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Peru: Is Identifying The Poor The Main Problem In Targeting Nutritional Programs?

Martín Valdivia

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Health, Nutrition and Population (HNP) Discussion Paper

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Health, Nutrition and Population (HNP) Discussion Paper

Peru: Is Identifying the Poor the Main Problem in Targeting Nutritional Programs?

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Paper prepared for the Program on Reaching the Poor with Effective Health, Nutrition, and Population Services, organized by the World Bank in cooperation with the William and Melinda Gates Foundation and the Governments of the Netherlands and Sweden.

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. There are two key findings. First, the age restriction is found to be very important for programs that allow for consumption within the household (the VL program and the ECHINP aggregate). 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 problem 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, the paper finds that the SB and VL programs are very pro-poor at the margin despite having a very mediocre targeting performance on average. This result suggests the need for caution in 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.

Keywords: targeting, nutritional programs, Peru, Vaso de Leche, School Breakfast Program, Early Childhood Nutritional Programs

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FOREWORD

This discussion paper is one in a series presenting the initial results of work undertaken through the Reaching the Poor Program, organized by the World Bank in cooperation with the Gates Foundation and the Governments of Sweden and the Netherlands.
The Program is an effort to begin finding ways to overcome social and economic disparities in the use of health, nutrition, and population (HNP) services. These disparities have become increasingly well documented in recent years. Thus far, however, there has been only limited effort to move beyond documentation to the action needed to alleviate the problem.

The Program seeks to start rectifying this, by taking stock of recent efforts to reach the poor with HNP services. The objective is to determine what has and has not worked in order to guide the design of future efforts. The approach taken has been quantitative, drawing upon and adapting techniques developed over the past thirty years to measure which economic groups benefit most from developing country government expenditures.

This discussion paper is one of eighteen case studies commissioned by the Program. The studies were selected by a professional peer review committee from among the approximately 150 applications received in response to an internationally-distributed request for proposals. An earlier version of the paper was presented in a February 2004 global conference organized by the Program; the present version will appear in a volume of Program papers scheduled for publication in 2005, Reaching the Poor with Effective Health, Nutrition, and Population Services: What Works, What Doesn't, and Why.

Further information about the Reaching the Poor Program is available at the following sites:

Program Overview:
http://www1.worldbank.org/prem/poverty/health/rpp/overview.htm

List of Papers Commissioned by the Program:
http://www1.worldbank.org/prem/poverty/health/rpp/projectlist.htm

Presentations at the Program Conference:
http://www1.worldbank.org/prem/poverty/health/rpp/conference.htm

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INTRODUCTION

"How well do social programs reach the poor?" has been a long-standing question about social policy in developing and developed countries. As characterized by J.S. Mill, the key issue in designing policies to alleviate poverty is "giving the greatest amount of needful help with the smallest amount of undue reliance on it." (Besley and Kanbur 1993: 67). The question is not only about who receives the transfers but also their impact and cost. These concerns pertain both to the poor who urgently need cash or in-kind transfers and to the non-poor who have to pay for them and on whose support the political sustainability of social programs depends.

The answer to such a question requires a definition of who are the neediest, what do they need most, and what is the best way to provide them with it. But the complications do not end there. Next, the neediest have to be identified, not as simple a job as it may first appear. Being concerned about program costs, we cannot just ask the individuals who belong to the group defined as "the neediest," say the poor, who lack the income to purchase a basket of basic needs. If we did, many non-poor would be tempted to say they are poor in order to receive the transfers. Alternatively, the cost of finding out who is truly poor may be too high, so that program officers have to live with imperfect solutions. Consideration of incentives and administrative costs leads us to the notion of an *optimal* but imperfect level of targeting (Besley and Kanbur 1993). Tullock (1992) adds another reason in favor of less-than-perfect targeting. The non-poor usually have more political power than the poor, so some leakage may be necessary to avoid eroding the political base that sustains a social program. This argument is controversial but relevant to the current debate, especially with reference to old programs.

Several instruments have been developed for targeting the poor at a reasonable cost. Proxy means-tested programs are used to identify the poor, based on observable, easily collected information such as residential neighborhood, dwelling characteristics, family size, and age composition. This method is cheaper than the ideal of trying to collect unbiased income or expenditure information but, in practice, still seems expensive. Sometimes excluding certain individuals within a locality from program benefits is also complicated, especially when program officers do not agree with the results of the proxy-means instrument. Poverty maps, also used to identify neighborhoods where the neediest concentrate, can further reduce costs, while at the same time sparing program officers the dilemma involved in excluding some individuals and families. Finally, programs can be designed in a way that discourages the non-poor from participating. The possibilities range from altering the nature of the transfer itself--low-wage jobs or low income-elasticity goods such as food, to establishing certain procedures for receiving transfers such as long waits in lines (Alderman and Lindert 2003). The use of these instruments varies across programs, and targeting performance is a result of a combination of instruments.

This discussion of targeting is highly relevant in the current Peruvian context, where several important sectors within the public administration and civil society share the objective of social policy reorganization. Many of the advances have concentrated on restructuring public food programs under the Program for the Integral Protection of Childhood, now administered by the National Food Assistance Program (PRONAA). This institution was in charge of organizing the transfer of these programs to local governments. Over the past two years, PRONAA itself, and the Vaso de Leche (Glass of Milk) Program, have faced several corruption-related media

scandals but also heavy leakage of benefits to the non-poor. Finally, several evaluations have been done on the different kind of leaks affecting these programs. All this attention reflects the growing importance of the issue in Peru.[1]

RESEARCH QUESTIONS

This paper analyzes the targeting performance of a subset of targeted public food programs in Peru, based on information from the Living Standards Measurement Surveys (LSMS). The programs are the Vaso de Leche (VL), the School Breakfast (SB) and several small early childhood nutritional programs with similar objectives and procedures aggregated under the ECHINP category. Unlike most previous studies, this one focuses on individual data about who benefits from programs, which allows checking not only the extent to which transfers reach poor families but also whether transfers are indeed received by the intended age groups. In addition, the paper follows 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; the second analyzes the extent to which the targeting performance of different programs changes with their size and timing. Unlike in previous studies, the marginal analysis presented here for the SB and VL Programs compares information for two years (1997 and 2000) so that individual data can be used instead of regional averages.

