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Three Essays on Social Policy and the Labor Market:

Learning from Mexico

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Three Essays on Social Policy and the Labor Market:

Learning from Mexico

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To my father,

who taught me to give everything I am in everything I do.

To my mother,

who continuously forgives and embraces all my limitations.

To my brother,

whose presence constantly reminds me that happiness is assured.

To the memory of Leonardo Piña.

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Three Essays on Social Policy and the Labor Market:

Learning from Mexico

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This dissertation studies the Mexican labor market and investigates the effects of exogenous changes in income, caused by recent policy interventions in Mexico, on economic outcomes. In the first chapter, I estimate the wage differential between the formal and informal sectors in Mexico with a sample of salaried workers. Using a first-differences model to control for individual heterogeneity, I find that the transition from a formal to an informal job leads to a decrease in the average real wage while the opposite movement leads to an increase. In the second chapter, I use data from Progresa, a Mexican transfer program, to investigate the effect of an increase in wives' incomes on household expenditures and on each spouse's access to credit. I find that the wife's

income share has a positive and significant effect on food and children's clothing, and a negative effect on adult's clothing. I also find that the program increases women's borrowing without significantly affecting total household borrowing. My findings suggest that increasing women's income increases the household resources devoted to children and improves women's individual access to credit. This evidence also supports models in which the distribution of income within the household affects outcomes. In the third chapter, I use the exogenous variation caused by a transfer program for the elderly that began in Mexico City in 2001 to estimate the effect of income on the private transfers received by households and individuals. In contrast with previous studies that do not have such exogenous income variation, I find large, negative and statistically significant income effects for both households and individuals. My results suggest a substantial crowding out effect of public programs, particularly those targeted towards the poor.

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Introduction

This dissertation studies the Mexican labor market and investigates the effect of exogenous changes in income, caused by recent policy interventions, on economic outcomes. By focusing on Mexico, I am able to address problems that are common to Latin America and to the developing world, such as the large fraction of workers that have jobs not covered by social security or other labor regulations; the need to increase the resources spent on children and to improve the economic status of women; and the challenge of providing support for the growing elderly population. In addition, I provide general evidence on how households and individuals respond to government programs that change their income or economic opportunities. This is important for the design and evaluation of government programs, because private responses can either enhance or mitigate the effectiveness of such programs.

In the first chapter, I estimate the wage differential between the formal and informal sectors in Mexico using a sample of salaried workers. Previous studies of the formal wage gap typically define workers to be informal if they are either self-employed or work in firms with five or fewer employees, and formal if they work in firms with more than five employees. This approach captures the effect of firm size on wages rather than the effect of regulation compliance. In addition, self-employment income is not comparable to the earnings of salaried workers because it might include returns to factors different from labor. In contrast to the previous literature, I define workers as formal if they pay social security contributions in their current job, and I am able to control

separately for the effect of firm size on wages. My cross section estimates show that formal salaried workers earn 34 percent more on average than informal workers according to the firm-size based definition, whereas they earn 29 percent more using the social security definition. After adding firm-size variables, the formal wage gap for the social security definition drops further to 16 percent. Using a first-differences model to control for individual heterogeneity, I also find that the transition from a formal to an informal job leads to a wage decrease, while the opposite movement leads to an increase. The first-differences estimates differ only slightly across definitions of formality, suggesting that the firm-based definition used in previous work overestimates the formal wage gap in cross section studies, but performs well once individual heterogeneity is controlled for.

In the second chapter, I use data from Progresa, a Mexican anti-poverty program that pays transfers to rural women, to investigate the effect of an increase in wives' incomes on household expenditures and on each spouse's access to credit. After controlling for the increase in total household expenditure induced by the program, my results indicate that the wife's income share has a positive and significant effect on the expenditures on food and children's clothing and a negative effect on the expenditures on adult clothing. Controlling for household fixed effects with a first-differences specification gives similar results, but the estimated coefficients become insignificant. In addition, I find that the program increases women's borrowing without affecting total household borrowing significantly. These findings suggest that increasing women's income encourages a redistribution of household resources towards children and improves women's access to credit. In addition, my results support models in which the distribution of income within the household matters for outcomes.

In the third chapter, I exploit a transfer program for the elderly that started in 2001 in Mexico City to identify the effect of an exogenous increase in income on the amount of private transfers received by households and individuals. Previous studies for developed countries find a positive or a small negative effect of recipient's income on private transfers received. As a result, these studies conclude that crowding out of private transfers by government programs is negligible and that altruism is not the primary motive for transfer behavior. In contrast with previous studies that do not have such exogenous income variation, I find large, negative, and statistically significant income effects for both households and individuals. My estimates imply that for urban households a one peso increase in income leads to a decrease of 18 cents in the total transfers received from other households. For poor households the effect is much larger, with an additional peso of income reducing cash private transfers received by 64 cents. My results also show that an increase in income substantially reduces the cash private transfers received by individuals. These findings are consistent with the altruistic model and suggest a large potential crowding out effect of public programs, particularly those targeted towards the poor.

In summary, the evidence presented in the three empirical studies of this dissertation suggests that private responses to government programs can either reinforce or compromise the goals of such programs. Consequently, these responses should be considered when designing and implementing government policies.

Chapter 1: Wage Differentials between Formal and Informal Sectors in Mexico

1.1 INTRODUCTION

Informal employment usually refers to those jobs in which either the employer or the worker, or both, do not comply with the existing labor regulations and tax laws. Thus, an informal worker might not receive some or all of the benefits established by law such as social security, over-time pay, or severance payments, and might not pay taxes on earnings. Since informal employment accounts for a large fraction of total employment in developing countries, the role of this sector and its position relative to the formal sector are relevant to understand the overall functioning of the labor market in those countries. This chapter focuses on the wage differentials between the formal and informal sectors using data for Mexico.

The empirical evidence on the effect of informality on wages is mixed. Using data for five Central-American countries, Funkhouser (1996) finds that the informal sector is composed disproportionately by the youngest, the oldest, least educated and female workers. He estimates separate wage regressions for the two sectors and finds that the returns to education are relatively smaller in the informal sector. Marcoullier et al (1997) find a negative effect of informality on wages in Peru and El Salvador, and a positive effect for Mexico. Maloney (1999) studies wage differentials and transition patterns of workers with at most high school education in Mexico and finds that the individuals who

leave a formal salaried job to open an informal business get 25% increase in earnings, while those experiencing the opposite transition suffer a decrease in earnings. Gong and Van Soest (2002) also find that the returns to education are lower in the informal sector and that wages rise faster with age in the formal sector than in the informal sector. According to their results, a low-educated man earns 16% less in the formal sector than in the informal sector, while a highly-educated man earns 45% more.

These studies classify self-employed, family and domestic workers, as well as salaried workers in firms with five or fewer workers as informal. Independent professionals and salaried workers in firms with more than five employees are considered formal. The use of this definition of informality has two potential problems. First, the earnings of the self-employed workers, classified as informal, could include returns to risk, capital and entrepreneurship. Comparing their earnings to those of salaried formal workers can be misleading and might explain the positive effect of informality on wages found in some studies. Second, to classify workers as formal or informal according to the size of the firm they work in is quite arbitrary. Strictly speaking, informality is the non-compliance of either the employer or the employee with labor regulations and tax laws. There is no reason to think that all workers in firms with five or less workers are actually informal, that is, they do not receive the benefits mandated by law or do not pay taxes, or conversely, that all workers in firms with more than five workers pay taxes and receive benefits. The results using this definition might be picking up the effect of the firm size on wages rather than the effect of informality.

Given these shortcomings of previous empirical studies, this chapter looks at wage differentials between the formal and informal sector in Mexico using a sample of

only salaried workers from the National Urban Employment Survey. Individuals are classified as informal if they are not given social security benefits in their current job. According to the Mexican labor law, employers must register all of their employees in the Social Security System[1]. Both employee and employer are required to pay contributions to the system and the benefits the employee gets are access to public health care and retirement saving, among others. Thus, for salaried workers, whether they have social security benefits is a better indicator of formality.

