FCND DP No. 99

FCND DISCUSSION PAPER NO. 99

CASH TRANSFER PROGRAMS WITH INCOME MULTIPLIERS: PROCAMPO IN MEXICO

Elisabeth Sadoulet, Alain de Janvry, and Benjamin Davis

Food Consumption and Nutrition Division

International Food Policy Research Institute
2033 K Street, N.W.
Washington, D.C. 20006 U.S.A.
(202) 862–5600
Fax: (202) 467–4439

January 2001

ABSTRACT

Cash transfer programs induce multiplier effects when recipients put the money they receive to work to generate additional income. The ultimate income effects are multiples of the amounts transferred. This paper analyzes the PROCAMPO program in Mexico, which was introduced to compensate farmers for the anticipated negative effect of the North American Free Trade Agreement (NAFTA) on the price of basic crops. The transfer rules and the timing of the panel data collected allow unique control of biases in this impact analysis. We find that the multiplier among *ejido* sector recipients is in the range of 1.5 to 2.6. Multipliers are higher for medium and large farm households, low numbers of adults in the household, nonindigenous backgrounds, and households located in the Center and Gulf regions. High multipliers reflect marginal income opportunities that were unrealized due to liquidity constraints that the transfers eased. Opportunities came from the asset endowments that these households have, particularly irrigated land, and these opportunities were enhanced by access to technical assistance.

CONTENTS

TABLES

ACKNOWLEDGMENTS

The authors are grateful for comments received from Nora Lustig, Juan Carlos Martinez, and Reed Hertford. All omissions and errors are solely the authors' responsibility.

Elisabeth Sadoulet and Alain de Janvry
University of California at Berkeley and the World Bank

Benjamin Davis
International Food Policy Research Institute

1. PRIMARY AND SECONDARY EFFECTS OF SOCIAL ASSISTANCE PROGRAMS

Social assistance programs are intended to induce behavioral responses among beneficiaries, and in most programs the degree of these responses are fundamental to how well the primary objectives of the programs are satisfied. Behavioral responses also create a wide range of indirect effects that need to be factored into the evaluation of the programs, as they may contribute significantly to the overall welfare impacts (Subbarao 1997a). These indirect effects can be quite difficult to identify and measure, particularly when they are diffused over a wide range of undertakings and if they occur over long periods of time. Some of the indirect effects of the main types of social assistance programs currently used by governments and international development agencies include the following.

1. *Food subsidy programs.* The primary objective of these programs is to increase the nutritional status of beneficiaries. The increase in food intake is typically significantly less than the food received if transfers are inframarginal and, when supramarginal, if there are secondary markets for the food received. However, these programs are also designed with a perspective on the indirect effects that higher food consumption has on the health of household members, the schooling achievements of children, and the labor productivity of adults (Behrman 1996). There is an extensive literature on the measurement of such direct and indirect

effects (Pinstrup-Andersen 1988). There are, for instance, concerns about the potential negative indirect effects of these programs, such as the disincentive to work that they create for recipient households (see, for instance, Sahn and Alderman (1995) on the Sri Lanka food stamps program).

2. *Employment generating programs.* Public works programs have been used extensively as countercyclical interventions, e.g., to provide employment in the agricultural off-season or to compensate for negative income shocks such as drought or recession (Grosh 1994; Subbarao 1997b). The primary intended benefit is to provide recipients with a means of consumption smoothing. The indirect effects are usually of a public goods nature, and the distribution of the benefits depends on the type and quality of the asset created. For example, the construction of schools and clinics, irrigation infrastructure for small farmers, and roads all benefit different groups. In programs like food for work, where the work consists of introducing soil conservation practices on land owned by the beneficiaries (e.g., Plan Sierra in the Dominican Republic; see de Janvry, Sadoulet, and Santos 1995), there is a private indirect effect through increased (future) income.

3. *Credit programs*. The primary objective of these programs is to increase income for borrowers after loans have been repaid (Morduch 1998; Pitt and Khandker 1998). Indirect effects of credit programs derive from factor reallocations induced by the relaxation of liquidity constraints such as improved children's education if they are relieved from farm work that competes with going to school. Other

indirect effects that are not easily measurable derive from increased business self-confidence for participating women, the inducement of greater interactions and the creation of social capital among recipients, and the development of new activities on a collective basis by members of credit groups. Negative effects can include the removal of children from school if loans are used to acquire capital equipment with high risk of moral hazards when used by hired labor (see Wydick 1999 for the response of weavers to credit programs in Guatemala).

4. *Cash transfer programs.* For these programs, the primary objective is simply to raise income through the cash received. There are, however, many derived effects from the transfers that are dependent on behavioral response. Several studies have, for instance, focused on the potential "negative" indirect effects of cash transfers on work effort, and on the decline in private transfers received by the targeted households if these transfers are crowded-out by public transfers (Cox and Jimenez 1992; Cox, Eser, and Jimenez 1998). To our knowledge, there are no studies of the positive indirect effects of cash transfer programs via income generation by putting the cash transferred to work. Yet, if the household is liquidity constrained and hence has underemployed and ill-allocated productive assets relative to an unconstrained situation, the cash transfer should generate benefits at least similar to a credit program—and expectedly higher, since there is no risk of failure to repay. The money transferred can be used to purchase current inputs or to invest in physical and human capital. Whether short-term income effects can be observed depends on the maturation time of the expenses. Expenses

on inputs for agricultural, commercial, or micro-manufacturing activities will have effects visible in the short run, as opposed to investments in equipment and especially in human capital that require longer maturation periods.

In this paper, we analyze the direct and indirect income effects of cash transfers to Mexican farm households in the context of PROCAMPO (Program for Direct Assistance in Agriculture). This program was introduced to compensate for the anticipated negative price effects of trade liberalization on basic crops. We focus on the *ejido* sector, a large sector of generally impoverished households that received access to land through the extensive land reform program. These households are in the unusual position of being endowed with productive assets while at the same time severely starved for access to credit due to the incomplete nature of property rights in the *ejido* that prevents them from using the land as collateral to access credit. In this context, cash transfer programs can be expected to have particularly large multiplier effects on income. In addition, they can be expected to lead to visible labor reallocation effects toward the activities where the cash received is used if household labor was partially allocated as a strategy to overcome credit market failures.

We calculate the magnitude of the income multipliers created by these transfers. We also identify under what conditions and for what types of households these multipliers were largest. This, in turn, provides guidelines for the management of transfer programs to rural poor households in order to maximize multiplier effects.

Assessing the impact of a program is usually plagued with the difficulty of controlling for biases arising from unobserved individual or regional characteristics that are correlated with program placement and program participation. In the case of PROCAMPO, systematic national coverage eliminates the standard program placement bias. Participation of eligible households is almost universal. However, eligibility itself and the amount that households receive are explicitly related to their cropping patterns. There is no doubt that unobserved household attributes affect both the cropping pattern, and hence the PROCAMPO transfers, and the outcome of interest, namely household income. Yet, we are able to exploit a truly exceptional situation where the basis for PROCAMPO transfers are the 1993 cropping patterns, while the program itself started only in the Fall of 1994, and households in the panel were surveyed in the Springs of 1994 and 1997. As the 1994 survey took place prior to the PROCAMPO transfers, but after the rules were set, a household fixed-effects estimation circumvented the problem of household unobservables that could bias the estimated impact of the PROCAMPO program. Variability in the amount received by the different households then allowed an estimate of the marginal effect of one unit of transfer.

2. THE PROCAMPO PROGRAM

As a consequence of the North American Free Trade Agreement (NAFTA), trade liberalization for basic crops competitive with U.S. and Canadian exports was anticipated to create a sharp decline in domestic prices for Mexican producers as prices for these

crops had been supported above border prices. The PROCAMPO program was introduced when NAFTA started (the Winter of 1994) as a compensatory income transfer targeted to these crop producers. The objectives were political (to manage the political acceptability of the free trade agreement among farmers), economic (to provide farmers with liquidity to adjust production to the new set of relative prices), and social (to prevent an increase in already extensive levels of poverty among smallholders and a rapid process of outmigration to the cities and the border in the North). The program was designed as a 15-year transition toward free trade.

Transfers are on a per-hectare basis, decoupled from current land use, and fixed across the whole country. Hectares that qualify were planted in any of nine basic crops (corn, beans, rice, wheat, sorghum, barley, soybeans, cotton, and cardamom) in one of the three agricultural years preceding August 1993. Since there are two agricultural cycles per year (Fall–Winter and Spring–Summer), payments are made twice a year for the area that had been planted in the corresponding cycle. Payments are hence quite different across households, but exogenous to current behavior. The only restriction is that land must currently be used in crops, livestock, or forestry, or be part of an approved environmental program (as opposed to being left idle), with freedom to choose among these options. Eligibility, both at inception as well as annually, is verified by local SAGAR (Ministry of Agriculture, Livestock, and Rural Development) officials, most often in conjunction with municipal or *ejido* authorities.

