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The impact of conditional cash transfers on household composition, fertility and migration in Central America

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1. Introduction

In an attempt to understand household composition and its evolution, research has generally focused on the historical trends in household size, age structure and formation. Examining the trends in a number of developed countries, household size has steadily declined from around five members in the middle of the nineteenth century to between two and three in 1990 (Bongaarts, 2001). The driving forces identified for this decline are not just a decline in fertility rates but also a reduction in the number of adults in the households (Kuznets, 1978). This decline is associated with changes in household composition from a traditional complex household structure, which includes the extended family, to a simpler nuclear household with parents and children that is apparent in developed countries. In many developing countries complex households remain common. Using data from 43 developing countries, Bongaarts (2001) finds only limited regional differences between sub-Saharan Africa, the Near East/North Africa, Asia and Latin America and that these averages, which are in the range of five members per household, are similar to the levels found in the second half of the nineteenth century Europe and North America.

Although improved living standards are associated with a tendency to smaller and less complex households, there is nothing inherent in household structure that predicts poverty (Lloyd, 1999). There is a concern though that social programs by altering the resources available to the household may alter household composition in a manner that undermines program objectives. The objective of this paper is to examine the impact of two conditional cash transfers programs – the Honduran Family Assistance Program (PRAF) and the Nicaraguan Social Protection Network (RPS) – on household composition in order to determine whether the programs may create incentives to alter household structure and thus influence household decision-making. To our knowledge, no empirical studies of the impact of social programs on household composition have been conducted. However, it should not be surprising that social programs may affect household composition given the evidence that programs appear to influence both migration and fertility (Stecklov, 2005; Schultz, 2004). These are two of the six proximate determinants that have been identified as ways in which households change[1] and, given the short-time span in which PRAF and RPS have been in operation, they are the likely mechanism through which household composition would change.

The remainder of the paper is divided as follows. Section 2 provides details of how PRAF and RPS operated and discusses the connection between these programs and household composition. Section 3 describes the data used in this analysis and presents a basic description of the households included in the analysis prior to the initiation of the programs. Section 4 then briefly discusses the empirical approach which makes use of the experimental nature of the data. The results of the analysis of the data are presented and discussed in Section 5 and conclusions and policy implications are discussed in the final section.

[1] Bongaart (1983) identifies the following six proximate determinants of household composition: nuptiality, fertility, adoption, mortality, migration (in or out of the household) and divorce.

2. Conditional cash transfer programs and household composition

To examine how conditional cash transfer programs may affect household composition this section begins by examining the PRAF and RPS programs with details relevant to household composition provided. This is followed by a discussion of how the programs may affect household composition, particularly through migration and fertility decisions.

2.1 PRAF and RPS

Conditional class transfer (CCT) programs are a class of anti-poverty programs that seek not just to reduce poverty but to invest in the long-term human capital development of the children of the poor. These types of programs were first introduced in Mexico (PROGRESA) in 1997 and have since been replicated in a number of countries including Honduras and Nicaragua. The programs tend to focus on chronically poor rural households using a variety of targeting methods. For PRAF and RPS, the selection of beneficiaries is done at the household level. For PRAF, in the initial stage of selection eligible municipalities were identified using geographic information on height-for-age z scores determined by a census of first graders. Given the high levels of poverty in the targeted municipalities, all households residing in these areas in the mid-2000 were deemed eligible to receive PRAF interventions. For RPS, extremely poor households in six municipalities in the northern part of the Central Region of Nicaragua (Madriz and Matagalpa) were targeted based on poverty levels as well as the existence of basic infrastructure that could support the implementation of the program. Within these six municipalities, the poorest *comarcas*[2] were selected on the basis of a marginality index developed from the census. All households in these *comarcas* at the initiation of the project in 2000 were identified as eligible for the program. For both programs, a special census was carried out to build a detailed eligibility roster and identify the components of the program that the household would be allowed to receive. Once the roster was established, it was not possible for a household to become eligible for the program by moving into a beneficiary community.

Following the Mexican PROGRESA model, both PRAF and RPS designate the primary female in the household as the beneficiary to receive transfer payments unless no such female was in the household. The motivation for providing transfers to women is the belief, generally confirmed by the intrahousehold allocation literature, that women are more likely to use income on education and health for their children. So while households were targeted in the design of the program the transfer was directly received by the primary female.

Two types of transfers are provided to recipients of PRAF and RPS: 1) a health/nutrition transfer, and 2) an education transfer. Both transfers involve a payment to the beneficiary household provided certain conditions are met. For the health/nutrition transfer, one key condition is regular health check-ups for all family members with more frequent check-ups for infants and young children as well as pregnant and lactating women. Another condition is attendance by the beneficiary at public health/nutrition lectures. For the education transfer, beneficiary households are required to have all eligible children enroll in school and attain a specified attendance rate.