Another difference with respect to previous studies for Mexico is the inclusion of firm size variables in the empirical analysis to separate the effects of informality on wages from the effects of firm size. Before, I argued that a definition of informality should not be based on firm size only. However, it is usually observed that a higher proportion of formal workers tend to be employed in relatively large firms. The positive effect of firm size on wages is well documented in the works of Brown and Medoff (1989), Schmidt and Zimmerman (1991) and Rebitzer and Robinson (1991), among others. Therefore, the estimated effect of informality on wages might be actually reflecting the effect of firm size if this variable is not taken into account.

The empirical analysis consists mainly of wage regressions using both the firm-size based definition of informality used in previous studies and the definition based on social security benefits for comparison. First, I use a cross-section of the data to estimate a single wage regression with individual characteristics and an indicator for formality. As a second step, I also estimate separate wage equations for each sector to see if the returns

[1] Unpaid family workers and non-salaried workers, as independent professionals, are not legally forced to register with the Social Security system.

to the included individual characteristics differ between sectors. A problem with this simple approach is that some unobserved individual determinants of wages might be correlated with working in the informal or formal sector. Therefore, the estimation may suffer from heterogeneity bias. To overcome this problem, I take advantage of the panel structure of the data to estimate a first-difference wage regression. The specification of this model also allows us to see the effect that different transitions between formal and informal jobs have on wages.

The main findings of this chapter are that the social security definition gives a smaller "formality premium" than the firm-size definition for salaried workers in Mexico. Formal salaried workers on average earn 28.5% more than informal workers using the former definition, while they earn 33.7% more according to the firm-size based definition. Inclusion of firm size variables decreases this premium even further to 15.8%. Returns to schooling are lower in the informal sector than in the formal sector for both definitions of informality, as in previous studies. The results for the first-difference estimation are not very different for the two definitions. For the social security definition, those workers who stayed in the informal sector earned 3.6% less than those who stayed in the formal sector. Compared to the latter group, those who moved from the formal to the informal sector experienced a decrease of 12.6% in their wage and those who moved to the formal sector experienced an increase of 7.6%.

These results imply that the positive effect of informality on earnings found in some studies for Mexico is mainly due to the inclusion of the self-employed as part of the informal sector. Salaried workers in the informal sector on average earn less than workers in the formal sector, even controlling for other observable characteristics. However, the

wage differentials between sectors are smaller once the effect of firm size is separated from the effect of informality.

This chapter is organized as follows. Section 1.2 describes the data and the variables used in the analysis. Section 1.3 presents the empirical specifications used to analyze the wage differentials between the formal and informal sector in Mexico. Section 1.4 presents the results of the estimation. Section 1.5 concludes.

1.2 DATA

This chapter uses quarterly data from Mexico's National Urban Employment Survey, which is a panel that covers 38 cities in the country. Each individual is followed for a maximum of five quarters and the information collected refers to the previous week. I use a sample of salaried workers for the first and second quarters of 1996[2]. Thus, all individuals who reported being employers, self-employed workers and workers without pay were dropped from the sample, as well as non-working individuals. Missing observations for the relevant variables were also eliminated. The final sample consists of 55,680 individuals in each quarter.

Table 1.1 compares the two definitions of formality used in this chapter. According to this table, 4% of the workers in the sample would be classified as informal under the firm-size definition used in previous studies while these workers actually receive social security benefits and, most probably, also pay the taxes that apply to their labor income. In addition, 15% of individuals in the sample that work in firms with more

than 5 employees have no social security benefits and should be classified as informal. Thus, about 19% of salaried workers would be misclassified using the firm-size definition. This chapter uses both definitions in the estimation to see if they give different results.

Table 1.1: Comparison of definitions of informality

	Firm with more than 5 workers	Firm with 5 or less workers
Social security	0.64 (71690)	0.04 (4730)
No social security	0.15 (16887)	0.16 (18053)

Data: National Urban Employment Survey (ENEU). Sample: Salaried workers in the first and second quarters of 1996. Proportions with respect to total sample size. Number of observations in parenthesis

Table 1.2 shows the proportion of workers in each sector in the final sample for the two definitions of formality. Regardless of the definition, this table shows that at least 20% of the salaried workers in the sample are informal. The social security definition gives a larger informal sector than the firm-size definition.

Table 1.3 shows the means and standard errors of the variables used in this analysis for the formal and the informal sectors using the social security definition. Schooling, gender, marital status, formality, firm size and industry are indicator variables. The real hourly wage is in 1994 pesos, and it is calculated as monthly labor earnings[3],

[2] To get a larger number of workers moving between sectors, I tried to use the first quarters of 1996 and 1997. I got a much smaller sample, but the proportion of workers changing sectors remained more or less the same (see Appendix).

[3] The survey questionnaire refers to the previous week, but the earnings actually reported in the dataset are monthly earnings.

divided by the monthly hours worked4 and the consumer price index for the corresponding quarter.

Table 1.2: Proportion of Workers in Each Sector

	Formal	Informal
Firm size definition	0.80	0.20
Social Security definition	0.69	0.31

Data: National Urban Employment Survey (ENEU). Sample: Salaried workers in the first and second quarters of 1996. Workers are classified as formal according to the firm size definition if the y work in firms with more than 5 employees. For the social security definition, workers are classified as formal if their current job is covered by social security.

The average wage is 76.6% higher in the formal sector than in the informal sector, while mean hours worked per week are almost the same for both sectors. Mean age is higher in the formal sector as well. The proportion of formal salaried workers that are married (64%) is higher than the corresponding proportion of informal workers (47%), as well as the proportion of formal workers that are female.

Table 1.3 also shows the relationship between firm size and formality: 62% of workers covered by social security work in firms with more than 250 employees, while 52% of informal workers work in firms with 5 employees or less.

[4] These are calculated as weekly hours worked multiplied by 4.3.

Table 1.3: Descriptive Statistics by Sector. Social Security Definition

	Formal sector		Informal sector	
	Mean	St Error	Mean	St Error
Hourly wage	23.14	0.086	13.10	0.111
Hours worked per week	45.51	0.043	45.63	0.085
Age	33.29	0.040	29.29	0.066
Male	0.62	0.002	0.68	0.002
Female	0.38	0.002	0.32	0.002
Married	0.64	0.002	0.47	0.003
Firm size				
2 to 5 workers	0.06	0.001	0.52	0.003
6 to 10 workers	0.05	0.001	0.11	0.002
11 to 15 workers	0.04	0.001	0.05	0.001
16 to 50 workers	0.12	0.001	0.09	0.002
51 to 100 workers	0.06	0.001	0.03	0.001
101 to 250 workers	0.06	0.001	0.01	0.001
More than 250 workers	0.62	0.002	0.19	0.002
Schooling				
Illiterate	0.01	0.0003	0.03	0.001
Literate but no formal schooling	0.01	0.0003	0.01	0.001
Some elementary school	0.06	0.001	0.13	0.002
Elementary completed	0.15	0.001	0.22	0.002
Some secondary schooling	0.06	0.001	0.09	0.002
Secondary completed	0.19	0.001	0.21	0.002
Some high school	0.19	0.001	0.13	0.002
High school completed	0.06	0.001	0.05	0.001
Some college	0.08	0.001	0.06	0.001
College degree	0.18	0.001	0.07	0.001
Graduate	0.02	0.0005	0.01	0.0004
Activity				
Agriculture	0.01	0.0003	0.02	0.001
Mining	0.01	0.0003	0.00	0.0002
Manufacturing	0.27	0.002	0.16	0.002
Electricity, gas and water	0.02	0.0005	0.00	0.0003
Construction	0.03	0.001	0.09	0.002
Retail trade	0.20	0.001	0.26	0.002
Transportation	0.06	0.001	0.09	0.002
Finance	0.03	0.001	0.01	0.001
Services	0.39	0.002	0.36	0.003
Number of observations	76420		34940	

There are also differences in schooling between sectors. While 53% of formal workers have an education level of at least high school, only 31% of informal workers have at least high school. The proportion of informal workers with elementary education or less is 39% while for formal workers it is 23%. As found in previous studies, informal workers are younger, less educated and tend to work in smaller firms than formal workers.