THE PROGRAMS AND THE DATA

Public food programs have come under close scrutiny in Peru following large increases in their number and budgets during the 1990s. Several new, uncoordinated programs, with confusing or overlapping objectives, were created under different government agencies.[2]

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

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

[2] 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 falls under the Ministry for the Promotion of Women and Human Development. (PROMUDEH)

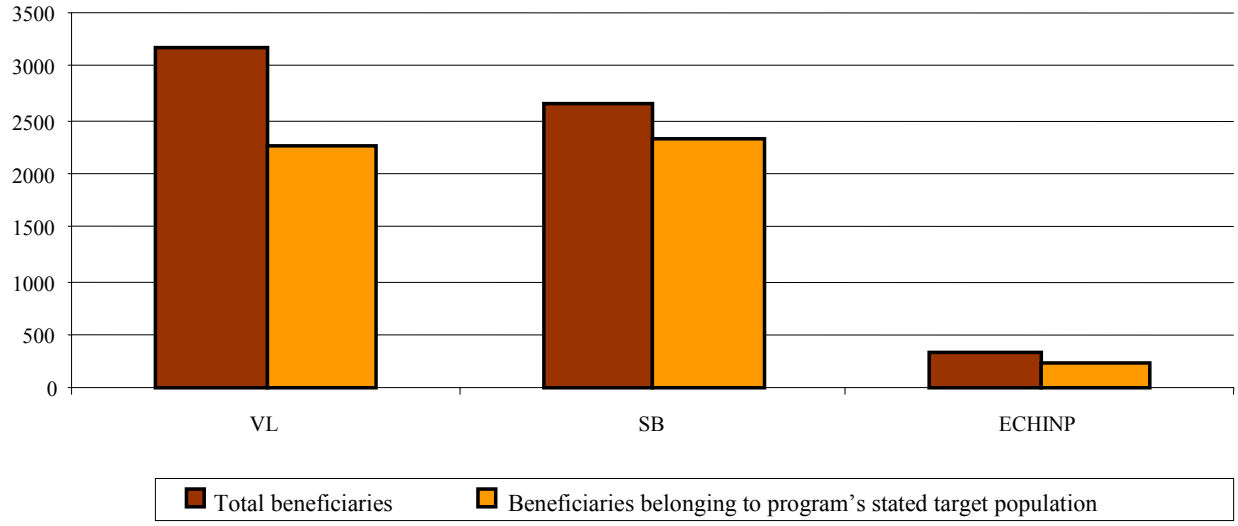
Table 1: Total Budget for Food Programs in Peru (thousands of U.S. dollars):

Program	*1998*	*1999*	*2000*
Vaso de Leche (VL)	97,645	90,273	93,159
School Breakfast (SB)	68,013	73,547	67,935
Early Childhood Nutritional Programs (ECHINP)	38,324	55,471	34,673
Subtotal	203,982	219,291	195,767
Total budget, food and nutritional programs	234,565	266,967	240,278

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

With household-level information from the 2000 LSMS, we can also compare program size by the number of individuals reporting themselves as program beneficiaries (Figure 1). The largest program, based on the number of beneficiaries, was the Vaso de Leche, followed by the School Breakfast. The VL Program has 3.1 million beneficiaries and the SB Program has about 2.6 million. Unlike in the VL Program, in the SB Program the number of beneficiaries closely matches the number of beneficiaries reported by the program. The Secretaría Técnica de Política Alimentaria Nutricional (STPAN 1999) reports that the VL Program is based on a total of 4.9 million beneficiaries but says that, according to some case studies, program beneficiaries may be overestimated by as much as 100 percent.

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



Source: LSMS 2000.

In addition to having the smallest budget, the ECHINP aggregate also has the smallest number of beneficiaries, with an even larger difference, suggesting that per capita transfers are also larger for the programs involved. Below, each program included in the analysis is briefly described.

The School Breakfast Program

The School Breakfast Program is a nutritional program that targets public primary school children. It was created in 1992 to improve nutrition for 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). Coordination between the two agencies seemed loose, but FONCODES tended to concentrate on rural areas.

Local mothers' committees organize breakfast, delivered to public schools during recreation.[3] Breakfast theoretically 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 age. In practice, though, local committees make adjustments to incorporate local inputs, mainly milk and grains produced in each area.[4]

In principle, 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 breakfasts delivered. In practice, though, these criteria work for new areas, but history works to sustain transfer levels for older neighborhoods even when nutritional risk or poverty have manifestly been reduced in recent years.

Vaso de Leche

The Vaso de Leche Program, started in 1984, was designed to target children younger than 6 years of age and pregnant or breast-feeding women. However, it has heavy leakage toward older children (from 7 to 13 years old) and the elderly.[5] In that sense, it overlaps significantly with the SB Program. The treasury funds the program through the municipalities, which buy and transfer food to the registered local mothers' committees. The mothers' committees organize distribution to registered households. This often implies a reduction in rations, as committees tend to increase the number of registered beneficiaries.

Distribution takes place in the municipal building, another community building, or the homes of elected local leaders. The ration varies by committee but usually includes 250 ml of milk, cereals, and other products and is often unprepared when delivered.[6] This is a key difference with respect to the SB Program, one that facilitates allocation among household members according to the food preferences of the mothers or household head, regardless of program guidelines.

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[3] See Cueto et al. (1999). They find that most breakfasts are delivered between 9 am and 11 am because children are hungrier by then than when they first arrive at school.

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

[5] 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.

[6] See Alcázar et al. (2003). Local mothers' committees argued that they do not prepare the product because of lack of organization and resources, but also because coming in daily for their ration is too burdensome for individuals who live in remote places. This way, they have to come only once a week (or once a month) to pick up the ration for the whole period.

The size of the transfer to municipalities is based on the poverty level in 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 with the committees. Again, as with the SB program, history affects the practice. These committees are in charge of verifying poverty among families in their neighborhoods and the presence of children in the prescribed age range. There are no clear rules for updating the information, and it is often claimed that many families remain beneficiaries even though they are no longer poor or do not have children in the prescribed age group.