[2] Comarcas are national census administrative areas within municipalities that include between one and five small communities averaging 100 households each.

Failure to meet the conditions of the program should, in theory, lead to the beneficiary household being expelled from the program. For RPS, the value of transfers was estimated to be approximately 21% of the mean value of consumption (Maluccio and Flores 2004). Estimates for PRAF show much lower shares but this may partially reflect differences in the consumption data. Given the significant quantities available for meeting conditions, it would not be too surprising if these programs altered household decision-making and thus household composition.

While PRAF and RPS are quite similar in their design, objectives, eligibility criteria and conditionality, there are a few key differences that can lead to significant differences in impacts on household composition. In the case of RPS, the nutrition and health and education transfers are lump sum amounts and cannot be increased by the addition of eligible or targeted individuals within the housheold. Most importantly, the nutrition and health voucher was distributed to every household designated to receive any transfers, regardless of household composition. Further, the addition of targeted individuals in the household, such as children aged 0 – 5 years, increased the conditions imposed on the household in order to receive the transfers (Maluccio and Flores, 2004). On the other hand, the amount of the health and nutrition voucher in PRAF was determined by the number of children under age 3 and pregnant women per household, up to a maximum of two per household. While the addition of targeted individuals into a household also increases the conditions imposed on the household, the amount received also increases. Therefore, the fact that the transfer amount can be increased by the addition of a pregnant woman and/or new child in PRAF creates an incentive for households to increase fertility, especially women in households with low income. These incentives do not exist in RPS because the amount of the transfer payment is fixed, and the addition of young children only imposes additional requirements to be met by the household (i.e. visits to the health center every month), which can be large.

2.2 Conditionality, eligibility and household composition

Changes in household composition occur through individual household members entering or leaving the household. More specifically, six proximate determinants are identified as altering composition: nuptiality, fertility, adoption, mortality, migration (in or out of the household) and divorce (Bongaarts, 1983). Household composition and these specific determinants are influenced by a number of social, cultural and economic factors. Providing conditional cash transfers to households is likely to influence household composition by altering the economic incentive facing households. The manner in which the transfer influences households will depend on the size of the transfer, the conditionality associated with the transfers, the eligibility requirements and the context in which the program operates. First, even without conditions attached, transferring income to households will increase the demand for normal goods. Thus, we may expect changes in the household to occur as the demand for goods – defined broadly to include goods such as "child services" – changes. Second, conditionality may alter incentives by making the cost of a conditioned activity, such as school attendance or health care check-ups, lower. Furthermore, by virtue of the fact household members must be physically present to go to school and receive health care benefits choices, such as the decision to migrate, may be affected. Finally, by declaring a household eligible for a program the decision of members to move in or out of the household may be affected. This is particularly the case if eligibility of members in the households is not fixed and an incentive is created for households to welcome new members,

such as school age relatives, that could receive the benefits of the program. Through changing economic conditions there are a variety of mechanisms through which households may be altered. However, given the short-term time period of program activity under consideration in this study (2000-2002), the expectation is that changes will primarily occur via members moving in our out of the household (migration) and through changes in fertility. The incentives related to these factors are discussed below.

Fertility

Empirical evidence suggests that there is a shift from high quantity-low quality to low quantity-high quality that occurs as income rises with development. This shift, however, occurs over generations and it is unclear whether such changes may occur over the relatively short periods over which these programs have operated. That is, even though parents may recognize the program may lead to higher quality children it may take time for them to respond to such changes and to reduce their desired level of fertility. To consider this more carefully, we turn to the economic model of fertility developed by Becker and Lewis (1973) that explores this quantity-quality trade-off and how changes in income and relative prices of quality and quantity influence the fertility decision. Based on this model and considering the effects of conditional cash transfer programs two conclusions can be drawn. First, an unconditional transfer to poor households will lead to a relatively greater increase in the demand for quality children relative to the quantity demanded and in certain cases may lead to a decrease in the quantity of children demanded – that is, a reduction in fertility. Second, the effects of a conditional transfer to poor households depends on program specifics especially the relative emphasis on conditions that are directly linked to the pure costs of childbearing, pure costs of quality or general costs of child services. If equally weighted, a reduction in the costs of children is likely to increase quantity more than quality and thus lead to higher fertility. An emphasis on reducing the direct costs of child bearing is likely to induce a greater increase on fertility while an emphasis on pure costs of quality is likely to reduce the overall effect of the program on fertility. The model predicts that the impact of a CCT program depends largely on program design.