PROCAMPO is a cash transfer program of significant magnitude. Since its inception in 1994, it has covered, on average, 14 million hectares a year, including more

than 95 percent of the area that had been planted in corn, beans, sorghum, and wheat. Payments are made to approximately 3 million producers a year, for a total expenditure in 1998 of US$919 million (SAGAR 1998).[1] The compensatory payments are regressively distributed in the farm sector, as they are proportional to the area that had been planted in these crops. The 45 percent of producers with farms smaller that five hectares thus receive only 10 percent of the total PROCAMPO transfer (SAGAR 1998). However, transfers are progressively distributed on a per-hectare basis, since they are uniform per hectare, unrelated to the yields that were achieved and to whether households were selling basic crops before NAFTA, and hence were to be negatively affected by the expected decline in prices or not. Transfers thus reach producers who had never benefited from pre-NAFTA price support programs due to lack of marketed surplus (Martinez 1999). In 1997, transfers represented, on average, US$329 per recipient and US$68 per hectare. This represents 46 percent of the gross maize income for a farmer who obtained the average yield of 1.06 tons per hectare and the average price of US$140 per ton observed in the *ejido*. These payments were to remain constant in real terms for the first 10ten years, then phased out over the remaining five years of the program. However, the real value of payments was not fully maintained, as it was left to erode from US$102 to US$68 per hectare between 1994 and 1997. In spite of this, transfers still represent a very significant cash contribution to farm households, particularly the poor, with the potential

[1] PROCAMPO is supported by a loan from the Inter-American Development Bank.

of not only adding importantly to their incomes but also affecting their behavior as farm producers, workers, and entrepreneurs in other income-generating activities.

PROCAMPO is all the more important, given the severe scarcity of formal credit in the agricultural sector. Access to formal sources of credit dropped drastically from 1994 to 1997. The percentage of *ejidatario* households that used formal credit fell from 25 to 11 percent. Furthermore, the amount available for *ejido* agriculture from formal sources fell over this period. While in 1994 formal sources granted 134 pesos per hectare, by 1997 this had fallen to 40 pesos per hectare overall (in 1994 pesos). Overall, average loan size fell from 534 pesos per hectare in 1994 to 377 pesos per hectare in 1997.

Current participation in PROCAMPO is limited to the households that were incorporated into the program when it was introduced in 1994. At that time, farmers had to show that they had planted at least one of the nine staple crops during the 1991–93 agricultural cycles. Under PROCAMPO, eligible farmers must go at each agricultural cycle to one of more than 700 CADER (*Centro de Ape al Desarrollo Rural*) offices around the country and solicit their PROCAMPO payments. The maximum quantity of land for which they may receive transfers is equal to or less that the area they had registered in 1994. Payments are, in most cases, distributed as checks from CADER offices. PROCAMPO qualification certificates can also be used as collateral against which to borrow from commercial banks or input retailers, giving beneficiaries flexibility in the timing when cash is available against the cost of the interest charged.

3. THE *EJIDO* SECTOR AND THE DATA

In this paper, we analyze the impact of the PROCAMPO program on households in the *ejido* sector. The *ejido* sector was the product of the sweeping land reform that followed the peasant-led revolution of 1910. It contains approximately 60 percent of the Mexican rural population, half the country's agricultural land, and half its irrigated land (Lamartine Yates 1981). In terms of social welfare, it is a major reservoir of rural poverty and an important source of migrants to the United States. This sector has been affected by important reforms since 1990 (DeWalt and Rees 1994). They include both global reforms affecting the context where *ejidatario* households operate (trade liberalization and NAFTA; generalized scaling down of subsidies), and reforms directly targeted at the sector (introduction of individual property rights over land plots formerly in usufruct; scaling down of official credit, marketing, and technical assistance services provided to the *ejido* by specialized state agencies; devolution of control over *ejido* affairs to the community; and greater freedoms for individual *ejidatarios* in making decisions about income strategies).

The data we use are derived from a nationwide panel survey of *ejido* communities and *ejidatario* households within these communities. The data were collected in 1994 by the Mexican Ministry of Agrarian Reform and the University of California at Berkeley (see de Janvry, Gordillo, and Sadoulet 1997) and in 1997 by the Mexican Ministry of Agrarian Reform and the World Bank (see World Bank 1998). The data characterize

resource use and income formation by households. The sample with complete panel information on income includes 958 households.[2]

The vast majority of *ejido* households have access to PROCAMPO. As the data in Table 1 show, over 86 percent of the households in the survey had received PROCAMPO transfers in 1997. Transfers reach equally small and large landholders. More differences emerge when viewed by region. The lower shares of households receiving PROCAMPO in the North Pacific and in the South are due to historical cropping patterns outside the nine basic crops covered by the program.

The direct value of PROCAMPO transfers represents, on average, almost 8 percent of 1997 income for all households in the survey. While PROCAMPO transfers show some regressivity with respect to farm size, relative importance of transfers is reversed in the other asset endowments, representing a higher share of income for the indigenous population than for nonindigenous households, and for households with low levels of labor, education, and migration assets. Note that these values underestimate the total effect of PROCAMPO on incomes as they neglect the indirect effect of PROCAMPO transfers achieved through the income multipliers that we will analyze below. During the period under study, total household income increased by 14 percent. Hence, direct PROCAMPO transfers represent more than 60 percent of the registered increase in income. PROCAMPO transfers served as an important compensating

[2] Data for 1994 and 1997 were constructed in a similar fashion, and include wage and other off-farm activities, agricultural and livestock activities, remittances, *ejido* income, rentals, and government programs such as PROCAMPO. Farm production not sold was valued at an average shadow price. Some adjustments were made in order to compensate for such problems as missing production cost data, for example.

mechanism for the larger landholders and for households with low labor, education, and migration assets for whom the observed change in income was less than the PROCAMPO transfer. Direct PROCAMPO transfers, however, fell short of compensating for the fall in income in the North-Pacific region, where agriculture is more technological and diversified.

The data in Table 2 show the structure of household income by source for 1994 and 1997. There are several remarkable facts to be noted. One is that even though all households are landed, the share of total income that derives from nonfarm activities is very high, and it rose from 47 percent to 55 percent during the period analyzed. This increase is in part due to the PROCAMPO program, which did not exist in 1994, and provided, on average in 1997, 7.7 percent of total household income and 14 percent of nonfarm income. In the period, income from agriculture declined due to adverse price incentives, and wage income stagnated as unemployment in Mexico rose with the aftermath of the peso crisis. By contrast, self-employment income rose and remittance income from the United States increased due to the double incentive of poor agriculture and labor market conditions in Mexico enhancing migration and a sharp depreciation of the real exchange rate with the U.S. dollar that drastically increased the purchasing power of dollar remittances.

In what follows, we analyze the income multiplier effects of the PROCAMPO transfers by identifying the determinants of income change between 1994 and 1997. We measure the multiplier effect of PROCAMPO on total household income using several alternative econometric specifications. We then calculate this multiplier for specific

subsets of the population and for each income source. Finally, we track the origins of the PROCAMPO multiplier in agriculture by analyzing how PROCAMPO has induced greater use of purchased chemical inputs.

4. ESTIMATING PROCAMPO INCOME MULTIPLIERS

THE ECONOMETRIC PROCEDURE

As for any program impact evaluation, it is crucial to properly control for biases that could come from endogenous participation in the PROCAMPO program. In this case, not only is PROCAMPO participation not random but, for a participant, the magnitude of the cash transfer is directly determined by the household's historical behavior in its choice of cropping patterns.

Consider the following income equation that relates income y^t in year t = 1997 to the household's asset endowment and characteristics z^t, the level of PROCAMPO transfer received P^t, the effect of unobservables ϕ^t, and a random effect ε^t:

$$y_i^{97} = z_i^{97} b^{97} + a P_i^{97} + f_i^{97} + e_i^{97}$$

where β^{97} is the vector of marginal return to the assets in 1997 and α the PROCAMPO income multiplier. Unobservables include both household characteristics such as managerial ability or land quality and external factors such as local conditions or government programs other than PROCAMPO. The standard problem in estimating the

PROCAMPO multiplier with such an equation is the potential bias on α created by a correlation between any unobservable and the PROCAMPO transfer P.