1.3. EMPIRICAL SPECIFICATION

The empirical analysis consists of wage regressions with different specifications. To study the wage differential between the formal and informal sector, this chapter uses first a cross section approach to the data. Specifically, I estimate the following regression:

$$\log W_i = X_i \beta + \gamma D_i + \varepsilon_i \tag{1.1}$$

where W_i is the real wage for individual i, X_i includes age, age squared, dummies for male, married, schooling, industry and quarter, and D_i is a dummy variable equal to 1 if the individual has a formal job. This specification implicitly assumes that the coefficients on the regressors are equal across sectors and the equations differ only in the constant term. When using the social security definition, this chapter controls for firm size by doing ordinary least squares on the following equation:

$$\log W_i = X_i \beta + \gamma D_i + F_i \delta + \varepsilon_i \tag{1.2}$$

where F_i is a vector of firm size dummy variables. As an alternative approach, I also allow the coefficients to vary across sectors by interacting all the regressors with the formal dummy.

This cross-section approach provides some evidence, but may suffer from heterogeneity bias if the error term in the wage equation is correlated with the regressors. In this case, ordinary least squares estimator is biased and inconsistent. For instance, if more able individuals are more likely to have a formal job, the effect of formality on wages would be biased upwards. The panel structure of the Mexican employment survey allows removing this bias by using a first- difference approach. Specifically, this means applying ordinary least squares to estimate:

$$\Delta log W_i = \Delta X_i \beta + \gamma_1 D_{1i} + \gamma_2 D_{2i} + \gamma_3 D_{3i} + \Delta F_i \delta + \Delta \varepsilon_i \quad (1.4)$$

where for a given variable Y_i, $\Delta Y_i = Y_{it+1} - Y_{it}$. To capture the effect of the transitions between the formal and informal sector on the real wage earned by a given individual, I define the dummy variables D_{1i} to D_{3i} as:

D_{1i} =1 if the individual has a formal job in *t* and informal job in *t+1*

D_{2i} =1 if informal job in t and formal job in *t+1*

D_{3i} =1 if individual has an informal job in both *t* and *t+1*

Implicitly, the reference category is composed by those individuals with formal job both in *t* and *t+1*.

1.4. RESULTS

Table 1.4 shows the estimated coefficient of the formal sector dummy in the restricted model. This model implicitly assumes that the coefficients on the other exogenous variables are the same for the two sectors. Even controlling for age, gender, marital status, schooling and industry, having a formal job increases the wage by 33.7% for the firm-size definition and by 28.6% for the social security definition. Both coefficients are significant at 1%. After adding dummy variables to control for firm size, the coefficient on the formal dummy is still significant and positive, but it reduces to 0.158. This implies that part of the estimated "formality premium" using the firm size is due to the effect of firm size on wages, rather than to the compliance with labor regulations.

Table 1.4: Effect of Formality on Wages: Restricted Model

	Coefficient	Robust S.E.
Firm-size definition	0.337	0.004
Social security definition		
Without firm size dummies	0.285	0.004
With firm size dummies	0.158	0.005
Number of observations	111,360	

Restricted model: OLS with formal dummy variable

Table 1.5 shows the estimation results for the case in which the coefficients are allowed to be different across sectors for the social security definition. The main result is that, as found in previous studies, the returns to education are lower in the informal sector than in the formal sector. This difference increases with the education level, and it is

significant for levels above elementary education completed. The results of the estimation for the firm-size definition, not reported, are similar, but they show a wider gap between the returns to education in the informal and formal sectors. For instance, the difference in the return to college degree between sectors is 0.54 for the firm-size definition, while it is only 0.27 for the social security definition. This reinforces the idea that the former definition might be picking up the effect of firm size on wages, rather than the effect of informality. For both sectors, firm size has a positive effect on the wage, which is significantly larger for the individuals employed in the informal sector.

Figures 1.1 and 1.2 present the estimated wage differential between formal and informal sectors for a reference worker using the results from the unrestricted model. Figure 1.1 shows how this wage differential varies with schooling level for men and women. In this case, the reference individual is 30 years old, married, and works in a firm with more than 250 workers in the manufacturing industry during the first quarter of 1996. Generally speaking, the wage differential increases with schooling level, it is always larger for female workers and it is the largest for individuals with some high school education. Men with some high school education earn 26% more in the formal sector than in the informal sector, while women with the same education level earn 31% more in the formal sector. Another interesting result is that for male workers with some elementary education or less the wage differential is close to zero or even negative. For instance, illiterate men earn 4% more in the informal sector.

Table 1.5: Wage Regressions for the Formal and Informal Sectors

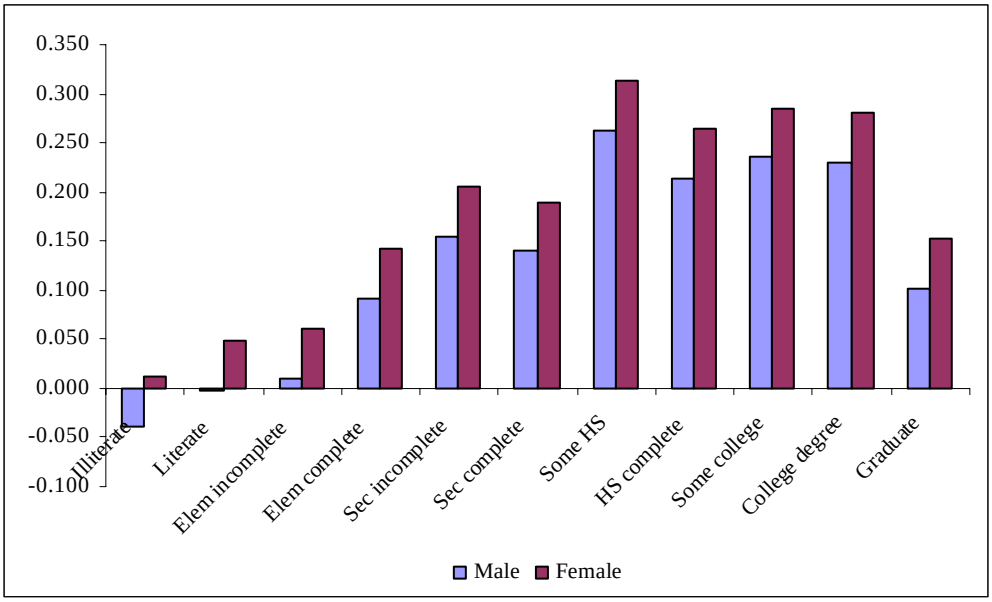
Social Security Definition

	Formal		Informal	
	Coefficient	Std Error	Coefficient	Std Error
Age*	0.046	0.001	0.037	0.002
Age squared	-0.0004	0.00001	-0.0004	0.00002
Male*	0.002	0.004	0.053	0.007
Married	0.095	0.005	0.103	0.008
6 to 10 workers*	0.089	0.011	0.143	0.010
11 to 15 workers*	0.131	0.012	0.223	0.014
16 to 50 workers*	0.149	0.009	0.236	0.012
51 to 100 workers*	0.157	0.011	0.239	0.021
101 to 250 workers*	0.172	0.110	0.234	0.030
More than 250 workers*	0.305	0.008	0.386	0.011
Literate but no formal schooling	0.082	0.030	0.046	0.034
Some elementary school	0.160	0.020	0.112	0.018
Elementary completed*	0.330	0.020	0.200	0.018
Some secondary schooling*	0.471	0.021	0.278	0.020
Secondary completed*	0.490	0.020	0.312	0.018
Some high school*	0.748	0.020	0.447	0.020
High school completed*	0.731	0.021	0.478	0.023
Some college*	0.892	0.021	0.619	0.023
College degree*	1.325	0.020	1.056	0.024
Graduate*	1.602	0.025	1.462	0.052
Mining	0.261	0.036	0.316	0.075
Manufacturing*	0.066	0.027	0.162	0.022
Electricity, gas and water*	0.113	0.030	0.277	0.061
Construction*	0.046	0.028	0.191	0.022
Retail trade*	-0.111	0.027	0.090	0.022
Transportation	0.111	0.028	0.151	0.023
Finance*	0.319	0.030	0.473	0.045
Services*	0.096	0.027	0.234	0.022
Period 2 dummy	-0.032	0.004	-0.034	0.006
Constant	0.822	0.037	0.851	0.035
Number of observations	76720		34940	

Unrestricted model: interactions with formal dummy. The reference category for firm size is 2 to 5 employees; for schooling, illiterate; and for industry, agriculture.
*Significantly different across sectors at 5%.