Empirical work does suggest that in some cases households do respond to price incentives by increasing fertility.[3] The results are also relevant only for developed countries where fertility rates are already low and the incentives are often designed to increase birth rates. Scant evidence is available on how such incentives will affect fertility in a developing country where fertility rates remain high. For a specific transfer program, it is very difficult to disentangle how conditions will influence the pattern of child costs. Preliminary evidence suggests the programs have had some effect on the investment in quality through increasing school enrolments and attendance (IFPRI 2003; Maluccio and Flores 2004). It could be the case, that both PRAF and RPS increase fertility rates as well. However, given the description of the programs provided above and the fact that PRAF allows an increase in the number of eligible children in eligible households thus lowering the price of childbearing, our expectation is that PRAF will have a stronger effect on fertility than RPS. Correspondingly, if by chance the programs induce sufficient quality gains to induce lower fertility rates, the expectation is that the reduction would be greater for RPS relative to PRAF.

[3] See for example, Whittington (1992), Whittington, Alm and Peters (1992), Zhang, Quan and Van Meerbergen (1994), Gauther and Hatzius (1997) and Milligan (2005).

Migration

In any given period, household members can migrate out of the municipality to another municipality, urban center or abroad or can leave the household to form their own household or join another household within the same municipality. Individuals can also move from within the municipality into the household or return from migration outside of the community. The manner by which CCT programs influence the movement of household members depends on the specifics of the program and the context in which the program operates as well as on the theoretical mechanisms that drive migration.

One program characteristics that may influence migration is the physical presence requirement which is greatest for children, who must attend schools and receive more regular heath check-ups, and the targeted beneficiary which is normally the adult female in the household with very young or school-aged children. Other adults in the household are only required to be physically present for annual health check-ups. In theory, the failure of any household member to attend these check-ups leads to a loss of the transfer although in practice this requirement may not be strongly enforced. The requirements to be physically present should not only affect labor migration but also migration by students for schooling or adults for marriage. Any migration of an eligible person, at least outside of the municipality, involves a cost since it limits the ability of the household to collect transfers related to that household member.

Departure may involve some costs, but they are likely to be limited since a household member can still easily meet any program requirements since they are still physically present. Furthermore, it may involve a benefit if by entering another household or forming a new household the level of benefits can be expanded. Whether this will occur depends on the eligibility requirements and whether a household would be allowed to obtain such benefits. If eligibility is open, a cap on the number of children per household that can receive benefits may create an incentive to have children move to friends or relatives households who are also eligible to obtain benefits but where the cap is not binding. Similarly, if eligibility is open an incentive to have children enter the household may exist in order to obtain more benefits. In terms of adults departing or entering the household much depends on the motivation for having a complex versus nuclear family. Transfer income may provide a household with the ability to assist relatives such as the parents, siblings, or in-laws of the head of household if they demand "relative services". Alternatively, if the motivation for having an extended family system is financial, it may make it less necessary to maintain a complex household with multiple income earning adults thus leading to a decline in adults in the household.

From a theoretical standard, the effect of conditional cash transfer on migration is ambiguous. Neo-classical models of migration consider the migration decision in a cost-benefit framework where potential migrants compare the expected utility from income at the point of origin to the expected utility from net income at possible migration destinations (Harris and Todaro 1970; Sjaastad 1962; Todaro 1969). If cash transfers were unconditional and there was no requirement to be physically present to receive the transfers, the receipt of transfers would not be expected to alter this calculation. Conditionality complicates this calculation by creating differential incentive for those whose presence is linked to payment, particularly school age children and beneficiary women.

An alternative to the neoclassical view of migration, referred to as the "new economics of migration", views the migration decisions as not necessarily made in isolation by individuals but by larger units of related people, particularly households (Massey et al. 1993). From this perspective, the decision to migrate may be considered a joint household decision with the household using migration as a mechanism to diversify risk or gain access to capital in the presence of credit and insurance market imperfections (Stark and Bloom 1985; Stark and Levhari 1982). Since a cash transfer provides a source of income that is uncorrelated with earnings in the origin sectors, it improves the ability of the household to manage risk thus reducing the need to diversify. Furthermore, it improves the household's liquidity by providing a regular source of cash income.

Both the neoclassical model and new economics of migration suggest cash transfer will either be neutral or reduce migration of household members. However, suppose that there are start-up costs to migration and would-be migrants are financially constrained. If the tightness of the financial constraint declines with income at a diminishing rate, the propensity to migrate as a function of income may follow an inverse-U pattern (Faini and Venturini 1993). That is, at low levels of income additional income may relax the financial constraint leading to greater migration while at higher levels of income, where financial constraints are less binding, additional income reduces migration, in the manner suggested in the neoclassical model above. Thus, aid to a relatively poor area may in fact increase migration by relaxing financial constraints and helping migrants cover start-up costs. Given that cash transfer programs target rural poor households who are likely to face substantial financial constraints, the program may act to increase migration if there are substantial costs to migration.