In the impact assessment literature, the potential sources of correlation are classified under headings referred to as program placement and household selection (Pitt, Rosenzweig, and Gibbons 1993; Ravallion and Wodon 1998; Ravallion 1999). A program placement bias may occur if there is any systematic geographical bias in the way the PROCAMPO program reaches the population. The survey data confirm that this is not the case. All *ejidos* except 11 have been reached by PROCAMPO, and for eight of these, the reason for not receiving PROCAMPO transfers was noneligibility of the individual households. Hence only three *ejidos*, comprising 11 households (i.e., 1.2 percent of the sample), may have been affected by lack of access due to unequal PROCAMPO reach.

A household selection bias occurs if the individual participation to the program or the amount of transfer received is correlated to unobserved characteristics, be it through the explicit rules of the program itself or from self-selection of households that do not participate despite their eligibility. Reasons given by households for not participating were collected by enumerators: 45 percent say they do not qualify for PROCAMPO transfers, 10 percent that the transaction is too cumbersome to be worth the cost, and 22 percent that they did not know about the program. One clearly cannot assume that lack of knowledge of the program or complaining about its functioning is not correlated with determinants of income. This self-selection is thus a potential source of bias. As for the

eligibility rule, PROCAMPO transfers are proportional to the area cultivated in nine basic crops in 1993. The cropping pattern in 1993 is a household decision taken jointly with all other decisions that determine the income of the household. It is therefore the function of the characteristics and the assets of the household in 1993 (z^{93}), and of the unobservables ϕ^{93}. Hence, any correlation between unobservables in 1993 and 1997 would create a selection bias in the estimation of the PROCAMPO multiplier in a simple cross-section analysis.

To eliminate this potential bias, we write the income equation in difference using the panel data for 1994 and 1997. Since there was no PROCAMPO program in 1994, differencing gives

$$y_i^{97} - y_i^{94} = z_i^{97}\boldsymbol{b}^{97} - z_i^{94}\boldsymbol{b}^{94} + \boldsymbol{a}P_i^{97} + \left(\boldsymbol{f}_i^{97} - \boldsymbol{f}_i^{94}\right) + \left(\boldsymbol{e}_i^{97} - \boldsymbol{e}_i^{94}\right).$$

The difference in unobservables $\left(\boldsymbol{f}_i^{97} - \boldsymbol{f}_i^{94}\right)$ only captures unobserved events that have occurred during the period 1994–1997, while the PROCAMPO transfers are determined on the basis of the information available in 1993. Can there be any correlation between the difference in unobservables and *P*?

The timing of the decision ensures that PROCAMPO transfers cannot be influenced by these unobserved events. Yet the opposite may happen: as PROCAMPO transfers have been extended since 1994, some changes in household assets may result from past PROCAMPO transfers. For the analysis to be valid, all productive assets that could have been accumulated with PROCAMPO transfers between 1994 and 1997 must

consequently be observed and not remain among the unobserved ϕ factor. One important asset that is particularly sensitive to windfall income is livestock. It is therefore essential that livestock assets at the beginning of the survey years be included in the set of asset variables *z*. Incomplete information on livestock raises some problems in that respect. We will return to this point after we present the basic estimation results.

To summarize, we estimate the equation,

$$y_i^{97} - y_i^{94} = z_i^{97} b^{97} - z_i^{94} b^{94} + aP_i^{97} + h_i,$$

where η combines difference in unobservables and error term, and is uncorrelated with z^{97}, z^{94}, and P^{97}. Note that as the environment—and notably prices—has changed between the years of the two surveys, we do not assume constant returns to assets and let the coefficients vary with the year. For the household characteristics that are invariant over time, only the difference between the two parameters β^{97} and β^{94} is estimated. For the characteristics that changed over the period, the estimation of two separate parameters allows us to distinguish the effect due to the change in the return to any asset *z* as captured by the difference between the parameters and the effect due to the change in asset position (Oaxaca 1994; Bourguignon, Ferreira, and Lustig 1999).

THE OVERALL PROCAMPO MULTIPLIER

The set of *z* variables includes land (irrigated and rainfed land, pasture, and the household share of common property land), livestock, human capital assets (gender and age of household head, number and average education of adults), and social assets

(Mexico and U.S. migration assets, ethnicity, and access to technical assistance and to formal credit).

A household's migration assets characterize both the historical migration and the current permanent migration of household members. The construction of this variable is based on information common to the two surveys.[3] Historical migration is measured by the number of household members who had migrated earlier but had returned home at least two years prior to the survey. The current permanent migration is measured by the number of children of the household head who are permanently established away from home. Note that no household members currently in temporary migration are included in these assets. This is because current temporary migration is a household decision jointly taken with all the other choices that contribute to the formation of income.

Among *ejidatarios*, access to technical assistance and to formal credit are essentially supply-determined and hence are considered exogenous to household decision-making. In addition to these assets, regional effects are added to control for geographical characteristics such as land quality, weather, and local level of economic development.

An important issue with agricultural household income is its extreme volatility, due to large fluctuations in weather conditions. This creates several econometric problems. The first is the presence of a large number of observations that are clear

[3] A more complete specification of migration assets, including both family and social networks, was used and shown to be important in the decision of a household to send migrants and hence in receiving remittances (Winters, de Janvry, and Sadoulet 1999). However, lack of comparable data on the extended family in 1994 and 1997 forced us to reduce the variable to the family members in this analysis.

outliers. The second is the fact that, since these fluctuations are weather related, they are likely to be correlated across observations from the same geographical area. The third is a more standard problem of heteroscedasticity as the volatility of income is directly related to the agricultural income itself and hence likely to land assets. To address these potential problems, we estimate the income equation model with Robust Regression and Least Absolute Deviations (LAD) (or median) estimators. The Robust Regression screens out or discounts outliers by weighting observations. It is an iterative process in which the calculation of weights is based on the absolute residuals of the previous iteration. The LAD estimator does not assume any specific distribution of the residuals η and gives consistent estimates even in the presence of heteroscedasticity and nonindependent residuals. LAD estimators are also less sensitive to outliers than OLS, because they minimize the deviations around the median rather than the square of the deviations around the mean. While LAD estimators seem to perform well in large samples, the standard deviations of the parameters are, however, usually large for small samples, which is our case. Hence, results from the two estimation techniques have distinct advantages and inconveniences, and should be looked at as mutually reinforcing.

The results from the Robust Regression estimation, reported in Table 3, show that household income is importantly determined by irrigated and rainfed land assets, number of adults, and access to technical assistance, and in 1997 by US migration assets and adult education. Note that, as conditions for agricultural production deteriorated in 1997, land assets have lost importance in income determination compared to 1994. In contrast,

human capital assets and migration assets, which are both sources of off-farm income, have gained in importance. Geographically, the region that benefited most during the period is the Gulf and the region that did worse is the North Pacific.

Access to cash transfers through PROCAMPO creates positive externalities on income change, with a 1 peso transfer inducing a direct increase of 1.97 pesos as estimated with Robust Regression. The corresponding 95 percent confidence interval reported in Table 4 is [1.5–2.6]. Hence, the marginal income effect of a 1 peso income transfer through PROCAMPO on beneficiary households is high. This is associated with PROCAMPO helping relax the liquidity constraint on farm households.

SENSITIVITY ANALYSIS

A particular issue arises with the measure of the livestock asset. Livestock is both a productive asset and a flexible savings instrument. Therefore, the herd size that generates the livestock income in 1997 may itself have been partly acquired with the current year PROCAMPO transfer. Hence the estimation of the equation,

$$y_i^{97} - y_i^{94} = z_i^{97} b^{97} - z_i^{94} b^{94} + zl_i^{97} bl^{97} - zl_i^{94} bl^{94} + aP_i^{97} + h_i,$$

where zl and βl refer to the livestock asset, would tend to underestimate the impact of PROCAMPO. An alternative specification is to use the herd size in the previous year. However, since the 1993 stock was not observed, using instead the 1994 stock introduces a bias, as follows:

$$y_i^{97} - y_i^{94} = z_i^{97} b^{97} - z_i^{94} b^{94} + zl_i^{96} bl^{97} - zl_i^{94} bl^{94} + \left(zl_i^{94} - zl_i^{93}\right) bl^{94} + aP_i^{97} + h_i.$$

Is the missing term $\left(zl_i^{94} - zl_i^{93}\right)$, i.e., growth of the livestock herd in 1993, correlated with the PROCAMPO transfer? Descriptive statistics indicate positive but low correlation between PROCAMPO transfers and herd size or growth in herd size. An estimation of the equation above would thus tend to give an overestimation of the impact of PROCAMPO. Estimations of both equations, giving potential under- and overestimation of the parameter, respectively, are reported in Table 4. They show very similar values for the PROCAMPO parameters, indicating that no bias is introduced when using the 1997 and 1994 livestock herd sizes.