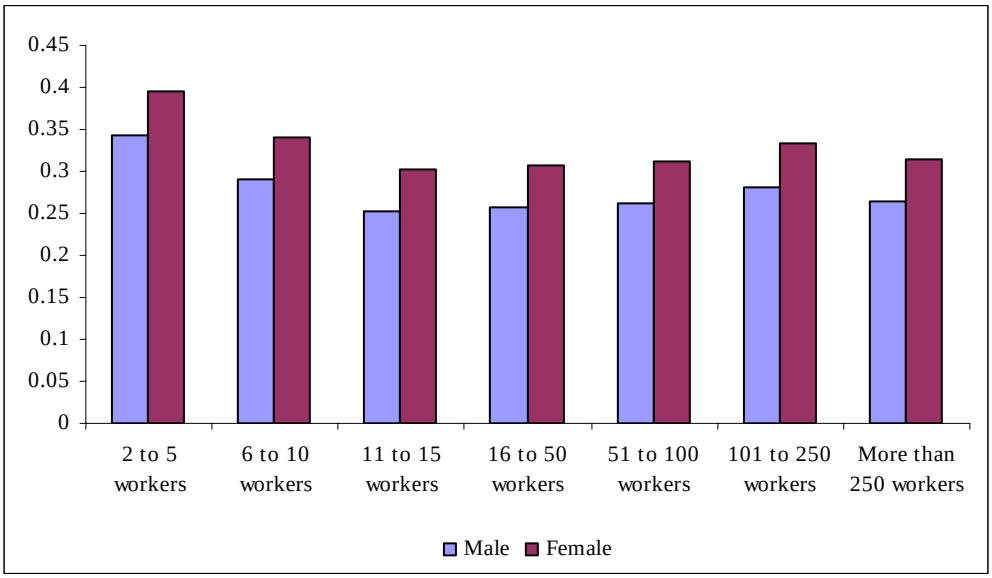
Figure 1.2 shows how the wage gap between sectors varies with firm size for an individual with the same characteristics already mentioned and with some high school education. As in Figure 1.1, the wage differential is larger for female workers and it is the largest for individuals working in the smallest firms. Men that work in firms with 2 to 5 employees and receive social security benefits earn 34% more than those without benefits in firms of the same size. For women working in the smallest firms, the wage differential is 39%. The wage differential does not vary much across firm size and it is around 30% for female workers and 26% for males.

Figure 1.1: Estimated Wage Differentials and Schooling



Wage differentials estimated using the results of the unrestricted model. The reference individual is 30 years old, married, and works in a firm with more than 250 workers in the manufacturing industry during the first quarter of 1996.

Figure 1.2: Estimated Wage Differentials and Firm Size



Wage differentials estimated using the results of the unrestricted model. The reference individual is 30 years old, married, with some high school education and works in the manufacturing industry during the first quarter of 1996.

As explained above, the cross section approach used so far might suffer from heterogeneity bias. The panel structure of Mexico's employment survey allows estimating a first-difference model to remove this bias. In this case, identification comes from individuals who actually moved between sectors. Table 1.6 shows the number of individuals in the sample that changed sectors between the first and the second quarter of 1996[5].

[5] The fraction of workers changing sectors from one quarter to another in my sample is consistent with the relatively high degree of labor mobility documented for Mexico by other authors. Calderon (2000) finds that around 45 to 50% of informal workers change labor force status within a given quarter, while 15 to 20% of formal workers do the same. He also finds that mean job tenure is shorter in Mexico compared to other OECD countries. Maloney (1997) and Gong et al (2002) find similar transition patterns.

Table 1.6: Transitions between formal and informal sector

1st quarter of 1996 to 2nd quarter of 1996

	Size definition	Social Security definition
Formal in t=1,2	0.74	0.62
	(41210)	(34401)
Formal in t=1, informal in t=2	0.05	0.07
	(3025)	(3755)
Informal in t=1, formal in t=2	0.06	0.07
	(3132)	(3863)
Informal in t=1,2	0.15	0.25
	(8313)	(13661)

Proportions with respect to total sample size (55,680 individuals). Number of observations in parenthesis

Table 1.7: First-difference Estimation

	Coefficient	Standard Error
Firm-size definition		
Formal in t=1, informal in t=2	-0.148	0.009
Informal in t=1, formal in t=2	0.099	0.009
Informal in t=1,2	-0.036	0.005
F-statistic*	14.10	
Social security definition		
Formal in t=1, informal in t=2	-0.126	0.009
Informal in t=1, formal in t=2	0.077	0.009
Informal in t=1,2	-0.036	0.005
F-statistic	14.61	

Reference category: Formal in t=1,2

*The reporter F-statistic is for testing the hypothesis that the sum of the coefficients on the formal to informal and informal to formal dummies is equal to zero.

Table 1.7 shows the estimated coefficients of the dummy variables defined for each of the possible transitions between sectors. All of these coefficients are statistically different from zero. For both definitions of informality, the movement from the formal to the informal sector leads to a decrease in the wage, while the opposite movement leads to an increase. Individuals that switched from a job with social security benefits to one without benefits suffered a 12.6% decrease in their wage, while individuals that moved from the informal to the formal sector experienced a 7.7% wage increase. Compared to individuals with a formal job in both quarters, those with an informal job in both periods earned 3.6% less. This implies that formal workers experienced a higher growth in their real wages between the first and second quarter of 1996, but could also be due to informal workers changing jobs but staying in the informal sector[6]. The estimated coefficients for the firm size definition are slightly larger, but have the same signs. The hypothesis that sum of the coefficients on the formal to informal and informal to formal dummy variables is equal to zero is rejected at 1% for both definitions. This means the decrease in the wage when moving from a formal to an informal job is not the same magnitude as the increase resulting from the opposite transition.

1.5 CONCLUSION

This chapter investigates the wage differentials between the formal and informal sectors in Mexico using a sample of salaried workers only and a definition of formality based on social security benefits. Previous work includes self-employed workers as part

[6] The data have no information on whether the individual is with the same employer from one quarter to another.

of the informal sector, which can be misleading given that the earnings of these workers usually include returns to capital, risk and entrepreneurship. These studies also consider workers in firms with five or less employees as informal. Even though there seems to be a positive relationship between firm size and compliance with labor and tax regulations, this definition is somewhat arbitrary.

The main findings of this chapter are that the social security definition gives a smaller "formality premium" than the firm-size definition for salaried workers in Mexico. Formal salaried workers on average earn 28% more than informal workers using the former definition, while they earn 34% more according to the firm-size based definition. Inclusion of firm size variables decreases this premium even further to 16%. As found in previous studies, the returns to schooling are lower in the informal sector than in the formal sector. This difference in the returns to education across sectors increases with education level and is significant for individuals with elementary education or more for both definitions of informality. However, this difference is smaller for the social security definition.