2.3 CCT programs and household composition

As noted in the introduction, the driving forces identified for the decline on household size are a decline in fertility rates and a reduction in the number of adults in the households (Kuznets, 1978). This section has highlighted how CCT programs may influence household fertility as well as the migration and departure of members from the household. The combined impact of these changes may cause CCT programs to alter household composition and thus change the composition of the beneficiary households. In the following sections, an analysis of data from PRAF and RPS is used to examine these possibilities.

3. Data collection and description

To conduct the analysis, panel data collected as part of a randomized impact evaluation strategy employed by both programs is used. Data from baseline studies collected in 2000 prior to the initiation of the programs combined with data collected in 2002 after the program was implemented in both countries is used. In both cases, prior to the initiation of the program a set of communities were identified as eligible for inclusion in the program. Among these eligible communities a portion were randomly assigned to treatment with the remainder used as a baseline. For PRAF, 70 municipalities were identified as eligible, 40 treated and 30 remained as control. The baseline survey was a random sample of households in each of the 70 municipalities of the program. In the case of RPS, 42 *comarcas* were initially identified as sufficiently poor for

intervention and of those 21 were randomly selected into the program and 21 were used as a control group. For the baseline, households were selected at random within each *comarca* to be included in the survey. Thus, for both data sets an experimental design was used to obtain a control and treatment group and to properly identify program impacts.

Since the interest of this study is to examine changes in household composition, the analysis concentrates on those households whose head is at least 20 and no more than 50. This restriction allows us to exclude households with older heads that have already passed through most of the stages of a household's life cycle and thus are less likely to be influenced by this program. It also excludes those few households with younger heads that have just recently formed. Because of the random selection of communities into treatment and control, restricting the sample using an exogenous variable such as age should not introduce any bias into the analysis. To be sure this is the case, this is verified below. In total, 3208 households are included from the PRAF sample and 909 from the RPS sample.

Table 1 presents information on the household data used in this study to examine the impact of PRAF and RPS on household composition. The data are from the 2000 baseline surveys and are presented here to get an understanding of the characteristics of the household prior to the initiation of the programs and to check whether the data design strategy led to a truly random sample and our restriction of the sample leads to any potential problems. If random assignment has worked properly, there should be few ex ante differences between the control and treatment groups in either survey, and the data should allow for the identification of the impact of treatment using standard approaches for experimental data.

The data indicate that in 2000 around four in five households in the Honduran and Nicaraguan samples had a nuclear household structure which is defined as a household including only parents and children. Around 10% of the households had a vertical household structure which is a household including different generations of the same family line (grandparents, parents and children) and the remaining households have either a horizontal structure – that is, include members of the extended family or non-relatives – or a complex relationship which is a combination of vertical and horizontal relationships. The breakdown of household structure appears to be the same for both households that receive the programs (treatment) and households that did not receive the programs (control). Tests of differences suggest there are no significant differences in control and treatment in household structure at the outset of the program.

Table 1: Initial household conditions (2000)

	PRAF				RPS			
	Total	**Treatment**	**Control**	**Test**	**Total**	**Treatment**	**Control**	**Test**
Household structure								
Complex	6.7%	6.7%	6.7%		6.4%	6.8%	5.9%	
Horizontal	4.5%	4.1%	5.1%		3.9%	4.7%	3.0%	
Vertical	10.3%	10.3%	10.3%		10.5%	11.0%	9.8%	
Nuclear	78.5%	79.0%	77.9%		79.3%	77.5%	81.3%	
Household composition								
Total members	5.93	5.94	5.92		5.82	5.79	5.86	
Adults	2.73	2.72	2.73		2.83	2.83	2.82	
Children	3.20	3.20	3.19		3.00	2.96	3.04	
Children-Eligible school age	1.39	1.38	1.39		1.36	1.36	1.35	
Children-Eligible preschool	0.79	0.80	0.77		1.07	1.11	1.03	
Proximate determinants								
Birth plus pregnancy (1998-2000)	36.7%	37.6%	35.6%		27.6%	25.1%	30.4%	*
Departures (1998-2000)	12.0%	11.8%	12.4%		-	-	-	
Migration (1998-2000)	7.8%	7.7%	7.9%		-	-	-	
Household characteristics								
Age of HH head	35.6	35.4	35.9		35.0	35.1	34.9	
Education of HH head	3.0	3.1	2.9		2.1	2.2	2.0	
Male head	86.9%	87.1%	86.7%		89.8%	89.8%	89.7%	
Head is married	91.4%	92.0%	90.6%		88.3%	89.0%	87.7%	
Land owned	3.6	3.1	4.2		-	-	-	
Expenditures per adult equivalent	8916	9316	8357	***	4833	5002	4651	
Migrant network	0.10	0.10	0.11		0.21	0.15	0.27	
Distance to school	17.56	17.53	17.59		25.46	26.90	23.91	
Index of marginality	-	-	-		80.93	80.82	81.05	
Observations	*3208*	*1872*	*1336*		*909*	*471*	*438*	

Notes: *** indicates signficance at the 99% level, ** at the 95% level and * 90% level.