To check on the robustness of the estimation of PROCAMPO multipliers, we use several alternative econometric specifications. Table 4 compares estimates for the PROCAMPO multiplier under robust regression, median regression, and ordinary least squares (OLS). In each case, we report the 95 percent confidence interval and the test of whether the parameter is significantly greater than one at 99 percent, i.e., that there is a significant multiplier effect. We see that while the OLS and the LAD point estimators are higher than the robust regression multiplier, they have larger standard deviations. Overall, however, it is the remarkable similarity of these values across econometric estimators that gives confidence in the robustness of the large multiplier effects observed for the PROCAMPO transfers.

WHICH HOUSEHOLDS ARE MORE EFFECTIVE IN GENERATING INCOME FROM PROCAMPO TRANSFERS?

We can identify who in the heterogeneous *ejido* population was able to derive greater advantage from the PROCAMPO transfers by comparing the income multiplier across population subsets. Results are presented in Table 5. One expects that the multiplier should be greater when a household has more assets and when they are more underused due to greater liquidity constraint. This suggests that neither the households with very low asset endowments, nor the best endowed households who may face less severe liquidity constraints, would benefit as much as a group intermediate between the two. This is exactly what the multiplier by farm size indicates (classes are defined on land use in 1994, as land use in 1997 is endogenous): the multiplier is 0.24 on smaller farms, 2.77 on medium farms, and 2.04 on the larger farms. In terms of human capital assets, the multiplier is higher for households with a smaller labor force (2.75 versus 0.93), since the liquidity constraint is more binding on them as they could engage less in compensatory activities that serve as sources of liquidity. The multiplier is also higher for households with higher levels of education (1.60 versus 1.25), although the difference in parameters is not statistically significant. The PROCAMPO effect is independent of the presence of migration assets, indicating that households with remittances are not subject to liquidity constraints. Finally, the PROCAMPO income multiplier is lower for indigenous households (0.19 versus 2.27 for nonindigenous), and for households living in the North and North-Pacific (in both cases not significantly different from 0). These multipliers reveal the shadow income value of liquidity for the corresponding category of recipient

households, reflecting in each case the particular marginal cost of uncaptured opportunities due to constraining liquidity. Results thus reveal that the greatest absolute income payoff (pesos of income per pesos of transfer) from relaxing liquidity constraints is among medium and large farmers, families with a small number of adults, nonindigenous households, and, regionally, the Gulf and the Center.

5. PROCAMPO TRANSFERS AND THE INTENSIFICATION OF AGRICULTURE

The above results on PROCAMPO multipliers by farm size show that transfers can be productively used in agriculture. This is clearly confirmed by farmers' responses to questions about use of their PROCAMPO receipts. In the survey, 70 percent of the households responded that they use the PROCAMPO money to purchase inputs. In a larger survey done by the Ministry of Agriculture (SAGAR 1998), 44 percent of respondents said that PROCAMPO transfers allowed them to increase their input purchases and another 17 percent to start using purchased inputs. This happened despite the fact that PROCAMPO transfers have often arrived late in the season (93 percent say they arrive after the promised date). While farmers would clearly benefit more from receiving PROCAMPO at the time they purchase their inputs, many of them purchase inputs either by collateralizing their PROCAMPO rights, or directly by obtaining credit from suppliers on the basis of the forthcoming transfers. Respondents say, however, that transfers are not sufficient to induce changes in cropping patterns or in the extent of areas

planted. To confirm this, we analyze the changes in agricultural income and in input use induced by PROCAMPO transfers using the 1994 and 1997 panel data. Results are presented in Table 6.

Although explaining the very volatile agricultural income is difficult, results indicate a positive multiplier effect in agriculture, with every peso of PROCAMPO transfer generating, at mean value, 0.33 pesos in agricultural income. As can be seen from the interaction terms with land, this effect is obtained through ownership of irrigated land. It is also largely influenced by the availability of complementary technical assistance. Setting technical assistance to zero would reduce the income multiplier from 0.33 to 0.23. The interactive term with credit confirms the role of PROCAMPO as a substitute for credit. Setting access to credit to zero (rather than at the mean value of 0.18) would increase the multiplier from 0.33 to 0.51. Hence, it is those households that control more irrigated land, have access to technical assistance, and no access to credit that are able to take greater advantage of the cash transferred in generating more income. Use of chemicals as estimated by a random effect probit equation also shows a significant positive response to PROCAMPO transfers. We do not have information on the amount used in 1994 and hence cannot measure the effect reported in interviews of increased applications for those who already used some chemicals in 1994.

Livestock income also responds to PROCAMPO transfers, with every peso of transfer generating 0.28 pesos of livestock income. Note that this estimation does not include the use of PROCAMPO transfers to purchase livestock. It therefore likely underestimates the long-term effect of PROCAMPO on livestock income.

As in all cash transfer programs (Subbarao 1997a), it is important to assess the impact transfers have on labor market participation. The labor market income effect due to PROCAMPO can derive both from a change in labor market participation and/or from a direct effect of PROCAMPO once participation has been decided. For farm households that participate in the labor market with the objective of relaxing liquidity constraints or of achieving portfolio diversification in their sources of income, cash transfers can lead to a reallocation of labor from the labor market to the farm. The partial results presented in Table 7 show that the PROCAMPO effect is indeed negative on labor market participation. On average, PROCAMPO transfers reduce labor market participation by 9 percent (from 45.4 to 41.8 percent). No significant effect is observed on participation to self-employment activities. Hence, this suggests that some households withdrew from the labor market in order to spend more time in agriculture once they gained access to the necessary liquidity. This result supports the notion that there was excess participation in the labor market by households endowed in land and other productive resources in response to credit market failures. PROCAMPO thus served indirectly as a mechanism to alleviate the stringency of this constraint, allowing households to reallocate part of their labor time to more profitable agricultural activities.

6. THE TRUE CONTRIBUTION OF PROCAMPO TO INCOME MAINTENANCE

As indicated in Section 3 of this paper, the true contribution of the PROCAMPO cash transfers to income maintenance is the sum of the monetary value of the transfers (direct effects) and the income generated through indirect effects measured by multipliers in excess of one. We can use the estimated multipliers in Table 5 to predict what would have been the change in income during the 1994–1997 period had there been no PROCAMPO program. This is done in Table 8. For all households, the observed income change is 14.2 percent. The direct cash transfer represents an increase of 8.7 percent over 1994 income. With a multiplier of 2.06, the indirect effect is a contribution to income of 9.3 percent over 1994 income. Hence, the total PROCAMPO contribution is an increase in income of 18 percent over the 1994 level. Had there been no PROCAMPO program, household income would, on average, have declined by 3.9 percent. Contrasting this result with the data in Table 1 shows the importance of accounting for the indirect income effects of cash transfers in assessing the impact of such programs. In Table 1, it appeared that PROCAMPO transfers would not have been necessary for income maintenance since other sources of income would have sustained an income increase of 5.4 percent. In fact, these other incomes were themselves related to the hidden multiplier effects of PROCAMPO transfers.

If they had not put the cash transfers to work, many categories of households would have suffered income declines in spite of the appearance of rising income after

discounting the direct transfers. This applies to medium farmers, nonindigenous households, and households in the Center region. There are five instances where transfers were not used to generate more income: smallholders, households with a large number of adults, indigenous households, and households in the North and North-Pacific, all of which were found to have income multipliers of less than one. In spite of this, however, all households were made better off by the cash transfers compared to the income levels they would have achieved without the transfers.[4]

7. CONCLUSION

The indirect effects of cash transfer programs have received little attention. Yet, we found that these effects can be highly significant and that they deserve full consideration in the design of such programs. We show, in particular, that PROCAMPO, a cash transfer program to Mexican farmers introduced in compensation for the anticipated decline in the price of staple crops as a consequence of trade liberalization, created large indirect effects among *ejidatarios* through multiplication of the liquidity received. The multiplier for all households is in the range of 1.5 to 2.6. Multipliers are higher for households with medium and large farms, low numbers of adults in the household, nonindigenous backgrounds, and located in the Center and Gulf regions. Large multipliers reflect uncaptured marginal income opportunities due to liquidity constraints that are relaxed by the transfers. Opportunities come from the asset

[4] The only negative multiplier, for households in the North-Pacific, is not significantly different from 0.

endowments that these households have, particularly irrigated land, and they are enhanced by access to technical assistance. Liquidity constraints derive from incomplete property rights in the *ejido* sector, and from the current disarray of financial institutions servicing agriculture following scaling down of the agricultural development bank implied by structural adjustment. Large multipliers thus reflect sizable gaps between opportunities and constraints. Households with migrants sending remittances and with higher levels of education may thus have lower multipliers because they were able to work around the liquidity constraints more effectively than other households. Households with little land and with ethnic backgrounds may have lower access to liquidity, but also have lower opportunities to invest additional cash received, again resulting in lower multipliers.