The panel structure of the data allows estimating a first-difference model to deal with heterogeneity bias and looking at the effect of different transitions between sectors on wages. For the social security definition, those workers who stayed in the informal sector earned less than those who stayed in the formal sector. Compared to the latter group, those who moved from the formal to the informal sector experienced a decrease of in their wage and those who moved to the formal sector experienced an increase. The magnitude of the effects is only slightly larger for the firm-size definition of informality.

These results imply that the positive effect of informality on earnings found in some studies for Mexico is mainly due to the inclusion of the self-employed as part of the informal sector. Salaried workers in the informal sector on average earn less than workers in the formal sector, even controlling for other observable characteristics. However, the wage differentials between sectors are smaller once the effect of firm size is separated from the effect of informality.

Chapter 2: The Impact of an Increase in Women's Income on Expenditures and on the Access to Credit in Rural Mexico

2.1 INTRODUCTION

In recent years, unitary models that treat the household as a single decision maker have been challenged and put to the test in empirical work. A key result from these models is that only household total income, and not its distribution among household members, has an effect on outcomes. In contrast, household bargaining models predict that individual incomes affect allocations by increasing the bargaining power of household members, and allowing them to affirm their preferences and get a higher fraction of household resources. An implication of the bargaining approach is that government interventions that change incomes or economic opportunities of specific household members could have a different impact on outcomes of interest like nutrition, labor supply, human capital investment, consumption patterns and children's welfare, among others. As a consequence, analyzing the distribution of income within the household has become increasingly important for the evaluation of government policies.

Most of the empirical evidence shows that who controls income within the household matters for allocations. Thomas (1990) finds that mother's income has a larger effect than father's income on household nutrient intakes, fertility, child survival rates, and the height and weight of children in Brazil. Using data on couples from Thailand, Schultz (1990) shows that each individual's own unearned income has a larger negative

impact on his or her labor supply than the spouse's income. Browning et al (1994) and Browning and Chiappori (1998) estimate a structural model of efficient bargaining with Canadian data and find that the unitary model of the household fails for couples, but not for singles. In addition, their results show that older and higher-income partners receive a higher fraction of total expenditure. Since the endogeneity of income can seriously bias estimates, some authors look at policies that induce exogenous changes in the income distribution within families. For instance, Lundberg, Pollak and Wales (1997) find a significant increase in the ratio of children's and women's clothing to men's clothing expenditures following a policy change that transferred a substantial child allowance from husbands to wives in the UK in the late 1970s.

This chapter exploits the design of Progresa, a Mexican cash transfer program in which benefits are paid directly to the mothers of poor families in randomly selected rural communities, to investigate the effect of an increase in wives' income on household expenditures and on each spouse's access to credit. Using data on administrative records, Rubalcava et al (2004) conclude that actual Progresa income increases spending on children's clothing, food and investment in small livestock. The actual transfer received depends on compliance with the program requirements, which could potentially bias their estimates. Attanasio and Lechene (2002) instrument the wife's share of income with the potential transfer from the program instead and find that it has a positive effect on the expenditure share of food and children's clothing and a negative impact on alcohol and services. None of these studies looks at the effect on credit access.

For the analysis of household expenditures, this chapter follows Attanasio and Lechene (2002), but investigates whether instrumenting with a treatment dummy, instead

of the transfer from the program, has any impact on the expenditure shares of food and different types of clothing. I also exploit the panel aspect of the Progresa data to estimate a first-differences model to control for household heterogeneity. In addition to expenditures, I estimate the effect of the increase in women's income caused by the program on the probability that each spouse gets a loan and on the loan amount.

My results confirm that additional income in the hands of women has a positive and significant effect on children's clothing and food, and a negative effect on adult's clothing, regardless of the instrumentation strategy used. Controlling for household fixed effects gives similar results, but the estimated coefficients become insignificant. Regarding the access to credit, I find that the potential transfer from the program increases wife's borrowing and decreases the husband's borrowing. I find no significant effect on the household total borrowing. These findings support the idea that who controls income has an effect on outcomes. An increase in women's own income leads to a reallocation of household resources towards children and women, and improves their individual access to credit.

This chapter is organized as follows. Section 2.2 briefly presents the unitary model of the household and its implications. Section 2.3 describes the Progresa program, the data and the empirical specifications used in this chapter. Section 2.4 discusses the results obtained. Section 2.5 concludes.

2.2. THEORETICAL FRAMEWORK

Consider a household composed of two members[7], *A* and *B*, who decide the allocation of total expenditure *x* between private consumption vectors q^A and q^B and public consumption *Q*. Children, if present, do not take an active part in the decision process. Under the assumptions of the unitary model of the household[8], household preferences can be represented by a single utility function and, thus, the demand vectors of q^A, q^B and *Q* are the optimal solution to the problem:

$$Max\ U(q^A, q^B, Q|\ z,\ \varepsilon)$$

$$s.t. \qquad p'(q^A+q^B)+P'Q=x$$

where *p* is the vector of prices for the private goods, *P* is the price of the public good, *z* is a vector of demographic characteristics of the household and ε represents unobservable heterogeneity. The resulting demand system can be characterized as:

$$q^A=f^A(p, P, x|z,\varepsilon)$$

$$q^B=f^B(p, P, x|z,\varepsilon)$$

$$Q=f^Q(p, P, x|z,\varepsilon)$$

Note that each demand depends on prices and total expenditure only, not on the income distribution among family members. The same result would follow if we had an

[7] This formulation follows Attanasio and Lechene (2002), but it is standard in this literature.
[8] See Samuelson(1956) and Becker(1981).

individual utility function for each member and a function that mapped these individual utilities to household welfare.

In contrast with the previous setting, bargaining models of household behavior predict that demand functions will depend on the distribution of income between family members, as well as on other variables that affect the bargaining power of individuals. For instance, McElroy and Horney (1981), McElroy (1990) and Lundberg and Pollack (1993) analyze the allocation of resources within marriage using a Nash bargaining model. In this context, the final allocation depends on the utility that each partner can get outside of marriage, which may be a function of prices, individual non-labor incomes, marriage and divorce laws, government taxes or transfers that are conditioned on marital status and variables that describe the relevant marriage markets. A change in the opportunities outside of marriage affects the allocation of resources resulting from the bargaining process through the effect on the individual threat points. In the efficient bargaining model studied by Chiappori (1992), members of the household first divide total income among them according to a specific sharing rule, which depends on total expenditure and on each member's income, and then each of them maximizes his or her own utility subject to an individual budget constraint. In this model, individual incomes affect outcomes through their effect on the sharing rule that determines the fraction of total expenditure each partner gets to allocate to private consumption.

2.4 DATA AND EMPIRICAL SPECIFICATION

2.4.1 The data

The data are from the evaluation sample of Progresa, a Mexican government program that pays cash transfers to the mother, or most senior woman, in poor rural families[9]. Part of the transfer is conditioned on complying with scheduled visits to health centers, and the rest is conditioned on children's enrollment and regular attendance in school. The most generous part of the transfer is the schooling subsidy, which increases with the child's grade and it is larger for girls compared to boys in secondary education. The total amount of benefits paid to any given family cannot exceed a certain maximum that varies from year to year. The program also provides in-kind health benefits and nutritional supplements for children younger than 5 years old, and for pregnant and lactating women.

The dataset is a panel collected for roughly 24,000 households (about 130,000 individuals) from 506 small and remote rural communities in 7 states (Guerrero, Hidalgo, Michoacan, Puebla, Queretaro, San Luis Potosi and Veracruz). Before the program started, 320 localities were randomly assigned to treatment and 186 localities were kept as controls. Poor families in treatment localities would participate in the program from the beginning, while the poor in control localities would not participate in the initial phase of it, even if they qualified for benefits[10]. Both "poor" and "nonpoor" households,

[9] Initially, the program targeted only rural families, since these are relatively the most disadvantaged among Mexican families, but it was recently extended to poor urban families in some areas. However, urban households are not part of the evaluation sample used in this chapter.