Early Childhood Nutritional Programs

Within the Early Childhood Nutritional Programs (ECHINP) category, the author has selected and aggregated five relatively small programs with similar objectives and target populations. All of them focus on children under three years of age. Four of them have exclusive nutritional objectives: the Nutritional Assistance Program for High-Risk Families (PANFAR) operated by the Ministry of Health (MOH),[7] the Infant Feeding Program (PAI) operated by the Ministerio de Promoción de la Mujer y Desarrollo Humano (PROMUDEH), and two other programs run by nongovernmental organizations (NGOs) (Niños and Nutrición Infantil). The fifth program included is the PROMUDEH integral childcare program, Wawa-Wasi, which also targets poor children under three. All these programs deliver precooked food rations for children under three years old (*papillas*), but use different locations for distribution.[8] PANFAR uses MOH health facilities and personnel. Other programs' distribution mechanisms rely heavily on the participation of the beneficiaries' mothers and often use the community center or pre-school buildings.

In the case of MOH programs, public health facilities are responsible for identifying the family's socioeconomic status. 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 socioeconomic characteristics of the families and seek out newborns and pregnant women. Rules vary by center, but families classified as poor or indigent are offered the baskets of the applicable program. Still, the subjectivity of the process allows for significant leakage.

These programs are intended to help nutritionally vulnerable children, but each one defines nutritional risk differently. PANFAR, for instance, looks for families with parents who have, at most, a primary education, unstable employment status, more than three children under the age of five, pregnant and breast-feeding women at nutritional risk, or women who have recently given birth (Gilman 2003). A family is eligible if it has four of the above characteristics, or if some of the under-five children are undernourished. Eligibility is reviewed every six months,

[7] The Programa de Complementación Alimentaria para Grupos en Mayor Riesgo (PACFO) is another nutritional program run by the MOH but it is not included as a separate alternative in the LSMS questionnaire. It has the same objective and target population so that some of the households that report benefiting from PANFAR may actually be PACFO beneficiaries.

[8] An important difference is that the PANFAR basket does include some food for adults, (e.g., oil, rice), because it is based on the premise that it is the economic situation of the family that puts the children at nutritional risk.

and the subsidy is withdrawn if no child under five is undernourished. This process generates a perverse incentive for which anecdotal evidence is often cited.

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 seven 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.

Table 2: Summary analysis of public food programs

Item	***School Breakfast (SB)***	***Vaso de Leche (VL)***	***Early Childhood Nutritional Programs (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 groups	None	Children between 7 and 13, TB patient and elders	None
Geographic targeting	Yes	Yes	No
Household/individual	No	No	Yes
Target population size[a,b]	5,159,807	8,802,312	2,074,662
Target population size[a,c]	3,439,627	5,651,974	1,384,366

PRONAA National Food Assistance Program; FONCODES Social Investment Fund; PANFAR Nutritional Assistance Program for High Risk Families; MOH Ministry of Health.

a. *Source:* LSMS 2000.

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

c. Target population who are poor within the age and school restriction of each program.

The benefit incidence information comes from social programs module 12 in the LSMS questionnaire. The first question asks the key informant whether any household member benefited from each program in the 12 months prior to the survey date. If the answer is positive, she is asked to identify the household members that did. For the most part, this study uses the 2000 LSMS, which includes a sample of 3,997 households and 19,957 individuals. The marginal incidence analysis compares two rounds of the LSMS (1997 and 2000) that have different sample sizes but similar sampling procedures and questionnaires in the relevant modules.

MEASUREMENT ISSUES AND METHODOLOGY

A lack of sufficient resources for social spending is the norm in developed and developing countries worldwide, although the size and nature of needs differ substantially. Most public programs are forced to 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 are usually identified as the most vulnerable groups. In this context, it is always relevant to know to what extent public programs attend to individuals or families outside the target population (type 1 error, leakage) and to what extent part of the target population is without the corresponding transfers (type 2 error, undercoverage). To estimate the magnitude of these errors, first who is poor and which age group is the most vulnerable have to be defined. Some of those decisions may have a significant impact on the evaluation of the targeting performance of public health programs. These issues are discussed in this section.

The *poor* can be defined as any individual or household that cannot afford to purchase a consumption basket of basic needs designated by a group of local experts. In Peru, for instance, most poverty studies work with a basic consumption basket and a basic food basket. Inability to purchase a basic food basket identifies the *extremely poor*.

With a household survey, we can estimate all household members' expenditures or income and use this estimate to determine if they are poor, assuming that resources are pooled within the household. The usual practice is to estimate per capita income or expenditures and compare it to the value of an individual consumption basket.[9] We can use the poverty indicator to define the measures of leakage and undercoverage, but for many programs poverty is not the only criterion for defining a target group. In fact, all the programs analyzed here specify children of different ages as the priority target population.[10] Enforcing 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:* (1) any case of a beneficiary who is non-poor, out of the age range, or does not attend a public school; (2) non-poor beneficiaries.

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, we can say that Program A has a better

[9] In some cases, adjustments are made by household composition, with the understanding that there are consumption economies of scale and differences in the needs of household members by age and gender (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, the ranking of households does not change much, but poverty levels may change substantially with these adjustments, if we keep the poverty line fixed. We deal with this issue below when discussing the effect of movements in the poverty line on the estimated targeting performance of the analyzed programs.

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

targeting performance than Program B. The evaluation is more complicated if Program A has a lower leakage rate but a higher undercoverage rate. Some analysts, concerned only about leakage, would then rank Program A first. Nevertheless, it can be argued that it is easier for smaller programs (higher undercoverage) to have less leakage. That could be because operators are especially careful at initial or pilot stages of a program, but also because smaller programs are usually under less political pressure than larger ones to distort their allocation procedures.

Several issues 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 is 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 a program affects 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 entire distribution of beneficiaries across the expenditure distribution but only at whether they are above or below the poverty line. The poverty-line approach has at least two limitations. The first one concerns its arbitrariness and is particularly important if some individuals above the poverty line are not significantly different from some of those below the line in terms of variables such as the extent of their nutritional vulnerability. The second limitation refers to the fact that a program that has many beneficiaries just above the poverty line should be differentiated from another one that has many beneficiaries farther above the poverty line.

With respect to the arbitrariness of the poverty line, it is important to keep in mind that program officers usually cannot observe beneficiaries' per capita expenditures and are limited to proxies based on the characteristics of the locality (geographic targeting) or the dwelling and the family. In this sense, program leakage 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 important, they may face similar nutritional risk, too, so that the decision to identify such beneficiaries as a leakage is questionable.