On average, households in the Honduran and Nicaraguan sample have just under six members in total and, although the range was between one and 17 in both countries and around two-thirds of households had between three and eight members. In both data sets, just under half of household members are adults (defined as 15 or older) and these are equally divided between men and women. There are no significant differences between the treatment and control groups in the numbers of adults in PRAF and RPS samples. The number of children in the household is important in examining these programs since it is the number of children (defined as under 15) that determines eligibility for the programs. The data in Table 1 indicate that prior to program initiation treatment households have the same number of children on average as control households in both countries. For each program, the number of preschool age and school age children is identified. These are defined in the same way as they are defined in the respective programs in order to determine if there are initial differences in program eligibility between control and treatment. In the case of PRAF, households are eligible for the health transfer if they have children under the age of three and are eligible for the schooling component if they have children between six and 12. The preschool and school age variables are defined accordingly. The data in Table 1 indicate that prior to the program, PRAF treatment households have

significantly more children in general, and eligible children in particular, than do the control households. This suggests the need to carefully consider initial conditions in evaluating the impact of the program. In the case of RPS, households are eligible for the health transfer if they have children under the age of five and are eligible for the schooling component if they have children between seven and 13. The data do not show any significant difference in the number of children or eligible children in the RPS control and treatment groups. The results indicate that initial household composition is similar in both countries, as would be expected given the random allocation of communities into control and treatment groups.

To examine the proximate determinants of household composition, variables for household fertility, departure and migration are examined in Table 1. Our interest is in examining if these cash transfer programs influenced these proximate determinants between the initiation of the program and the follow-up survey – that is, between 2000 and 2002. The baseline to compare this against is then the period 1998-2000. In the case of fertility, we examine whether any household member had a child or was pregnant in the year prior to the survey. Since it takes nine months to have a child and usually some time to conceive, this was considered a reasonable estimate of when fertility changes as a response to the program may have occurred. For the case of departure and migration, we considered whether anyone left the household in the two year period as having departed and those that left and moved outside the municipality as having migrated (so that departed includes those who left but remained in the community and those defined as migrated). Data on the date of departure for the RPS data set for the period prior to the initial survey was not available and could therefore not be calculated.

As can be seen from Table 1, there are no significant differences between control and treatment groups for PRAF in terms of fertility, departure or migration. The data indicate approximately 37% of household in the PRAF data had a member who had child or was pregnant during the period in question and that there were no significant differences between control and treatment households. Along with these additions to households, 12% of households had someone leave in the two years prior to the baseline survey and 8% had someone migrate out of the municipality. Household fertility in the RPS data set is similar to PRAF, although slightly lower at 28%, than in the PRAF data. Fertility rates at the initiation of RPS were slightly higher in the control group than the treatment group.

Finally, in Table 1 observable household characteristics are compared to examine differences in the control and treatment group prior to the initiation of the programs. The data indicate that there are no statistically significant differences in the RPS control and treatment group but that there is one significant difference between the PRAF control and treatment group. PRAF treatment households have slightly higher expenditures per adult equivalent. Examination of the data indicates that this is largely the results of a few households at the extreme high end of expenditures.

In general, the comparison of initial conditions in both data sets suggests that households in the control and treatment groups are remarkably similar. There are no significant initial differences in household structure or composition between control and treatment. The proximate determinants are the same for both control and treatment with the exception of RPS treatment households appearing to have slightly lower initial fertility rates. Household characteristics also

appear remarkably similar. This suggests that the experimental nature of the programs was successful in creating a legitimate control for comparison and differences that emerge are likely to be the result of the program..

4. Empirical approach

The randomized and panel nature of the data used in this evaluation provides the option of using either a single post-treatment evaluation (first difference since it compares the difference between control and treatment) or a before-after comparison of control and treatment (difference-in-difference or double difference since it compares the difference between control and treatment as well as before and after). The major advantage of double difference (DD) is that it allows us to control for initial differences between the treatment and control group prior to the onset of the experiment in the event that randomization is imperfect. In contrast, the first difference (FD) design relies entirely on randomized selection of the treatment and control groups and therefore assumes control and treatment groups necessarily have equal levels of the outcome variable prior to treatment. When this assumption is mistaken, the estimation of the treatment effect can be inaccurate. Given that the experimental design randomly assigned communities rather than individual households to treatment and control, it is critical to be wary of potential problems in the randomization of the data. However, as Table 1 indicates, the experimental design seems to have been effective in creating similar treatment and control groups. Nevertheless, in general a DD approach is used to control for potential problems although in a few cases because of data limitations FD approaches are used.