[10] However, poor families in the control communities were told about the program and knew that they would start receiving benefits by the end of 1999.

defined in terms of program eligibility, in treatment and control communities were followed over time.

In this chapter, I use a sample of one-couple households[11] with children both before and after the payment of benefits started in May, 1998. Before the program started two waves of data were collected: one in October 1997 and another in March 1998. The first one has information on individual demographic characteristics, labor supply variables and income from various sources, but no expenditure information, while the second has information only on children and household expenditures. The "before" data were constructed by merging these two waves. After the start of the program, data were collected on October 1998, March 1999 and November 1999. Each of these waves has information on incomes, expenditures and demographic characteristics of household members.

2.4.2 Specification for expenditure shares

To investigate the impact of Progresa on the distribution of resources within the household, this chapter uses household expenditures on different types of clothing, which is the assignable good typically considered in previous studies, and on food, which is not assignable in these data. The equation of interest is:

$$w_h = X_h\beta + \gamma y_h + u_h \qquad (2.1)$$

[11] About 44 percent of households in the original data fit in this category, since households with more than one married couple are common in rural Mexico. However, restricting the sample to only one-couple households simplifies the analysis and increases the comparability with the previous literature.

where w_h is alternatively the expenditure share of food or clothing for girls, boys, women and men of household h, X_h is a set of regressors that includes household size, number of children, number of children of different age currently enrolled in school, state dummy variables, years of schooling of husband and wife, log of household total expenditure and its square, and u_h is an error term. The key independent variable is y_h, which represents the wife's income share in household h. If the income pooling result holds, the coefficient on this variable should be zero after controlling for total expenditure and other relevant variables in the demand equation. A significant coefficient for y_h would cast doubt on the unitary model of the household and favor bargaining models in which the distribution of income among family members affects outcomes.

A major source of concern for the estimation of equation (2.1) is the potential correlation of the wife's share of income with the household error term. If the correlation is positive, the effect of interest would be biased upwards. For example, this could happen if women who have more bargaining power in a couple for unobservable reasons also have a higher income share, perhaps because they are allowed to work outside the house, and spend more on their assignable good. Progresa can be used to control for this endogeneity since due to the program design, being chosen as a beneficiary is exogenous, conditioned on being poor. Since the program causes an increase in total household income together with an increase in the wife's income, total expenditure is included in the demand equations to control for the household income effect.

As mentioned before, Attanasio and Lechene (2002) use the potential transfer from the program as an instrument for the income share of the wife in their demand system. This chapter replicates their estimation, but also tries different instrumentation

strategies. I use a treatment dummy, which is equal to one if the household qualifies for the program and lives in a treatment community, regardless of whether it actually participates and how much it collects through the program, to instrument for the wife's income share. Alternatively, I also use the actual transfer collected from the program to compare results. I instrument total expenditure and its square with the average of men's agricultural wage, its square and its interaction with the number of children in the household, and current number of children of various ages in school with the same variables in the first round of the survey, before the start of the program, as they do.

The panel structure of the dataset allows controlling for the endogeneity with yet another estimation strategy. Consider the following version of the general equation specified above,

$$w_{ht} = X_{ht}\beta + \gamma y_{ht} + \alpha_h + u_{ht} \qquad (2.2)$$

where the variables are the same as defined before, t indicates a given period, and we have repeated observations on the same household h. Unobservable household heterogeneity that is constant over time is captured in α_h, a household fixed effect that could be correlated with the variable of interest, y_{ht}. A first-difference estimation of equation (2.2) would eliminate the household fixed effect and yield unbiased and consistent estimates of all the coefficients and, in particular, of the coefficient on the wife's share of income. Thus, in addition to the cross section equations, I estimate

$$\Delta w_{ht} = \Delta X_{ht}\beta + \gamma \Delta y_{ht} + \Delta u_{ht} \qquad (2.2')$$

where, for instance, $\Delta w_{ht} = w_{ht+1} - w_{ht}$.

2.4.3 Specification for access to credit

In addition to the effect on expenditures, I estimate the impact of the program on each spouse's access to credit. The data have information on whether someone in the household got a loan in the past six months, the amount of the loan and the identity of the borrower. I estimate probit equations for the probability that the wife or the husband got a loan, and for the probability that someone in the household got a loan. For the loan amounts, I estimate:

$$l_h = X_h\delta + \theta t_h + \nu_h \tag{2.3}$$

where l_h is alternatively the the wife's or the husband's loan amount in household h, or the total household loan amount. As before, X_h are household controls, like household size, number of children, age and schooling of both husband and wife, and t_h is the variable that measures treatment. A large fraction of households in my sample did not get any loans in the previous months, so I estimate (3) with a tobit and capture the effect of an increase in women's income by including alternatively a treatment dummy, or the potential amount of the Progresa transfer directly in the equation of interest, instead of instrumenting for the income share of the wife.

2.4.4 Variables

The survey asks for food expenditures and consumption[12] in the past week and clothing expenditures in the last six months. Expenditure and income variables were converted to monthly amounts. Food and clothing expenditures were divided by total expenditure to get the expenditure shares. Total income of each spouse includes labor, non labor, transfer and crop income, as well as earnings from self-employment activities. The income shares are just the total income of each spouse divided by the total income of the couple. The potential transfer from Progresa is calculated according to the rules of the program and the number of children in different school grades in each round. The actual monthly Progresa transfer is calculated using administrative records and it is the average transfer per month in the past six months. Nominal values were divided by the national consumer price index to get real values. Household size is just the total number of members, number of children is the total number of members at most 16 years old, and number of boys and girls in different age groups currently attending school are included in the equations to control for any effect of Progresa on schooling. Years of schooling for husband and wife, together with round and state dummy variables, are also included. The indicator variable for "poor" is equal to one if the household qualifies for Progresa, and the program treatment dummy is equal to one if the household is poor and lives in a locality randomly assigned to treatment. Regarding access to credit, I define indicator variables for whether the wife got a loan, the husband got a loan, and for whether someone in the household got a loan. For the credit amounts, I use the reported wife's

and husband's loan amount separately and calculate the total household loan amount as the sum of the two.

For all the IV estimations, I use the three rounds after the program started (October 1998, March and November 1999). For the first-differences estimation, I use the round before and the first round after the program started. Since the credit variables are not collected in all rounds, I use only March 1999 round for the loan estimations.

2.5 RESULTS

2.5.1 Expenditure shares

Table 2.1 shows the means and simple difference-in-differences estimates for income share of each spouse and the expenditure shares for the three rounds after the program started. Poor households in treatment communities have a larger income share of the wife than similar households in control villages, even after subtracting the difference between non-poor households in treatment and control villages. The husband's income share is not significantly different for poor households in treatment communities. Poor households in treatment communities have larger expenditure shares of boy's and girl's clothing and the difference is significant. For adult clothing and food, the differences are not significant. This descriptive evidence shows that the program effectively increased poor women's income in treatment communities and that it also affected household expenditures. However, to see that the effect on expenditures comes

[12] Consumption of own production of basic food items is valued at local prices.

from the increase in the income controlled by women, and not from a mere household income effect, we must turn to the instrumental variables estimation.