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 program ranking changes significantly as we move the poverty line upward or downward. 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 appropriate (inappropriate) beneficiaries. An additional condition 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 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.[11] If we

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

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, it can be said that Program A has a lower leakage rate for all levels of the poverty line.[12] We need to be careful with these comparisons, however, for they could be somewhat misleading when comparing programs that focus on populations with different poverty levels.

Marginal Incidence Analysis

The proportion of poor and non-poor benefiting from a program at any time may not be a good indicator of how an expansion (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 (Lanjouw and Ravallion 1998). The higher cost of reaching remote areas is typically the argument advanced for early capture. Late capture could result from the fact that small pilot projects are more carefully monitored and under less political pressures than larger projects. However, expansions would invariably transfer the program to public officials with less expertise and fewer compatible incentives. Political pressures or bribes that distort resource allocation are also more likely as a program expands.

Political distortions can also affect the dynamics of beneficiary selection. A good system for identifying beneficiaries can imply low leakage rates at the beginning. But later, leakage increases, because households that escape 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 high, but leakage for new areas, where the system for identifying beneficiaries is again applied properly, could remain low.

All these arguments indicate the need to expand the analysis of estimated marginal incidence properties of the programs being studied. Lanjouw and Ravallion (1998), Younger (2002), and other studies based their estimates on one cross-section, so they used heterogeneity across regions to infer marginal behavior. This study uses heterogeneity over time to estimate the impact of a program expansion or contraction on the poor, based on individual data.[13] The idea is to estimate the following equation:

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

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 quintile 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 quintile.

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

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

Equation (1) is estimated, with 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 $\sum_j^q \hat{\beta}_j \Big/ 5$ on q, so that we can check which program is marginally more pro-poor.[14]

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, cutting (expanding) Program B will have a larger negative (positive) effect on the poor.[15]

EMPIRICAL RESULTS

The LSMS questionnaire asks key respondents whether the household receives transfers from a large list of public programs and also to identify the members who benefit from it. It could be argued that individual identification is biased toward 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 Cuánto, whose surveyors are trained to explain to respondents that none of the information revealed to them goes to any government agency. In that sense, such bias may not be that important. Also, the results are very consistent with the characteristics of each program's delivery mechanisms.

Table 3 shows participation rates by quintiles for each of the public programs under analysis. That analysis is done at the individual and household level. At the individual level, two estimates are presented, one that constructs quintiles on the whole population while the second one does it for those belonging to the target population.[16] At the individual level, the VL Program obtains the largest coverage rate (12.4 percent). The coverage of the SB program is similar (10.4 percent) but the ECHINP aggregate covers only 1.4 percent of the Peruvian population. The VL program is also less pro-poor than the other two programs in 2000. Almost 4 percent of Peruvians in the richest quintile benefited from the VL program compared to almost 19 percent in the poorest quintile. The ECHINP aggregate shows the lowest coverage but also the greatest pro-poor bias since the proportion of beneficiaries among the poorest is 17 times that of the richest quintile.

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

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

[16] In the second case, the analysis is restricted to individuals within the age and school restrictions set for each program. At the household level, the analysis is restricted to those having 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 (Younger 2002; Stifel and Alderman 2003).

Estimated coverage rates are naturally larger when analysis is restricted to the target population, and in that case the SB program is the one with the largest coverage (44.7 percent). More than 31 percent of school children in the richest quintile benefited from the SB Program in 2000, compared to 55 percent in the poorest quintile. Again, the ECHINP aggregate shows the lowest coverage but also the greatest pro-poor bias since the proportion of beneficiaries among the poorest is 5.4 times greater than in the richest quintile. At household level, average global rates are similar to the latter individual rates for all programs, but 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.[17]

Table 3: Coverage of social programs, by per capita expenditure quintiles

Level/program	*I*	*II*	*III*	*IV*	*V*	*Total*
Individual level						
School Breakfast (SB)	18.7	13.4	10.0	7.1	2.6	10.4
Vaso de Leche (VL)	18.8	15.3	13.0	10.7	3.9	12.4
Early Childhood Nutritional Programs (ECHINP)[a]	3.4	1.6	1.2	0.5	0.2	1.4
Individual level – targeted population						
School Breakfast (SB)[a]	55.1	55.5	42.9	39.4	30.7	44.7
Vaso de Leche (VL)[b]	31.4	26.7	30.8	23.5	15.0	25.5
Early Childhood Nutritional Programs (ECHINP)[c,d]	19.4	16.9	13.9	4.8	3.6	11.7
Household level [e]						
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
Early Childhood Nutritional Programs (ECHINP)[c]	22.2	18.0	12.7	5.9	3.9	12.5

a. As a percentage of children between 4 and 13 years of age who attend a public school.
b. As a percentage of children under 13 years old and women who are pregnant or breast feeding.
c. Includes Nutritional Assistance Program for High Risk Families, Infant Feeding Program, Wawa-Wasi, Programas no Escolarizados de Educación Inicial, and Cuna.
d. As a percentage of children under 3 years old
e. As a percentage of households with at least one member in the age/school restriction of each program.
Source: LSMS 2000.

Table 4 shows the individual-level leakage and undercoverage rates for the analyzed programs, by type of location (urban/rural). The smallest leakage rate, that is the proportion of beneficiaries that are non-poor, is in the ECHINP aggregate (17.1 percent). The estimated leakage rates for the SB and VL programs are closer to each other at between 28 and 32 percent.

[17] Household-level results are consistent with those reported in Stifel and Alderman (2003), but not with those in Younger (2002). Unfortunately, the author was not able to identify the reasons for the discrepancy.

Table 4: Estimated leakage and undercoverage rates for each program

	Leakage[a]			*Undercoverage*[b]		
Program	***Global***	***Urban***	***Rural***	***Global***	***Urban***	***Rural***
School Breakfast (SB)	28.8	31.3	27.3	86.4	91.5	79.4
Vaso de Leche (VL)	31.4	33.0	30.1	84.3	88.0	79.3
Early Childhood Nutritional Programs (ECHINP) [c]	17.1	22.5	15.9	97.9	99.4	95.9

a. Non-poor beneficiaries as a percentage of total beneficiaries.

b. Poor beneficiaries as a percentage of the total poor.

c. Includes Nutritional Assistance Program for High Risk Families, Infant Feeding Program, Wawa-Wasi, Programas no Escolarizados de Educación Inicial, and Cunas.