While the traditional literature on experimental design often ignores the issue of control variables, there is little reason to not include control variables in the analysis. The advantage of control variables is that it allows one to eliminate additional observable factors that may or may not differ between the treatment and control groups thus further insuring that any estimated impacts are truly due to the treatment. Additionally, including controls improves the precision of the estimates of program impact (Stock and Watson 2003). Control variables are most easily introduced by turning to a regression framework which is convenient for both the FD and the DD. In the FD method, a standard regression model can include a dummy variable for treatment which captures both the magnitude of the impact of treatment as well as the statistical significance. This model can be specified as follows:

$$f_i \quad _0 \quad _1 P_i \quad _1 X_{1i} \quad \cdots \quad _N X_{Ni} \quad _i \qquad (1)$$

where f_i is variable indicating the outcome of interest during the period in question, P_i is an indicator of program participation by household i, X_{ni} are control variables and $_i$ is an error term. In the FD specification the coefficient $_1$ estimates the magnitude of the program impact on the outcome and is used to test for statistical significance. Data used in the analysis comes from the post-treatment survey.

In the DD estimator, dummy variables are included for time, treatment and the product of time and treatment as follows:

$$f_{it} \quad _0 \quad _1 t \quad _2 P_i \quad _3 t * P_i \quad _1 X_{1i} \quad \dots \quad _N X_{Ni} \quad _{it} \qquad (2)$$

where *t* refers to whether the period is pre treatment (t=0) or post-treatment (t=1). The coefficient on the time variable ($_1$) captures changes that occur over time that are independent of the program, the coefficient on the treatment variable ($_2$) captures initial difference between the treatment and control households and the coefficient on the interaction of time and treatment ($_3$) provides an estimate of the impact of the program on the outcome variable. Data from both the baseline and the post-treatment survey are both used.

For variables that are continuous, including household size variables, standard regression models with robust standard errors are used. In most cases, however, including analysis of the probability of a household having a certain structure, the probability of birth or pregnancy, and the probability of departure/migration, the dependent variable is a discrete variable, taking the value of zero indicating the outcome did not occur or one if the outcome did occur. Given the discrete nature of these outcome variables, in these cases a probit model is used. The DD approach as specified in equation (2) is used on all cases presented below with the exception for the analysis of departures and migration (Table 5) for RPS since the relevant data is not available from the baseline survey. In that case, a FD approach following equation (1) is used.

5. Analysis and discussion of results

To begin the analysis, we first consider whether PRAF and RPS had an influence on household structure. Recall that as development occurs the general trend is usually toward nucleation. However, as mentioned in the discussion in section 2, there are reasons why these transfer programs may lead to greater or less nucleation. Specifically, it depends on the incentives created for entering and departing from the household and the preferences of household members. The data presented in Table 1 shows that at the initiation of the two programs about four in every five household had a nuclear structure.

Table 2 presents the results of probit analyses of the probability of a household having a complex, horizontal, vertical or nuclear structure. Using the experimental design of the data, the DD approach shown in equation (2) is used in each case. Table 2 only presents the results of the main marginal effects of each regression with the remainder of results available in the appendix. In the case of PRAF, there appears to be no significant changes in household structure over the period (the marginal effect of year) or as a result of the program (the marginal effect on treatment*year). However, for RPS some significant results do emerge. In general, it appears that over the two year period there is a significant decline in the number of nuclear households (by 6%) which appears to be primarily the result of an increase in the number of vertical households. This decline, however, did no occur for RPS, households who saw an increase (relative to changes in other households) of 8.7%. The apparent general decline in nucleation of around 6% over time could be the result of the coffee crisis which hit Nicaragua at this time. Maluccio (2005) shows that RPS served to shield households from the crisis by acting as a safety net. Household without access to RPS may have found it necessary to band together in more vertical

household arrangements while those with RPS did not need to maintain such strong family relationships and thus maintained or moved towards a nuclear structure.

Table 2: Analysis of household structure (probits)

	PRAF		RPS	
Complex	**Marginal effects**	**P-value**	**Marginal effects**	**P-value**
Year	-0.005	0.54	-0.011	0.31
Treatment	0.000	1.00	0.005	0.63
Treatment*year	-0.011	0.33	-0.010	0.49
Horizontal				
Year	-0.005	0.49	0.014	0.25
Treatment	-0.010	0.14	0.016	0.16
Treatment*year	0.004	0.66	-0.022	0.12
Vertical				
Year	0.003	0.76	**0.050**	**0.01**
Treatment	0.005	0.66	0.015	0.42
Treatment*year	0.007	0.62	-0.037	0.11
Nuclear				
Year	0.007	0.64	**-0.060**	**0.03**
Treatment	0.006	0.68	**-0.044**	**0.10**
Treatment*year	-0.002	0.94	**0.087**	**0.01**
Observations	*6416*		*1818*	

Notes: Results for other variables included in the regressions are reported in appendix.