Table 2.1: Means and Difference-in-Difference Estimates of Income and Expenditure Variables

	Poor, Treatment	Poor, Control	Non-poor, Treatment	Non-poor, Control	DD estimate
Wife's share of income	0.044	0.026	0.051	0.045	0.012
	(0.002)	(0.002)	(0.003)	(0.003)	(0.005)
Husband's share of income	0.829	0.837	0.796	0.805	0.002
	(0.004)	(0.005)	(0.005)	(0.006)	(0.011)
Expenditure shares					
Girl's clothing	0.008	0.006	0.005	0.004	0.001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0004)
Boy's clothing	0.009	0.006	0.005	0.004	0.001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0004)
Women's clothing	0.004	0.004	0.006	0.005	-0.001
	(0.0001)	(0.0002)	(0.0002)	(0.0003)	(0.0004)
Men's clothing	0.005	0.004	0.005	0.005	0.00001
	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0004)
Food	0.766	0.760	0.711	0.707	0.003
	(0.001)	(0.002)	(0.002)	(0.003)	(0.005)
Number of observations	8200	4994	4728	3253	

Data: Progresa evaluation sample. Author's calculations using the October 1998, March 1999 and November 1999 rounds. Standard errors in parentheses. A household is "poor" if it qualifies for Progresa. The household belongs to the "treatment" group if the it is located in a community assigned to treatment. The difference-in-differences (DD) estimates are calculated as the difference in means between the poor in the treatment and control communities, minus the difference in means between the non-poor in treatment and control communities.

Table 2.2 summarizes the results from the IV estimations on the expenditure shares by showing the estimated coefficients on the wife's income share obtained with different instrumentation strategies. The first column presents the results from using the transfer amount that the household qualifies for as an instrument for the income share of the wife and intends to replicate Attanasio and Lechene (2002). The second and third

columns show the results from using the Progresa treatment dummy and the actual transfer received from the program as instruments. The results show that, regardless of the instrument used, the wife's income share has a small, but positive and significant effect on children's clothing, which is of similar magnitude for boy's and girl's clothing. The effect on adult's clothing is always negative and of similar magnitude for women's and men's clothing, but it is significant only when using the actual transfer as an instrument. The wife's income share also has a positive and significant effect on food, except when using the actual transfer from the program.

Table 2.2: Expenditure Shares. Coefficients on the Wife's Share of Income

	IV with Potential Progresa transfer	IV with Progresa dummy	IV with Actual Progresa transfer	First-Differences
Girl's clothing	0.108	0.084	0.138	0.045
	(0.039)	(0.027)	(0.047)	(0.038)
Boy's clothing	0.138	0.096	0.171	0.017
	(0.044)	(0.028)	(0.053)	(0.040)
Women's Clothing	-0.012	-0.012	-0.047	-0.050
	(0.017)	(0.015)	(0.026)	(0.039)
Men's clothing	-0.0002	-0.007	-0.049	-0.051
	(0.017)	(0.015)	(0.025)	(0.045)
Food	1.644	1.593	0.246	1.008
	(0.494)	(0.396)	(0.264)	(0.391)
First-stage coefficient of instrument for wife's income share	2.13×10^{-5} (5.20×10^{-6})	0.016 (0.003)	4.04×10^{-5} (1.18×10^{-5})	-
Number of observations	21175	21175	21175	11529

IV Estimation: Two stages least squares (2SLS) using the October 1998, March 1999 and November 1999 rounds. The key endogenous variable is the wife's share in total household income, and the instrumenting strategies are in columns 1-3. Robust standard errors, clustered at the household level, are in parentheses. The last column reports the results from a first-differences estimation using one round before the program started (October 1997 and March 1998 rounds merged together) and one round after (October 1998).

The results from the first-difference estimation, shown in the last column of Table 2.2, confirm the results from the IV estimations. The signs of the estimated coefficients are the same, but none of them is significant.

For the IV estimations, the bottom of Table 2.2 shows reports the first-stage estimated coefficient of the instrument used. The potential Progresa transfer has a positive and significant effect on the income share of the wife. Multiplying the estimated coefficient (2.13×10^{-5}) by the mean potential transfer (473.8 pesos per month) gives an increase of 0.01 in the wife's income share as a result from the program. Doing the same calculation for the mean actual transfer (221.8 pesos per month), also results in an increase of 0.01 in the wife's income share. Both effects are similar to the estimated first-stage coefficient of the Progresa dummy (0.016).

The results for the expenditure shares imply that an increase in the income controlled by women increases the resources devoted to children and reduces those devoted to adults, regardless of gender. The negative effect found for women's clothing contradicts the results obtained by Lundberg et al using UK data and by Attanasio and Lechene. Both studies find that the wife's income share has a positive effect on the expenditures on women's clothing. However, Ruvalcaba et al also find a negative effect on women's clothing using the actual Progresa transfer directly in their demand equations. Table 2.3 presents the results from repeating the estimation of expenditure shares on a subsample of couples without children. Since the school subsidy constitutes a large part of the transfer from Progresa, households with no children qualify for a smaller transfer amount that does not vary much between households. For this reason, Table 2.3 shows the estimated coefficients using only the Progresa dummy as an instrument. The

effect on children's clothing is close to zero and not significant as would be expected for this subsample. The wife's income share now shows a small positive effect on women's clothing, which suggests that in these households women are getting more resources as a result of the increase in their income. The effect on men's clothing is negative and similar in absolute value to the effect on women's clothing. The positive effect on food is consistent with the results obtained with the whole sample. None of these effects is significant probably because for these households the increase in women's resources induced by the program is not as large as for the households with children.

Table 2.3: Expenditure shares. Coefficients on Wife's Share of Income.

Couples with No Children

	IV with Progresa dummy
Girl's clothing	-0.002
	(0.002)
Boy's clothing	0.006
	(0.011)
Women's Clothing	0.017
	(0.029)
Men's clothing	-0.016
	(0.029)
Food	1.029
	(0.662)
Vices	-0.128
	(0.081)
Number of observations	6629

IV Estimation: Two stages least squares (2SLS) using the October 1998, March 1999 and November 1999 rounds. The key endogenous variable is the wife's share in total household income, instrumented with the Progresa treatment dummy. Subsample: Couples with children under the age of 16. Robust standard errors, clustered at the household level, are in parentheses.

2.5.2 Access to credit

Table 2.4 presents the means and simple differences-in-differences estimates for the loan variables. In each group, between 4 and 5 percent of households report that someone in the household got a loan in the past six months. The proportion of wives that got a loan is smaller than the proportion of husbands that did for all groups. A higher proportion of poor households in treatment localities report that the wife got a loan, but the estimate is not significant. The opposite is true for whether the husband got a loan. A smaller fraction of poor treated households got a loan and the estimate is significant at 10 percent. Poor treated households also have significantly smaller amounts of total household loans and loans given to the husband. They also have slightly larger amount of loans given to the wife, but this estimate is not significant. Non-poor households in treatment localities have the highest fraction of households with positive loans and also the largest mean household loan amount, even compared with similar households in control localities. This is consistent with the findings of Angelucci and De Giorgi (2006), of an increase in the borrowing of non-eligible households in treatment communities probably due to the increase in liquidity caused by the program. If Progresa has such an effect on the borrowing of non-qualifying households in treated areas, my results would underestimate the effect of the program on the loan variables of poor treated households.

The descriptive statistics in Table 2.4 suggest that the program has increased women's borrowing by less than it has decreased men's borrowing, leading to a fall in total household borrowing. One possible explanation not related to the effect of the program on the intrahousehold distribution of income is that the program decreased the

need for loans by providing extra income to the household. Since husbands borrow more than wives in these rural communities, higher and more stable income would decrease the need to borrow for the household. However, the statistics in Table 2.4 do not control for the relevant covariates or for the large fraction of households with loans censored at zero. Tables 2.5 and 2.6 present the results from probit and tobit estimations to that take all these into account.

Table 2.4: Means and Difference-in-Differences Estimates for Loan Variables

	Poor, Treatment	Poor, Control	Non-poor, Treatment	Non-poor, Control	DD estimate
Someone in the household got a loan	0.038	0.039	0.051	0.037	-0.016
	(0.002)	(0.003)	(0.006)	(0.006)	(0.009)
The wife got a loan	0.009	0.003	0.006	0.002	0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)
The husband got a loan	0.029	0.037	0.045	0.035	-0.018
	(0.002)	(0.003)	(0.005)	(0.006)	(0.009)
Household loan amount	57.76	63.29	183.48	66.97	-122.05
	(8.41)	(18.75)	(56.0)	(16.53)	(61.89)
Wife's loan amount	13.02	1.38	12.17	2.09	1.563
	(5.74)	(0.67)	(6.02)	(1.61)	(8.49)
Husband's loan amount	44.76	61.94	171.66	64.88	-123.96
	(6.17)	(18.75)	(55.80)	(16.46)	(61.42)
Number of observations	6479	4011	1580	1005	

Data: Progresa evaluation sample. Author's calculations using the March 1999 round. Standard errors in parentheses. A household is "poor" if it qualifies for Progresa. The household belongs to the "treatment" group if the it is located in a community assigned to treatment. The difference-in-differences (DD) estimates are calculated as the difference in means between the poor in the treatment and control communities, minus the difference in means between the non-poor in treatment and control communities.