Source: LSMS 2000.

Analyzed by type of location, most of the difference between the ECHINP aggregate and the other programs occurs in rural areas, while the performance is more similar in urban areas. Also, without exception, all programs show lower leakage rates in rural areas. At 84 percent, the lowest undercoverage rate belongs to the VL Program, the largest to the ECHINP aggregate. Separating by type of location, a special bias is observed toward rural areas, where the VL and SB programs cover about 20 percent of the population.

In conclusion, there seems to be a systematic relation between the size of the program, in terms of the number of beneficiaries, and its performance in terms of its leakage rate. The ECHINP aggregate has the smallest programs as well as those with the smallest leakage rate. 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 consider only non-poor beneficiaries as leakage, and not the cases in which the beneficiary does not fulfill the age and school restrictions. In the VL Program, for example, poor children above the age of 13 are not considered as leakage.

Because 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 tighten the definition of a leakage. First, when considering the age and school restrictions, the largest leakage rate still belongs to the VL Program (49.5 percent), but now the estimated rate is much larger than that of the SB Program (38 percent). In that case, the leakage rate of the SB program is not much different from that of the ECHINP aggregate (41.5).[18]

Table 5 also shows that the age restriction is more important than the school restriction for the SB Program, which delivers rations only in public schools. When omitting the age restriction, the leakage rate for the SB Program rises four points to 33 percent, but the largest age effects are found with the VL and ECHINP Programs. In the VL Program, the leakage rate rises 18 points to 49.5 percent, indicating that two fifths of the leaks reported in the last column of Table 5 for that

[18] Disaggregated analysis by type of location is not reported here but is available from the author upon request. Observed patterns are similar in both urban and rural areas.

program are indeed poor beneficiaries but older than 13 years.[19] For the ECHINP aggregate, the age effect is even more important, since its omission implies a 25 point increase in the estimated leakage rate, meaning that almost three out of every five of their leaks are poor beneficiaries but older than 3 years.

Table 5: Leakage rates under alternative set of restrictions

Program	*Only poverty restriction*	*No age restriction*	*No school restriction*	*All restrictions*
School Breakfast (SB)	28.8	33.0	37.1	38.0
Vaso de Leche (VL)	31.4	31.4	49.5	49.5
Early Childhood Nutritonal Programs (ECHINP)	17.1	17.1	41.5	41.5

Source: LSMS 2000.

In summary, the age/school restrictions are not that relevant for the SB Program, which is not surprising because delivery occurs in the school. Also, the age restriction is significantly larger for the VL Program and the ECHINP aggregate. This latter result is important because it suggests that food programs that allow for consumption within the household permit reallocation of the rations for the benefit of members who are not within the age restrictions set by the program.[20] 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 that the transfer will achieve any real impact on the originally targeted population because the per capita ration shrinks when distributed among more individuals than originally planned.[21] 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 are indeed determined at the household level.

Targeting Errors and the Poverty Line

We presented above two ways of analyzing the robustness of the comparison of two programs to changes in the poverty line.[22] 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 three programs and shows that the ECHINP aggregate performs

[19] 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 household members and not only among children under six-years old and pregnant and breast-feeding women. Only 41 percent of the ration assigned to the household actually reaches the target group.

[20] Most programs in the ECHINP aggregate deliver *papillas*, which are supposed to be specifically for children in their first months. Still, according to anecdotal evidence, these *papillas* are dissolved in beverages and soups that are also consumed by household members outside the age range.

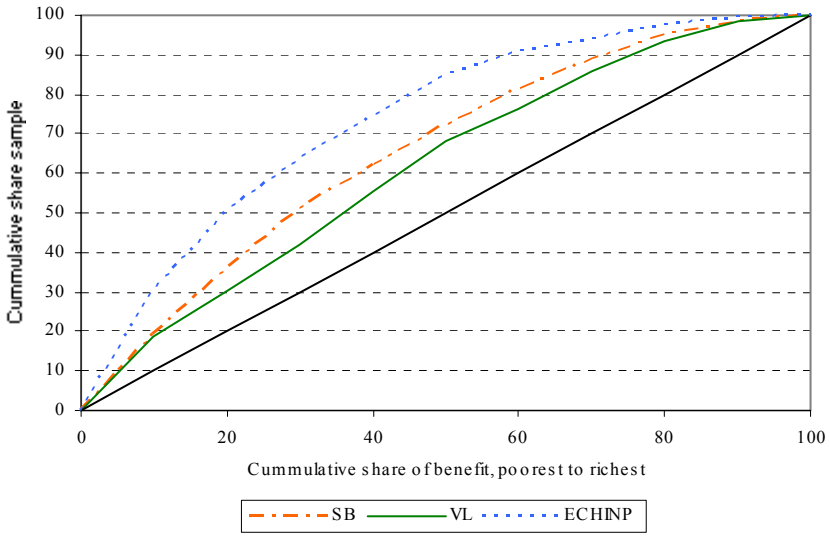
[21] Stifel and Alderman (2003) do attempt to evaluate the nutritional impact of the VL Program using a model with district fixed effects. They find no significant effect.

[22] This analysis disregards the age restriction, defining a leak only when the individual is not poor.

best, because its concentration curve dominates those of the VL and SB programs. SB Program seems slightly to outperform the VL Program, but no clear difference is observed, especially around the first decile.