There are two policy implications that derive from this analysis. First is that if multiplier effects are important and policy-responsive (as suggested by heterogeneity of multipliers across households), then the PROCAMPO program would gain from being managed as part of a comprehensive effort to maximize these multipliers (since the ultimate goal is to raise the income of targeted households). This can be done by introducing complementary rural development initiatives that increase opportunities to use the transfers productively. It is worth emphasizing that the households that benefit from the multiplier effect are primarily from higher income groups. Thus, while increasing incomes, the indirect effect does not reinforce the impact of the direct effect on poverty. Thus the cash transfer that maximizes the multiplier effect may not be the most effective at reducing poverty.

We observed that additional liquidity serves principally to increase the use of current inputs. Transfers thus enhance the level of traditional activities. We found no evidence of technological change or of the introduction of new activities (see SAGAR 1998 for a similar observation). In correspondence with the new set of incentives introduced by NAFTA, transfers should instead be used for the modernization of agriculture and its diversification toward high value activities with comparative advantage. That this is not happening is not surprising. In the current context of declining institutional support to agriculture, only 18 percent of the *ejidatarios* have access to formal credit, 13 percent to *Alianza para el Campo*, the main public program in support of rural development, and 7 percent to technical assistance. Multiplier effects could thus be significantly increased if the PROCAMPO program were accompanied by a serious effort at institutional reconstruction and technological change in support of the modernization and diversification of *ejido* agriculture.

The second policy implication is that high multipliers show capacity to borrow even at high interest rates. Willingness to pay for liquidity is somewhat overrepresented by the magnitude of the multipliers, since they need to be discounted for the risk of borrowing, which is not present with gifted money. However, the results show that there is a clear unmet need for liquidity that can be productively invested, and that *ejidatarios* can pay for this service at interest rates that are quite compatible with current commercial rates. This shows the high payoff that exists from constructing an alternative set of financial institutions able to replace the parastatals that previously served the sector. If land is to serve as collateral in accessing loans in these financial institutions, then the

current titling program should have a high payoff. Titling without access to credit will, however, not change the current situation. PROCAMPO multipliers help reveal the shadow value of liquidity in every category of potential borrowers. They consequently provide a metric to identify where the effective demand for financial services is the greatest.

The magnitude of the PROCAMPO multipliers should be taken as proof that the *ejido* sector is not to be discounted as a lively sector for investment and growth. To avoid this potential being wasted, transfers should be complemented with investment opportunities in new commodities and new technologies, and the institutions that service the sector, most particularly for accessing liquidity, should be reconstructed.

TABLES

Table 1—PROCAMPO in household income, *ejido* households, 1997

Categories of households	Number of observations	PROCAMPO Participation*	PROCAMPO as share of income in 1997	Observed total income change 1994-97	Sources of income change: PROCAMPO	Sources of income change: Other incomes
		(%)	(%)	(%)	(% of 1994 income)	
All households	956	86.4	7.7	14.2	8.7	5.4
Farm size: land used in 1994						
Small (< 3 hectares)	322	84.8	6.3	20.9	7.6	13.3
Medium (3 to 7 hectares)	282	90.1*	8.3	29.7	10.7	19.0
Large (> 7 hectares)	352	84.9	7.9	4.8	8.3	-3.5
Labor asset: number of adults in the household						
Low (< 4 adults)	514	85.4	8.4	2.2	8.6	-6.4
High (≥ 4 adults)	442	87.6	7.0	27.3	8.9	18.4
Education asset: average adult education						
Low (< 4.5 years)	480	87.3	9.7	9.8	10.7	-0.9
High (≥ 4.5 years)	476	85.5	6.5	16.8	7.6	9.1
Migration assets for the United States						
No migration asset	526	84.8	8.0	6.2	8.5	-2.3
Positive migration asset	430	88.4*	7.4	20.8	9.0	11.8
Social assets: ethnicity						
Indigenous	209	84.7	8.9	30.4	11.6	18.8
Nonindigenous	747	86.9	7.5	12.1	8.4	3.7
Regions:						
North	207	90.3	9.0	42.6	12.8	29.9
North Pacific	103	74.8*	5.3	-40.2	3.2	-43.4
Center	262	89.7	8.7	19.7	10.4	9.2
Gulf	166	90.4	9.5	94.4	18.4	76.0
South	218	81.2*	4.5	15.0	5.2	9.8

Notes: * Indicates significantly different at 95 percent. For farm size, comparison is made with the small farms. For the regions, comparison is made with the North.

Table 2—Sources of income, *ejido* households, 1994 and 1997

All households	1994	1997	Percent change in income	Test of difference in income
Total household income (1994 pesos)	10,828	12,361	14.2	*
	(shares, in percentage)			
Farm income	53.1	45.1	-3.0	
Agriculture	38.3	27.7	-17.5	
Livestock	14.8	17.4	34.5	**
Farm income	46.9	54.9	33.6	**
Off-farm activities	36.4	40.2	26.3	**
Wage income	27.6	24.2	0.0	
Self-employment	6.7	9.8	67.2	**
Remittances	2.1	6.3	242.8	**
Other off-farm income	10.6	7.0	-23.9	**
PROCAMPO	0.0	7.7		
Number of observations	956	956		

Note: * (**) means significantly different at 95 percent (99 percent).

Table 3—Change in total household income between 1994 and 1997

		Robust regression		
	Mean value	Coefficient	Standard deviation	P-value
Asset or characteristic in 1994: parameter is β^{94}				
Irrigated area owned (hectares)	0.9	609	175	0.00
Rainfed area owned (hectares)	6.5	140	43	0.00
Pasture area owned (hectares)	3.5	5	31	0.88
Common property land per *ejidatario* (hectares	24.8	2	10	0.83
Cattle (number of heads)	6.4	265	32	0.00
Number of adults	3.4	500	202	0.01
Average years of education among adults	4.5	254	176	0.15
Mexico migration assets	0.14	-1,011	835	0.23
U.S. migration assets	0.42	451	378	0.23
Access to technical assistance (dummy)	0.10	1,822	1,046	0.08
Access to formal credit (dummy)	0.31	938	662	0.16
Asset or characteristic in 1997: parameter is β^{97}				
Irrigated area owned (hectares)	1.24	230*	111	0.04
Rainfed area owned (hectares)	7.8	30*	34	0.39
Pasture area owned (hectares)	4.2	-14	23	0.55
Common property land per *ejidatario* (hectar	25.3	8	9	0.38
Cattle (number of heads)	7.4	236	28	0.00
Number of adults	3.64	639	196	0.00
Average years of education among adults	4.55	547*	184	0.00
Mexico migration assets	0.21	-950	695	0.17
U.S. migration assets	0.74	791	271	0.00
Access to technical assistance (dummy)	0.07	2,918	1,199	0.02
Access to formal credit (dummy)	0.18	-140	849	0.87
PROCAMPO transfer				
PROCAMPO transfer (pesos)	947	2.1	0.3	0.00
Constant asset or characteristic: parameter is $\beta^{97} - \beta^{94}$				
Gender of household head (man = 1)	0.97	474	1,764	0.79
Age of household head	51.8	30	24	0.22
Indigenous (dummy)	0.22	-807	805	0.32
Regional effects (base = North)				
North Pacific	0.11	-4,555	1,236	0.00
Center	0.27	-1,450	879	0.10
Gulf	0.17	1,235	1,124	0.27
South	0.23	-414	974	0.67
Intercept		-2,539	2,512	0.31
Goodness-of-fit				
Number of observations		956		
F(30, 925)		10.10		

[1] Standard errors estimated with bootstrapping.

* Significantly different from the 1994 parameter at 95 percent.

Table 4—PROCAMPO multipliers

Number of observations: 956

	With cattle stock in 1997		With cattle stock in 1996	
	Coefficient	95% conf. interval	Coefficient	95% conf. interval
Robust regression	2.06**	1.5-2.6	2.09**	1.5-2.7
Quintile regression: median (LAD)[a]	2.20**	1.3-3.1	2.17	1.1-3.2
OLS	2.24	0-4.5	2.30	0-4.6

Note: ** Significantly different from 1 at 99 percent.
[a] Standard errors estimated with bootstrapping.

