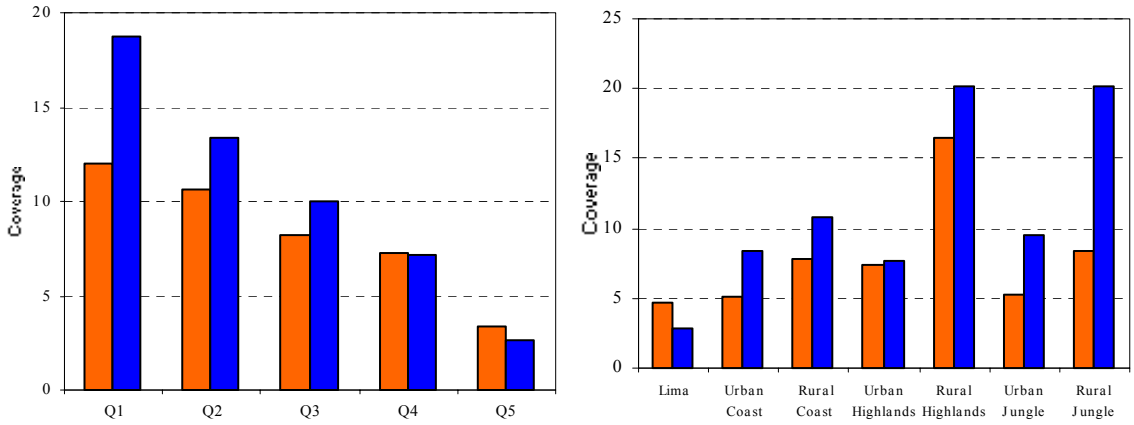
	0.75	0.9	LP	1.1	1.25
Leakage					
SB	56.6	43.2	38.0	32.9	28.1
VL	66.3	54.3	49.5	45.4	41.0
ECHINP	57.1	47.8	41.5	39.1	37.4
Undercoverage					
SB	50.0	51.2	52.1	52.6	53.5
VL	72.0	71.5	71.7	71.9	72.3
ECHINP	83.9	82.2	85.3	85.8	86.5

Figure A.1: VL and SB coverage by quintile, region and year

VL program



SB program



Source: LSMS (1997, 2000)

Table A.2: Marginal effects by quintile (1997-2000)
(absolute value of t statistics in parenthesis)

	With individual data		With regional averages	
	VL	SB	VL	SB
Poorest quintile	1.601	2.804	2.113	2.219
	(2.83)***	(12.37)***	(1.64)*	(3.44)***
Q2	2.605	1.337	3.176	1.289
	(4.61)***	(5.90)***	(3.82)***	(4.10)***
Q3	0.141	0.736	1.533	0.635
	(0.25)	(3.25)***	(1.81)*	(1.69)*
Q4	0.753	0.263	-0.698	0.737
	(1.33)	(1.16)	(-0.53)	(1.62)*
Richest quintile	-0.101	-0.139	-1.124	0.121
	(-0.18)	(-0.61)	(-1.41)	(0.27)

* significant at 10%; ** significant at 5%; *** significant at 1%