Exploring this further, Table 3 examines the impact of PRAF and RPS on household size, the number of adults in the household and the number of children. From Table 3, it is clear that for PRAF there has been no substantial overall change in household size because of the program. The results indicate that household size increased over the period in question for beneficiary households (8.9%) relative to control who saw a general decline (by 4.3%). These result, however, are not significant. Looking more closely at the breakdown of the household, there was a slight decline in the number of adults in treatment households and a rise in the number of children, but again neither of those is statistically significant. Examining the categories of children that are the source of eligibility for parts of the program, it appears that the number of preschool age children is significantly greater for PRAF recipient households and this is compared to a general significant decline in the number of preschool age children. Taken together, the results indicate PRAF increased the number of preschool age children in the household relative to the downward trend which led to slightly greater number of children.

Table 3: Analysis of household size

	PRAF		RPS	
Total housheold	**Marginal effects**	**P-value**	**Marginal effects**	**P-value**
Year	-0.043	0.59	**0.251**	**0.03**
Treatment	0.113	0.12	-0.046	0.67
Treatment*year	0.089	0.39	**-0.294**	**0.07**
Adults (15 and over)				
Year	0.005	0.90	**0.205**	**0.00**
Treatment	0.033	0.37	-0.011	0.59
Treatment*year	-0.029	0.59	**-0.148**	**0.01**
Children (under 15)				
Year	-0.044	0.49	0.046	0.68
Treatment	0.076	0.20	-0.035	0.74
Treatment*year	0.122	0.15	-0.145	0.33
Children-Eligible school age				
Year	**0.142**	**0.00**	0.080	0.28
Treatment	0.036	0.32	0.013	0.86
Treatment*year	0.031	0.56	-0.020	0.84
Children- Eligible preschool				
Year	**-0.230**	**0.00**	**-0.116**	**0.04**
Treatment	0.030	0.21	-0.055	0.34
Treatment*year	**0.079**	**0.02**	-0.041	0.61
Observations	*6416*		*1818*	

Notes: Results for other variables included in the regression are reported in appendix.

For RPS, given the results for household nucleation the expectations is that household size increased for those households not receiving RPS but decreased relative to this baseline for treatment households. This result can be seen in the table. In general, households have 0.25 more members after the two year period but treated households have not seen this increase and have in fact on average declined in size. Correspondingly, the number of adults in the household has increased over time although again not in the treated households. Unlike PRAF, the number of children in the household, in general or by eligibility category, has not changed significantly. The significance of thee results confirms the view that households in general have taken in more adults over this period (or reduced less than the previous trend), but that RPS has somehow insulated households from this overall trend.

To explore the mechanism by which changes may have occurred, Table 4 examines the impact of the programs on fertility. The results from the table indicate that both programs have a positive effect on fertility and in the case of PRAF it is highly significant. For Honduras, there appears a general decline in fertility, but that decline is reduced for PRAF recipients. The results correspond with the positive direction of change in the number of preschool children and suggest that PRAF is inducing greater fertility among recipient households. It is difficult to know whether this increase in fertility in the short-run will lead to a long-run increase in the total fertility rate of recipients. It could be that recipient households are responding to the incentives

created by the program and shifting forward births that they intended to have anyway. However, this result at least suggests the potential for increased fertility and changes in household composition and should be explored further using a longer time period.

Table 4: Analysis of fertility (probit)

	PRAF		RPS	
Births and pregnancies	**Marginal effects**	**P-value**	**Marginal effects**	**P-value**
Year	**-0.147**	**0.00**	0.000	1.00
Treatment	0.018	0.28	**-0.052**	**0.08**
Treatment*year	**0.067**	**0.01**	0.043	0.48
Observations	*6416*		*1818*	

Notes: Results for other variables included in the regression are reported in appendix.

Finally, in terms of movement out of the household, Table 5 presents the analysis of departures from the households as well as migration by members to locations outside the community. Note that in the interest of space only the impact parameter is reported with complete results left for the appendix. Also recall that data limitations make it impossible to use a DD approach to analyze departures and migration for RPS so a FD approach is used. In the case of PRAF, the results show that the program had little significant affect on movements out of the household. The exceptions are the marginally significant decrease in departures of household members over 50 and the increase in the departures of males age 15-29. Neither of these groups showed a significant increase in migration, however, suggesting the possibility that younger males are leaving the household to form new households within the community as a result of PRAF. To carefully test this hypothesis requires data on marriages or cohabitation. Unfortunately, this data does not exist.