Table 5—PROCAMPO multipliers for selected groups of recipients

	Robust regression	
	Coefficient	t-statistic
All households	2.06	7.1
Farm size: land used in 1994		
Small (< 3 hectares)	0.24	0.4
Medium (3 to 7 hectares)	2.77	3.6
(P-value for test of difference)	(0.01)	
Large (> 7 hectares)	2.04	4.3
(P-value for test of difference)	(0.42)	
Number of adults in the household		
Low (<4 adults)	2.75	9.2
High (≥ 4 adults)	0.93	2.0
(P-value for test of difference)	(0.02)	
Average adult education		
Low (<4.5 years)	1.25	3.6
High (≥ 4.5 years)	1.6	3.3
(P-value for test of difference)	(0.56)	
U.S. migration assets		
Zero migration assets	2.05	6.7
Positive migration assets	1.9	3.6
(P-value for test of difference)	(0.79)	
Social assets: ethnicity		
Indigenous household	0.19	0.5
Nonindigenous household	2.27	6.6
(P-value for test of difference)	(0.00)	
Regional effects		
North-Pacific	-2.1	0.3
North	0.15	0.8
(P-value for test of difference)	(0.28)	
Gulf	2.21	5.5
(P-value for test of difference)	(0.01)	
Center	2.81	4.7
(P-value for test of difference)	(0.41)	
South	1.09	0.8
(P-value for test of difference)	(0.25)	

Table 6—Effect of PROCAMPO on agricultural activities, partial results
Partial results: coefficients on assets not reported.

Agricultural income	(Robust regression on difference)
PROCAMPO transfer	0.19
P-value	0.31
PROCAMPO *irrigated area	0.23
P-value	0.00
PROCAMPO *rainfed area	-0.01
P-value	0.10
PROCAMPO *technical assistance	1.44
P-value	0.00
PROCAMPO *access to credit	-0.99
P-value	0.00
PROCAMPO at mean value of exogenous variables	0.33
P-value	0.02
PROCAMPO at mean value, but no credit	0.51
P-value	0.00
PROCAMPO at mean value, but no technical assistance	0.23
P-value	0.10
Use of chemicals	(Probit random effect)
PROCAMPO transfer	0.00016
P-value	0.02
Average value without PROCAMPO[a]	48.6%
Average value with PROCAMPO[a]	52.5%
Livestock income	(Tobit random effect)
PROCAMPO transfer	0.28
P-value	0.07

[a] Average expected probability calculated by sample enumeration.

Table 7—Effect of PROCAMPO on labor market participation and self-employment

Partial results: coefficients on assets not reported

	Random effect Probit on participation	Random effect Tobit on income
Wage labor market		
PROCAMPO transfer	-0.000120	-0.33
P-value	0.02	0.56
Average value without PROCAMPO[a]	45.4%	
Average value with PROCAMPO[a]	41.8%	
Nonfarm self-employment activities		
PROCAMPO transfer	-0.000048	-0.67
P-value	0.35	0.24
Average value without PROCAMPO[a]	26.5%	
Average value with PROCAMPO[a]	25.2%	

[a] Average expected probability calculated by sample enumeration.

Table 8—Contribution of PROCAMPO in income changes, 1994-1997

Categories of households	Observed total Income change1994-97	Income change due to PROCAMPO Direct	Indirect	Total[a]	Income change without PROCAMPO
	(percent)	(percent of 1994 income)			
All households	14.2	8.7	9.3	18.0	-3.9
Land asset					
Small (< 3 hectares)	20.9	7.6	-5.8	1.8	19.1
Medium (3 to 7 hectares)	29.7	10.7	19.0	29.7	0.0
Large (≥ 7 hectares)	4.8	8.3	8.6	16.9	-12.1
Labor asset					
Low (<4 adults)	2.2	8.6	15.1		-21.5
High (≥ 4 adults)	27.3	8.9	-0.6		19.0
Education asset					
Low (<4.5 years)	9.8	10.7	2.7		-3.6
High (≥ 4.5 years)	16.8	7.6	4.6		4.6
Migration assets for U.S.					
No migration asset	6.2	8.5	8.9	17.4	-11.2
With migration asset	20.8	9.0	8.1	17.0	3.8
Social assets					
Indigenous	30.4	11.6	23.7	2.2	28.2
Nonindigenous	12.1	8.4	8.3	19.1	-6.9
Region					
North	42.6	12.8	13.3	1.9	40.7
North Pacific	-40.2	3.2	12.2	-6.7	-33.5
Center	19.7	10.4		23.0	-3.4
Gulf	94.4	18.4	33.3	51.6	42.8
South	15.0	5.2	0.5	5.7	9.3

[a] Total effect computed with the multipliers reported in Table 5.

REFERENCES

Behrman, Jere. 1996. The Impact of Health and Nutrition on Education. *The World Bank Research Observer* 11 (1): 23–27.

Bourguignon, François, Francisco Ferreira, and Nora Lustig. 1999. The Microeconomics of Income Distribution Dynamics in East Asia and Latin America. Inter-American Development Bank, Washington, DC. Photocopy.

Cox, Donald, and Emmanuel Jimenez. 1992. Social Security and Private Transfers in a Developing Country: The Case of Peru. *The World Bank Economic Review* 6 (1): 155–169.

Cox, Donald, Z. Eser, and Emmanuel. Jimenez. 1998. Motives for Private Transfers over the Life Cycle: An Analytical Framework and Evidence from Peru. *Journal of Development Economics* 55 (1): 57–81.

de Janvry, Alain, Elisabeth Sadoulet, and Blas Santos. 1995. Project Evaluation for Sustainable Rural Development: Plan Sierra in the Dominican Republic. *Journal of Environmental Economics and Management* 28 (2): 135–154.

de Janvry, Alain, Gustavo Gordillo, and Elisabeth Sadoulet. 1997. *Mexico's Second Agrarian Reform: Household and Community Responses.* La Jolla, Calif., USA: Center for U.S.-Mexican Studies, University of California at San Diego.

DeWalt, Billie, and Martha Rees. 1994. *The End of Agrarian Reform in Mexico: Past Lessons, Future Prospects.* La Jolla, Calif., USA: Center for U.S.-Mexican Studies, University of California at San Diego.

Grosh, Margaret. 1994. *Administering Targeted Social Programs in Latin America: From Platitudes to Practice*. Washington, DC: World Bank.

Lamartine Yates, Paul. 1981. *Mexico's Agricultural Dilemma*. Tucson, Ariz., USA: University of Arizona Press.

Martinez, Juan-Carlos. 1999. Programa de Apoyo al PROCAMPO. Inter-American Development Bank, Washington, DC. Photocopy.

Morduch, Jonathan. 1998. Does Microfinance Really Help the Poor? Unobserved Heterogeneity and Average Impacts of Credit in Bangladesh. Harvard University, Cambridge, Mass., USA. Photocopy.

Oaxaca, Ronald L. 1994. On Discrimination and the Decomposition of Wage Differentials. *Journal of Econometrics* 61 (3): 5–21.

Pinstrup-Andersen, Per. 1988. *Food Subsidies in Developing Countries*. Baltimore, Md., USA: Johns Hopkins University Press for the International Food Policy Research Institute.

Pitt, Mark, and Shahidur Khandker. 1998. The Impact of Group-Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy* (Chicago) 106 (5): 958–997.

Pitt, Mark, Mark Rosenzweig, and D.M. Gibbons. 1993. The Determinants and Consequences of the Placement of Programs in Indonesia. *World Bank Economic Review* 7 (3): 319–348.

Ravallion, Martin. 1999. *The Mystery of the Vanishing Benefits: Ms. Speedy Analyst's Introduction to Evaluation*. Policy Research Working Paper 2153. Washington, DC: World Bank.

Ravallion, Martin, and Quentin Wodon. 1998. *Evaluating a Targeted Social Program when Placement is Decentralized*. Policy Research Working Paper 1945. Washington, DC: World Bank.

SAGAR (Ministry of Agriculture, Livestock, and Rural Development). 1998. PROCAMPO, 1994–1998. *Claridades Agropecuarias* 64 (December).

Sahn, David, and Harold Alderman. 1995. The Effect of Food Subsidies on Labor Supply in Sri Lanka. In D. van de Walle and K. Nead, eds., *Public Spending and the Poor*. Baltimore, Md., USA: Johns Hopkins University Press.

Subbarao, Kalandihi. 1997a. *Safety Net Programs and Poverty Reduction: Lessons from Cross-Country Experiences*. Washington, DC: World Bank.