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

Figure 2:Concentration curves of the three programs

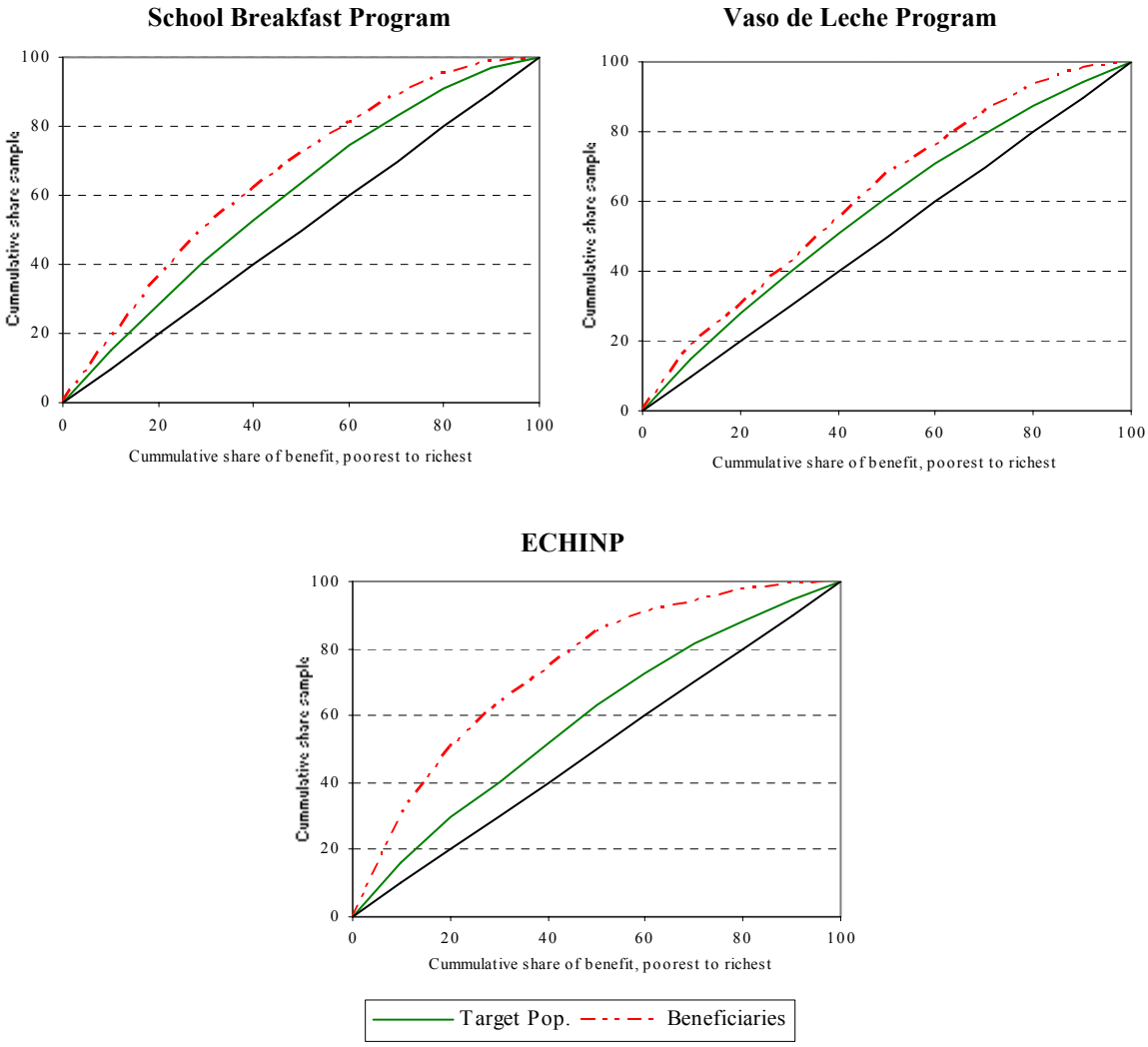


SB School Breakfast; VL Vaso de Leche ; ECHINP Child-Oriented Food Programs.
Source: LSMS 2000.

Several factors could explain the observed superiority of the ECHINP aggregate. The ECHINP aggregate is different from the other two programs because the programs are the only ones that use an individual targeting instrument and because they focus on younger children (up to three years of age), who tend to be more concentrated in poor families, as described above. One way to approximate the importance of differences in the age groups assisted by each program is by comparing the concentration curve of each program's beneficiaries with the curve of the age target group. Figure 3 plots those two curves for each program. We can see that the pro-poorness of the ECHINP aggregate well exceeds the pro-poorness of the age group they work with, since the two curves for these programs are the farthest away from each other. In the case of the other two programs, the two curves are very close to each other, especially those of the VL Program.[23]

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

Figure 3: Concentration curves of beneficiaries vs. target population



Source: LSMS 2000.

The pattern observed in Figure 3 suggests that something other than target group age has to explain the superior performance of the ECHINP aggregate. One factor could be their use of a specific individual targeting instrument, which could be providing significant help, despite criticism about subjectivity and sensitivity to political pressure. Nevertheless, our checks cannot be considered proof positive. Thus, the observed feature may be less a property of the ECHINP programs than a result of the other two programs' targeting procedures. Next, we focus on the targeting performance of the SB and VL Programs.

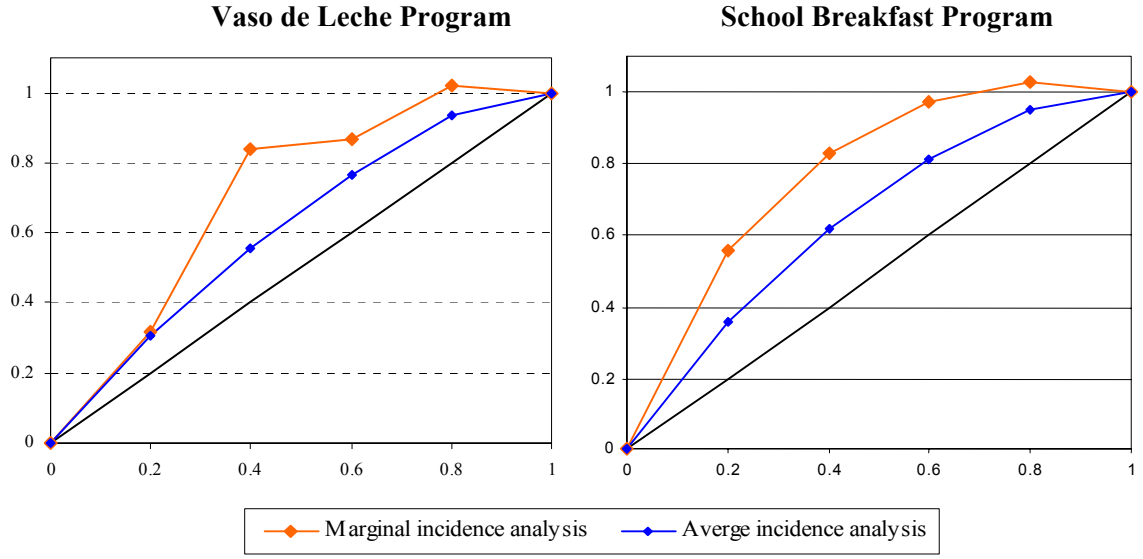
Marginal Incidence Analysis for the SB and VL Programs

As we have seen, average incidence analysis may not provide us with enough information to adjust the scale of an antipoverty program, because a number of factors 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 of programs across quintiles, and time.