For RPS, the results indicate that the program led to a clear increase in the number of departures, both in general (by 7.5%) and across the different age categories with the greatest increase among the 15-29 year old category (by 3.6%). Further analysis by gender suggests that this is driven by the departure of males from the household. The departure of females generally appears to be positive, but is not significant. Looking at migration to outside of the community, it appears that RPS, leads to a general increase in migration by around 6%. Migration is particularly higher for those in the 30-49 age range and those over 50. Migration by both males and females seems to have increased and males 30-49 in particular show a significant increase in the probability of migration. These results are consistent with the earlier results showing a significant RPS-induced decline in household size and the number of adults in the household. Again, these results should be viewed in light of the Nicaraguan context at the time of the RPS intervention and a theoretical understanding of migration. The overall results appear to indicate a degree of pressure on households due to the coffee crisis that was occurring at the time of RPS implementation. The response by RPS recipient households was to increase or maintain departures and migration flows at a level greater than non-recipient households. One explanation for this would be that the availability of RPS transfers allowed households to overcome credit constraints and invest in migration as expected by the Faini and Venturini (1993) model

discussed in section 2. Furthermore, it may be the case that RPS by providing a secure source of income allowed households to continue on a path toward nucleation while non-recipient household facing a crisis were forced to maintain broader social relationships. The result indicates the importance of the context in determining the influence of CCT programs on household composition.

Table 5: Analysis of departures and migration (probits)

	PRAF		RPS	
	Impact of treatment	**P-value**	**Impact of treatment**	**P-value**
Departure	-0.013	0.51	**0.075**	**0.01**
Departures 15-29	0.011	0.50	**0.036**	**0.10**
Departures 30-49	-0.004	0.62	**0.018**	**0.07**
Departures 50+	**-0.009**	**0.09**	**0.013**	**0.02**
Departure males	-0.012	0.54	**0.069**	**0.00**
Departure males 15-29	**0.025**	**0.06**	**0.035**	**0.01**
Departure males 30-49	-0.003	0.54	**0.010**	**0.05**
Departure females	0.004	0.65	0.028	0.21
Departure females 15-29	-0.017	0.15	0.007	0.67
Departure females 30-49	0.002	0.66	0.000	0.95
Migration	-0.013	0.42	**0.061**	**0.00**
Migrations 15-29	0.001	0.91	0.011	0.30
Migrations 30-49	-0.004	0.41	**0.015**	**0.03**
Migrations 50+	-0.004	0.21	**0.013**	**0.02**
Migration males	-0.013	0.29	**0.041**	**0.00**
Migration males 15-29	0.004	0.68	0.005	0.49
Migration males 30-49	-0.003	0.54	**0.005**	**0.04**
Migration females	-0.007	0.52	**0.036**	**0.02**
Migration females 15-29	-0.006	0.48	0.007	0.36
Migration females 30-49	0.000	0.93	0.002	0.57
Observations	*6416*		*909*	

Notes: Results for other variables included in the regressions are reported in appendix. Results for PRAF are the results of difference-in-difference specification while the results for RPS are first difference results.

6. Conclusions

Providing conditional cash transfers to households has the potential to influence the composition of households by altering the economic incentives faced by households. Altering the composition of households may in turn alter the manner in which the transfers are used. In this paper, we explore this possibility using data collected to evaluate the impact of the PRAF program in Honduras and the RPS program in Nicaragua. The results indicate that the programs have had an impact on household structure and composition, but that this impact varies by country for two important reasons. First, the design of the programs created differential incentives to have children. In the case of PRAF, leaving the eligibility roster open[4] created an incentive to

[4] Note that the PRAF administration ahs since recognized this potential problem and has adjusted program rules accordingly.

increase childbearing at least in the short-run. This problem was not observed in RPS which created no such incentive. Second, the different context in which the programs operated created different effects. The coffee crisis hit Nicaragua hard and had a significant impact on the rural economy. As reported by Maluccio (2005), RPS acted as a safety net to mitigate the impact of the crisis. This appears to be reflected in the fact that departures and migration by adults, particularly males, increased among RPS recipients relative to the trends in other households. This is likely to be because RPS transfers were available to allow households to undertake such changes.

The analysis clearly indicates that CCT program design and context can influence the structure and composition of households. Given this is the case, CCT programs must be carefully designed to ensure that unintended and possibly undesirable outcomes do not occur. Those designing CCT programs must also recognize that impacts may be different than intended depending on the context in which the program is operating. A dramatic event such as the coffee crisis experienced by Nicaragua may have profound impacts on the economy and cause programs designed for a certain context to have different outcomes than expected. As such, a degree of flexibility needs included to address potential changes in the context.

The impacts found in this paper, however, should be viewed with some caution. It may be the case that in the long-run PRAF may have led to only changes in the timing of births rather than the number of birth. Similarly, RPS may have led to only an increase in temporary migration rather than permanent migration. Given the short period of this study it would be useful to return to these issues using a longer period of implementation.

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