Subbarao, Kalandihi. 1997b. Public Works as an Anti-Poverty Program: An Overview of Cross-Country Experiences. *American Journal of Agricultural Economics* 79 (2): 678–683.

Winters, Paul, Alain de Janvry, and Elisabeth Sadoulet. 1999. Family and Community Networks in Mexico-U.S. Migration. Department of Agricultural and Resource Economics, University of California at Berkeley, Calif., USA.

World Bank. 1998. *Mexico Ejido Reform: Avenues of Adjustment Five Years Later*. Latin America and Caribbean Region. Team Leader: Louise Cord. Washington, DC.

Wydick, Bruce. 1999 The Effect of Microenterprise Lending on Child Schooling in Guatemala. *Economic Development and Cultural Change* 47: 853–869.

FCND DISCUSSION PAPERS

01 *Agricultural Technology and Food Policy to Combat Iron Deficiency in Developing Countries*, Howarth E. Bouis, August 1994

02 *Determinants of Credit Rationing: A Study of Informal Lenders and Formal Credit Groups in Madagascar*, Manfred Zeller, October 1994

03 *The Extended Family and Intrahousehold Allocation: Inheritance and Investments in Children in the Rural Philippines*, Agnes R. Quisumbing, March 1995

04 *Market Development and Food Demand in Rural China*, Jikun Huang and Scott Rozelle, June 1995

05 *Gender Differences in Agricultural Productivity: A Survey of Empirical Evidence*, Agnes R. Quisumbing, July 1995

06 *Gender Differentials in Farm Productivity: Implications for Household Efficiency and Agricultural Policy*, Harold Alderman, John Hoddinott, Lawrence Haddad, and Christopher Udry, August 1995

07 *A Food Demand System Based on Demand for Characteristics: If There Is "Curvature" in the Slutsky Matrix, What Do the Curves Look Like and Why?*, Howarth E. Bouis, December 1995

08 *Measuring Food Insecurity: The Frequency and Severity of "Coping Strategies,"* Daniel G. Maxwell, December 1995

09 *Gender and Poverty: New Evidence from 10 Developing Countries*, Agnes R. Quisumbing, Lawrence Haddad, and Christine Peña, December 1995

10 *Women's Economic Advancement Through Agricultural Change: A Review of Donor Experience*, Christine Peña, Patrick Webb, and Lawrence Haddad, February 1996

11 *Rural Financial Policies for Food Security of the Poor: Methodologies for a Multicountry Research Project*, Manfred Zeller, Akhter Ahmed, Suresh Babu, Sumiter Broca, Aliou Diagne, and Manohar Sharma, April 1996

12 *Child Development: Vulnerability and Resilience*, Patrice L. Engle, Sarah Castle, and Purnima Menon, April 1996

13 *Determinants of Repayment Performance in Credit Groups: The Role of Program Design, Intra-Group Risk Pooling, and Social Cohesion in Madagascar*, Manfred Zeller, May 1996

14 *Demand for High-Value Secondary Crops in Developing Countries: The Case of Potatoes in Bangladesh and Pakistan*, Howarth E. Bouis and Gregory Scott, May 1996

15 *Repayment Performance in Group-Based credit Programs in Bangladesh: An Empirical Analysis*, Manohar Sharma and Manfred Zeller, July 1996

16 *How Can Safety Nets Do More with Less? General Issues with Some Evidence from Southern Africa*, Lawrence Haddad and Manfred Zeller, July 1996

17 *Remittances, Income Distribution, and Rural Asset Accumulation*, Richard H. Adams, Jr., August 1996

18 *Care and Nutrition: Concepts and Measurement*, Patrice L. Engle, Purnima Menon, and Lawrence Haddad, August 1996

19 *Food Security and Nutrition Implications of Intrahousehold Bias: A Review of Literature*, Lawrence Haddad, Christine Peña, Chizuru Nishida, Agnes Quisumbing, and Alison Slack, September 1996

FCND DISCUSSION PAPERS

20 *Macroeconomic Crises and Poverty Monitoring: A Case Study for India*, Gaurav Datt and Martin Ravallion, November 1996

21 *Livestock Income, Male/Female Animals, and Inequality in Rural Pakistan*, Richard H. Adams, Jr., November 1996

22 *Alternative Approaches to Locating the Food Insecure: Qualitative and Quantitative Evidence from South India*, Kimberly Chung, Lawrence Haddad, Jayashree Ramakrishna, and Frank Riely, January 1997

23 *Better Rich, or Better There? Grandparent Wealth, Coresidence, and Intrahousehold Allocation*, Agnes R. Quisumbing, January 1997

24 *Child Care Practices Associated with Positive and Negative Nutritional Outcomes for Children in Bangladesh: A Descriptive Analysis*, Shubh K. Kumar Range, Ruchira Naved, and Saroj Bhattarai, February 1997

25 *Water, Health, and Income: A Review*, John Hoddinott, February 1997

26 *Why Have Some Indian States Performed Better Than Others at Reducing Rural Poverty?*, Gaurav Datt and Martin Ravallion, March 1997

27 *"Bargaining" and Gender Relations: Within and Beyond the Household*, Bina Agarwal, March 1997

28 *Developing a Research and Action Agenda for Examining Urbanization and Caregiving: Examples from Southern and Eastern Africa*, Patrice L. Engle, Purnima Menon, James L. Garrett, and Alison Slack, April 1997

29 *Gender, Property Rights, and Natural Resources*, Ruth Meinzen-Dick, Lynn R. Brown, Hilary Sims Feldstein, and Agnes R. Quisumbing, May 1997

30 *Plant Breeding: A Long-Term Strategy for the Control of Zinc Deficiency in Vulnerable Populations*, Marie T. Ruel and Howarth E. Bouis, July 1997

31 *Is There an Intrahousehold 'Flypaper Effect'? Evidence from a School Feeding Program*, Hanan Jacoby, August 1997

32 *The Determinants of Demand for Micronutrients: An Analysis of Rural Households in Bangladesh*, Howarth E. Bouis and Mary Jane G. Novenario-Reese, August 1997

33 *Human Milk—An Invisible Food Resource*, Anne Hatløy and Arne Oshaug, August 1997

34 *The Impact of Changes in Common Property Resource Management on Intrahousehold Allocation*, Philip Maggs and John Hoddinott, September 1997

35 *Market Access by Smallholder Farmers in Malawi: Implications for Technology Adoption, Agricultural Productivity, and Crop Income*, Manfred Zeller, Aliou Diagne, and Charles Mataya, September 1997

36 *The GAPVU Cash Transfer Program in Mozambique: An assessment*, Gaurav Datt, Ellen Payongayong, James L. Garrett, and Marie Ruel, October 1997

37 *Why Do Migrants Remit? An Analysis for the Dominican Sierra*, Bénédicte de la Brière, Alain de Janvry, Sylvie Lambert, and Elisabeth Sadoulet, October 1997

FCND DISCUSSION PAPERS

38 *Systematic Client Consultation in Development: The Case of Food Policy Research in Ghana, India, Kenya, and Mali*, Suresh Chandra Babu, Lynn R. Brown, and Bonnie McClafferty, November 1997

39 *Whose Education Matters in the Determination of Household Income: Evidence from a Developing Country*, Dean Jolliffe, November 1997

40 *Can Qualitative and Quantitative Methods Serve Complementary Purposes for Policy Research? Evidence from Accra*, Dan Maxwell, January 1998

41 *The Political Economy of Urban Food Security in Sub-Saharan Africa*, Dan Maxwell, February 1998

42 *Farm Productivity and Rural Poverty in India*, Gaurav Datt and Martin Ravallion, March 1998

43 *How Reliable Are Group Informant Ratings? A Test of Food Security Rating in Honduras*, Gilles Bergeron, Saul Sutkover Morris, and Juan Manuel Medina Banegas, April 1998

44 *Can FAO's Measure of Chronic Undernourishment Be Strengthened?*, Lisa C. Smith, with a *Response* by Logan Naiken, May 1998

45 *Does Urban Agriculture Help Prevent Malnutrition? Evidence from Kampala*, Daniel Maxwell, Carol Levin, and Joanne Csete, June 1998

46 *Impact of Access to Credit on Income and Food Security in Malawi*, Aliou Diagne, July 1998

47 *Poverty in India and Indian States: An Update*, Gaurav Datt, July 1998

48 *Human Capital, Productivity, and Labor Allocation in Rural Pakistan*, Marcel Fafchamps and Agnes R. Quisumbing, July 1998

49 *A Profile of Poverty in Egypt: 1997*, Gaurav Datt, Dean Jolliffe, and Manohar Sharma, August 1998.