Here, we look at the results of the marginal analysis proposed above for two of the largest and oldest food programs in Peru: the Vaso de Leche Program and the School Breakfast Program.[24] The exercise uses the information from the 1997 and 2000 rounds of the LSMS.[25] Figure 4 plots the concentration curves associated with the marginal effects estimated using expression (1) and compares them with the average effects.[26]

Figure 4: Marginal effects vs. average effects in the VL and SB Programs



Source: LSMS 1997 and 2000.

The concentration curves for both programs, but especially SB, show a stronger pro-poor bias at the margin than on average. This means that, if the VL Program were expanded, about 32 percent of the new beneficiaries would belong to the poorest quintile, so that marginal behavior is not any different from the average. Nevertheless, the estimates also suggest that 51 percent of the new beneficiaries would be in the second poorest quintile, much larger than the proportion of current beneficiaries in that quintile (26 percent). In the case of the SB Program, 58 percent of new beneficiaries would be concentrated in the poorest quintile, and 23 percent in the second poorest quintile. The average numbers are 38 percent and 22 percent, 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. Appendix Table A.2 includes those estimates.

[24] Marginal analysis for the other programs was not feasible because they were not singled-out in the LSMS surveys before 2000, used here.

[25] Appendix A, Table 1 shows coverage rates by quintile and geographical domain for both programs in both years.

[26] Appendix A, Table 2 shows the corresponding β's . The coefficients for the poorest three quintiles are significant.

The SB Program estimates are similar. For the VL Program, the pro-poorness of the marginal effect is even larger for the three poorest quintiles. The pro-poorness of both programs at the margin is an interesting result, since it suggests that two programs with a fairly 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 much more than the average leakage rate would suggest.

How can we explain this dramatically different targeting performance at the margin? As indicated above, many researchers have argued that this difference could result from mechanisms that facilitate or promote early capture by the non-poor (Lanjouw and Ravallion 1998). One idea is that the less poor have more political power and can influence public officials to become early beneficiaries. Later, as the program expands, the poor inevitably benefit more. We cannot test this hypothesis properly here but want to mention a possible alternative that has more to do with the dynamics of each program's beneficiary list. As explained above, 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, once a public school is included in the registry, it is politically difficult to drop it later as poverty is reduced in the surrounding neighborhood. The same thing happens with the VL Program: it is difficult to retire a mothers' club once the municipality has registered it as a beneficiary. It is also conceivable that, once a mother's club has registered a family or household as a beneficiary, it is unlikely to be dropped from the registry when they move out of poverty or no longer have the same number of children in the qualifying age range.[27] If that is true, a program will spring more and more leakage as time passes, no matter how good its system for the initial selection (identification) of beneficiaries.

Disentangling these two mechanisms would be interesting, but the important thing is that either hypothesis would take the emphasis away from using poverty enhancement maps and means-tested programs to identify the poorest. In the latter case, however, the focus shifts toward designing enforceable exit rules for pruning the beneficiary list, giving due consideration to the political economy of program-delivery mechanisms managed on the ground by social organizations.

SUMMARY OF RESULTS, POLICY IMPLICATIONS, AND LIMITATIONS

This study analyzes the targeting performance of public food programs for the nutrition of children in Peru: the Vaso de Leche, the School Breakfast, and an aggregate of programs (ECHINP) focused on the nutrition of children in their first three years. These programs have large leakages: between 40 percent and 50 percent of their beneficiaries fall outside the target

[27] Anecdotal evidence supporting this hypothesis is growing in Peru. The media report cases of beneficiaries of the VL Program in neighborhoods that were once slums but are now residential neighborhoods, while new slums receive no transfers. If the program were expanded, the current slums would likely benefit the most, 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 appropriate revision of the beneficiary list.

group either because they are not poor or because they are outside the age range. These leakages are larger for the VL Program (50 percent) and in urban areas, where poverty rates are relatively lower. These numbers argue loudly for urgent policy intervention to reduce these leaks. Nevertheless, a closer look suggests that improving poverty maps and means-tested programs may not be the right priority. Instead, priority should be given to defining delivery protocols that are consistent with program objectives and to addressing political distortions in their management so appropriate exit rules for beneficiaries become feasible.

In analyzing the robustness of those results, the analysis explores three key adjustments to the original estimates:

- Restricting the definition of leakage to the poverty level of the individual or household, thus disregarding the age of the beneficiary
- Exploring the effect of movements in the poverty line
- Comparing the average with the marginal incidence estimates.

With respect to the first adjustment, the age restriction is very important, especially for programs that allow for consumption within the household (the VL Program and the ECHINP aggregate). It calls into question the notion that in-kind transfers are preferable to cash transfers because they can better be directed to the target population. Indeed, when the age restriction is dropped, the VL Program ceases to be the one with the worst targeting performance, and the ECHINP aggregate becomes by far the program with lowest leakage (17 percent). Furthermore, none of the analyzed programs have a leakage rate above 32 percent once the age restriction is disregarded.

The importance of the age-related leaks within households for the VL Program and the ECHINP aggregate suggests that food programs that allow consumption of the food ration in the household cannot prevent distribution of the transfer across household members instead of to the targeted individuals. 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 improving nutrition within the target population.

Changes in the poverty line have little effect on ranking the targeting performance of the three programs analyzed here. In other words, the ECHINP aggregate has lower leakage than the others no matter where program officers draw the poverty line. The comparison of the each program's concentration curve with that of their target population also suggests that the superiority of the ECHINP aggregate cannot be explained by differences in the distribution of their target groups and also supports the notion that their targeting instruments perform better for some reason. What we do not know is how much the small size of the programs considered within the ECHINP aggregate influences these results.

With respect to the marginal incidence analysis, the SB and VL Programs display very pro-poor behavior at the margin, despite their mediocre targeting performance on average. This result suggests caution about making decisions based on the program's average targeting performance. They might show large leakages on average, but a cut (expansion) could still damage (benefit)

the poor disproportionately.[28] For policy, this result implies that emphasis on improving the targeting instruments used by these two programs should be shifted to dealing with the political distortions that influence the selection of beneficiaries. Working with the political economy underlying the delivery mechanisms would seem to be a powerful way to get base organizations (mother's clubs) to accept appropriate exit rules when beneficiaries escape poverty. Nevertheless, along the lines of Tullock's arguments, these leaks to the non-poor may be optimal, in the sense that they may be necessary to sustain the political support of the people who pay for these programs. If so, changes in the political base for these programs will have to be achieved before anything can be done about leakage.

Further research is definitely needed before any action is taken, and, considering the limitations of this study, these results must be taken cautiously. One important limitation is our assumption that all beneficiaries receive the same kind of transfer, when often they do not for several reasons. In the case of food programs involving daily rations, two individuals may identify themselves as beneficiaries of the program, but one receives more rations because she goes more regularly to the community center where meals are delivered. The content of the ration also varies significantly by region, and foods are often chosen for the convenience of local agricultural producers rather than their nutritional value. We could try to homogenize transfers by assigning them a value, but assigning a unit value to a transfer is often complicated. A common solution is to use the unit production cost as the transfer value. Finally, when analyzing a program's benefits distribution, other sources of large leaks must be considered, for example, those associated with large administrative costs or corruption, which may vary substantially among programs.

[28] Targeting performance at the margin is also not sufficient to determine program expansion or shrinkage. The answer to that question requires an analysis of the program's nutritional impact and cost.

APPENDIX A: TECHNICAL APPENDIX

Appendix A, Table 1: Targeting errors and the poverty line

Item	*0.75*	*0.9*	*Poverty line*	*1.1*	*1.25*
Leakage					
School Breakfast Program (SB)	56.6	43.2	38.0	32.9	28.1
Vaso de Leche Program (VL)	66.3	54.3	49.5	45.4	41.0
Early Childhood Nutritional programs (ECHINP)	57.1	47.8	41.5	39.1	37.4
Undercoverage					
School Breakfast Program (SB)	50.0	51.2	52.1	52.6	53.5
Vaso de Leche Program (VL)	72.0	71.5	71.7	71.9	72.3
Early Childhood Nutritional programs (ECHINP)	83.9	82.2	85.3	85.8	86.5

Source: LSMS 2000.

Appendix A, Table 2: Marginal effects by quintile (1997–2000)

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

*Note: A*bsolute value of t-statistics in parentheses.

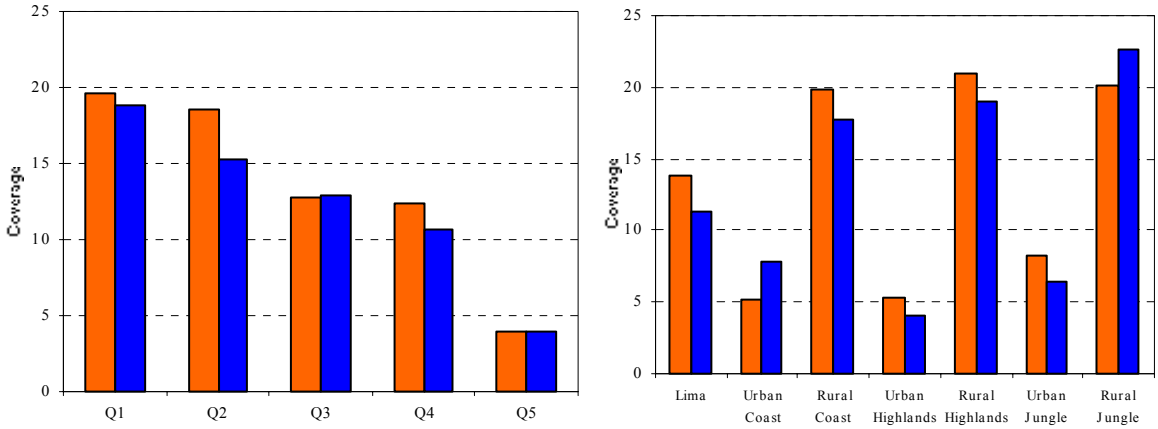
a) Significant at 1 percent.

b) Significant at 10 percent.

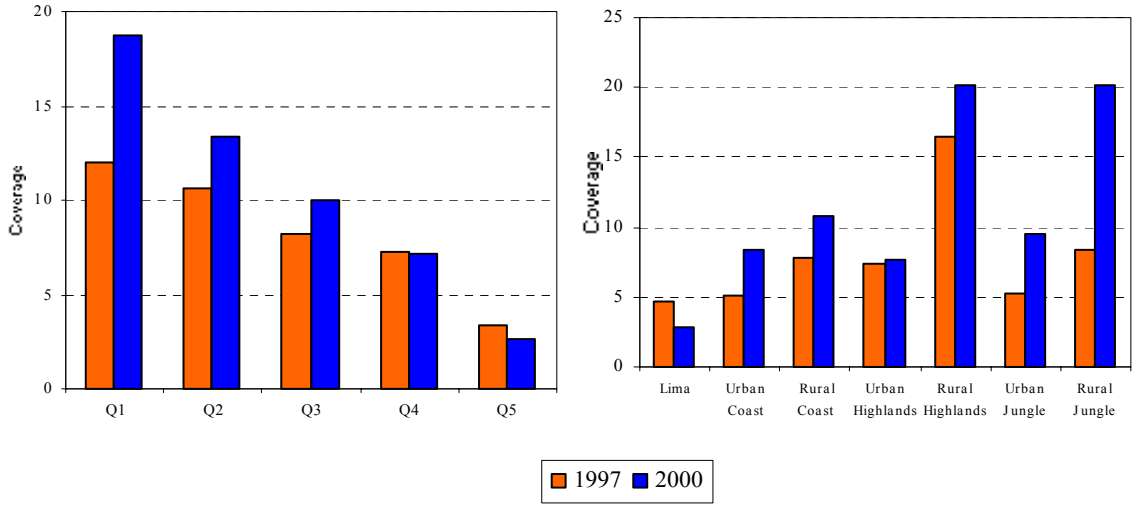
Source: LSMS (2000)

Appedix A, Figure 1: Vaso de Leche and School Breakfast coverage, by quintile, region, and year

Vaso de Leche Program



School Breakfast Program



Sources: LSMS 1997, 2000.

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