50 *Computational Tools for Poverty Measurement and Analysis*, Gaurav Datt, October 1998

51 *Urban Challenges to Food and Nutrition Security: A Review of Food Security, Health, and Caregiving in the Cities*, Marie T. Ruel, James L. Garrett, Saul S. Morris, Daniel Maxwell, Arne Oshaug, Patrice Engle, Purnima Menon, Alison Slack, and Lawrence Haddad, October 1998

52 *Testing Nash Bargaining Household Models With Time-Series Data*, John Hoddinott and Christopher Adam, November 1998

53 *Agricultural Wages and Food Prices in Egypt: A Governorate-Level Analysis for 1976-1993*, Gaurav Datt and Jennifer Olmsted, November 1998

54 *Endogeneity of Schooling in the Wage Function: Evidence from the Rural Philippines*, John Maluccio, November 1998

55 *Efficiency in Intrahousehold Resource Allocation*, Marcel Fafchamps, December 1998

56 *How Does the Human Rights Perspective Help to Shape the Food and Nutrition Policy Research Agenda?*, Lawrence Haddad and Arne Oshaug, February 1999

57 *The Structure of Wages During the Economic Transition in Romania*, Emmanuel Skoufias, February 1999

58 *Women's Land Rights in the Transition to Individualized Ownership: Implications for the Management of Tree Resources in Western Ghana*, Agnes Quisumbing, Ellen Payongayong, J. B. Aidoo, and Keijiro Otsuka, February 1999

59 *Placement and Outreach of Group-Based Credit Organizations: The Cases of ASA, BRAC, and PROSHIKA in Bangladesh*, Manohar Sharma and Manfred Zeller, March 1999

60 *Explaining Child Malnutrition in Developing Countries: A Cross-Country Analysis*, Lisa C. Smith and Lawrence Haddad, April 1999

61 *Does Geographic Targeting of Nutrition Interventions Make Sense in Cities? Evidence from Abidjan and Accra*, Saul S. Morris, Carol Levin, Margaret Armar-Klemesu, Daniel Maxwell, and Marie T. Ruel, April 1999

62 *Good Care Practices Can Mitigate the Negative Effects of Poverty and Low Maternal Schooling on Children's Nutritional Status: Evidence from Accra*, Marie T. Ruel, Carol E. Levin, Margaret Armar-Klemesu, Daniel Maxwell, and Saul S. Morris, April 1999

63 *Are Urban Poverty and Undernutrition Growing? Some Newly Assembled Evidence*, Lawrence Haddad, Marie T. Ruel, and James L. Garrett, April 1999

64 *Some Urban Facts of Life: Implications for Research and Policy*, Marie T. Ruel, Lawrence Haddad, and James L. Garrett, April 1999

65 *Are Determinants of Rural and Urban Food Security and Nutritional Status Different? Some Insights from Mozambique*, James L. Garrett and Marie T. Ruel, April 1999

66 *Working Women in an Urban Setting: Traders, Vendors, and Food Security in Accra*, Carol E. Levin, Daniel G. Maxwell, Margaret Armar-Klemesu, Marie T. Ruel, Saul S. Morris, and Clement Ahiadeke, April 1999

67 *Determinants of Household Access to and Participation in Formal and Informal Credit Markets in Malawi*, Aliou Diagne, April 1999

68 *Early Childhood Nutrition and Academic Achievement: A Longitudinal Analysis*, Paul Glewwe, Hanan Jacoby, and Elizabeth King, May 1999

69 *Supply Response of West African Agricultural Households: Implications of Intrahousehold Preference Heterogeneity*, Lisa C. Smith and Jean-Paul Chavas, July 1999

70 *Child Health Care Demand in a Developing Country: Unconditional Estimates from the Philippines*, Kelly Hallman, August 1999

71 *Social Capital and Income Generation in South Africa, 1993-98*, John Maluccio, Lawrence Haddad, and Julian May, September 1999

72 *Validity of Rapid Estimates of Household Wealth and Income for Health Surveys in Rural Africa*, Saul S. Morris, Calogero Carletto, John Hoddinott, and Luc J. M. Christiaensen, October 1999

73 *Social Roles, Human Capital, and the Intrahousehold Division of Labor: Evidence from Pakistan*, Marcel Fafchamps and Agnes R. Quisumbing, October 1999

74 *Can Cash Transfer Programs Work in Resource-Poor Countries? The Experience in Mozambique*, Jan W. Low, James L. Garrett, and Vitória Ginja, October 1999

FCND DISCUSSION PAPERS

75 *Determinants of Poverty in Egypt, 1997*, Gaurav *Datt* and Dean Jolliffe, October 1999

76 *Raising Primary School Enrolment in Developing Countries: The Relative Importance of Supply and Demand*, Sudhanshu Handa, November 1999

77 *The Political Economy of Food Subsidy Reform in Egypt*, Tammi Gutner, November 1999.

78 *Determinants of Poverty in Mozambique: 1996-97*, Gaurav Datt, Kenneth Simler, Sanjukta Mukherjee, and Gabriel Dava, January 2000

79 *Adult Health in the Time of Drought*, John Hoddinott and Bill Kinsey, January 2000

80 *Nontraditional Crops and Land Accumulation Among Guatemalan Smallholders: Is the Impact Sustainable?* Calogero Carletto, February 2000

81 *The Constraints to Good Child Care Practices in Accra: Implications for Programs*, Margaret Armar-Klemesu, Marie T. Ruel, Daniel G. Maxwell, Carol E. Levin, and Saul S. Morris, February 2000

82 *Pathways of Rural Development in Madagascar: An Empirical Investigation of the Critical Triangle of Environmental Sustainability, Economic Growth, and Poverty Alleviation*, Manfred Zeller, Cécile Lapenu, Bart Minten, Eliane Ralison, Désiré Randrianaivo, and Claude Randrianarisoa, March 2000

83 *Quality or Quantity? The Supply-Side Determinants of Primary Schooling in Rural Mozambique*, Sudhanshu Handa and Kenneth R. Simler, March 2000

84 *Intrahousehold Allocation and Gender Relations: New Empirical Evidence from Four Developing Countries*, Agnes R. Quisumbing and John A. Maluccio, April 2000

85 *Intrahousehold Impact of Transfer of Modern Agricultural Technology: A Gender Perspective*, Ruchira Tabassum Naved, April 2000

86 *Women's Assets and Intrahousehold Allocation in Rural Bangladesh: Testing Measures of Bargaining Power*, Agnes R. Quisumbing and Bénédicte de la Brière, April 2000

87 *Changes in Intrahousehold Labor Allocation to Environmental Goods Collection: A Case Study from Rural Nepal*, Priscilla A. Cooke, May 2000

88 *The Determinants of Employment Status in Egypt*, Ragui Assaad, Fatma El-Hamidi, and Akhter U. Ahmed, June 2000

89 *The Role of the State in Promoting Microfinance Institutions*, Cécile Lapenu, June 2000

90 *Empirical Measurements of Households' Access to Credit and Credit Constraints in Developing Countries: Methodological Issues and Evidence*, Aliou Diagne, Manfred Zeller, and Manohar Sharma, July 2000

91 *Comparing Village Characteristics Derived From Rapid Appraisals and Household Surveys: A Tale From Northern Mali*, Luc Christiaensen, John Hoddinott, and Gilles Bergeron, July 2000

92 *Assessing the Potential for Food-Based Strategies to Reduce Vitamin A and Iron Deficiencies: A Review of Recent Evidence*, Marie T. Ruel and Carol E. Levin, July 2000

93 *Mother-Father Resources, Marriage Payments, and Girl-Boy Health in Rural Bangladesh*, Kelly Hallman, September 2000

94 *Targeting Urban Malnutrition: A Multicity Analysis of the Spatial Distribution of Childhood Nutritional Status*, Saul Sutkover Morris, September 2000

95 *Attrition in the Kwazulu Natal Income Dynamics Study 1993-1998*, John Maluccio, October 2000

96 *Attrition in Longitudinal Household Survey Data: Some Tests for Three Developing-Country Samples*, Harold Alderman, Jere R. Behrman, Hans-Peter Kohler, John A. Maluccio, Susan Cotts Watkins, October 2000

97 *Socioeconomic Differentials in Child Stunting Are Consistently Larger in Urban Than in Rural Areas*, Purnima Menon, Marie T. Ruel, and Saul S. Morris, December 2000

98 *Participation and Poverty Reduction: Issues, Theory, and New Evidence from South Africa*, John Hoddinott, Michelle Adato, Tim Besley, and Lawrence Haddad, January 2001