Table 2.5 presents the coefficients and the marginal effects of the Progresa variables on the probability that the wife or the husband got a loan, and on the probability that someone in the household got a loan, obtained using probit estimations. The

dependent variables are in columns and each row is a separate estimation including either a Progresa dummy or the Progresa transfer the household qualifies for. The first column shows that both the treatment dummy and the potential transfer from the program have a positive effect on the probability that the wife gets a loan, which is significant only for the transfer. Conversely, both Progresa variables have a significant and negative effect on the probability that the husband got a loan. When using the transfer from the program, the negative effect for husbands is of similar magnitude to the positive effect for the wives, so that the effect on the probability that someone in the household got a loan is negative, but small and not significant.

Table 2.5: Probability of Getting a Loan

	Someone in the household got a loan	The wife got a loan	The husband got a loan
Probit coefficients			
Progresa dummy	-0.159	0.062	-0.208
	(0.112)	(0.292)	(0.115)
Potential Progresa transfer	-0.0001	0.0005	-0.0002
	(0.0001)	(0.0002)	(0.0001)
Probit marginal effects			
Progresa dummy	-0.009	0.001	-0.010
	(0.006)	(0.003)	(0.006)
Potential Progresa transfer	-6.27×10^{-6}	4.92×10^{-6}	-1.22×10^{-5}
	(1×10^{-5})	(1.72×10^{-6})	(4.84×10^{-6})
Number of observations	12742	12742	12742

Estimation: Probit using the March 1999 round. Robust standard errors are in parentheses. Each row is a separate estimation using either the Progresa dummy or the potential Progresa transfer to capture the effect of the program.

The bottom part of Table 2.5 shows the marginal effects, which are very small in magnitude, probably because of the low fraction of household that report getting any loans, but still significant.

Table 2.6: Loan Amounts

	Household loan amount	Wife's loan amount	Husband's loan amount
Tobit Coefficients			
Progresa dummy	-1527.9	381.4	-2001.1
	(826.4)	(1867.8)	(897.2)
Potential Progresa transfer	-0.768	2.861	-1.773
	(0.674)	(1.163)	(0.763)
Tobit marginal effects			
Progresa dummy	-173.22	22.22	-220.00
	(93.67)	(108.91)	(98.61)
Potential Progresa transfer	-0.087	0.169	-0.195
	(0.076)	(0.069)	(0.084)
Number of observations	12742	12742	12742

Estimation: Tobit using the March 1999 round. Robust standard errors are in parentheses. Each row is a separate estimation using either the Progresa dummy or the potential Progresa transfer to capture the effect of the program. The marginal effects are calculated for those households actually receiving positive loans.

Table 2.6 presents the results from the tobit estimation of the loan amounts. The potential transfer from the program has a positive and significant effect on the amount borrowed by the wife, and a negative and significant effect on the amount borrowed by the husband. Consistent with the probit results, the effect for the total household loan amount is negative, but not significant. The dummy for Progresa presents the same signs,

but since the positive effect on the loan amount of the wife is not significant, the effect on household total loans is negative and significant, but only at 10 percent. The marginal effects show that for those households actually getting loans, an additional peso of potential transfer from the program increases the amount borrowed by the wife by 16 cents and decreases the amount borrowed by the husband by 20 cents. The effect for the household loan amount is a decrease of 9 cents per additional peso of the transfer, but it is not significant. If the program improved credit access only through a household income effect, then it would increase the probability of borrowing and the loan amount for the household, but not decrease the husband's borrowing. If more household income decreases the need for credit, then it would be consistent with the decrease in the husband's borrowing, but not with the increase in the wife's borrowing. My results imply that who controls income matters for each individual's access to credit. The increase in women's income caused by Progresa improves their access to credit, allowing them to borrow more on their own. The husband might be responding to this by reducing his own borrowing, so that the household borrowing is not significantly changed.

2.6 CONCLUSION

The distribution of income within the household has received much attention in recent years, and has been proven important for the design and evaluation of government policies that target specific family members, like children and women. Using the data

from Progresa, I examine the effect of an exogenous increase in women's income on household expenditures and on their access to credit.

For the expenditure shares, I alternatively use a treatment dummy and the actual transfer received from the program to instrument for the income share of the wife in the demand equations, and compare my results with previous studies. My findings confirm that the wife's income share has a positive and significant effect on children's clothing and a negative effect on adult's clothing, regardless of the instrument used. The wife's income share also has a positive and significant effect on food consumption. For couples with no kids, the wife's income share has a positive effect on women's clothing and a negative effect on men's clothing. Although these effects are not significant, they suggest that women in these household are getting more resources as a result of the increase in their income. Controlling for household fixed effects with a first-differences estimation gives similar results, but the estimated coefficients become insignificant.

My results for the loan variables imply that increasing women's incomes improves their individual access to credit, without affecting total household borrowing. The potential transfer from Progresa has a positive and significant effect on the probability that the wife gets a loan, and on her loan amount. On the contrary, the transfer has a negative effect on both the husband's probability of getting a loan and on his loan amount. Given that the effects for wives' and husband's borrowing are similar in absolute value, the effects on total household borrowing are negative, but small and insignificant.

My findings on expenditures and credit are not consistent with the unitary model of the household, and instead support models in which the distribution of income within the household affects outcomes. Increasing women's income seems to encourage a

redistribution of household resources towards children and women in the form of private consumption and better credit opportunities. An implication is that government programs that increase the incomes or economic opportunities of specific members within a household might be more effective in improving their condition or changing their individual outcomes, than programs that merely increase household total resources.

Chapter 3: The Motives for Private Transfers: Evidence from a Transfer Program for the Elderly in Mexico

3.1. INTRODUCTION

Transfers among households are an important aspect of economic behavior. In the U.S., the gross flow of these transfers is estimated to be 63 billion dollars per year[13] . In developing countries, a large proportion of households participate in transfer networks and private transfers constitute an important source of family income, especially among the poor. Understanding why households and individuals engage in transfer behavior is critical because private transfers can neutralize or reinforce government redistributive efforts depending on whether they are motivated by altruism or exchange. Altruistic transfers occur because the donor cares about the utility of the recipient, whereas transfers motivated by exchange aim at compensating the recipient for providing services to the donor, like informal care or visits. Under altruism, givers can undo the effects of a transfer program for the poor by reducing their private support to poor households in response to the government intervention[14]. In contrast, if transfers are motivated by exchange and poor families are net providers of services to other families, a government transfer program could actually increase the transfers they receive from other households.

[13]This figure is taken from Gale and Scholz (1994). Using data from the Survey of Consumer Finances (SCF) for the years 1983-1986, they also calculate that gifts and transfers from parents to adult children living away from home account for at least 20 percent of aggregate net wealth in the U.S.

Some studies on inter vivos transfers in the U.S. show a positive relationship between income and private transfers received, which would be consistent with exchange but not with altruism[15] (Cox ,1987; Cox and Rank,1992). Other studies find small negative effects which suggest that the potential crowding out from government programs is negligible. For instance, Cox and Jakubson (1995) estimate that the poverty rate when public transfers are eliminated and no private response occurs is only 2.3 percent greater than the poverty rate when private transfers adjust to meet the decrease in public transfers. Analyzing data from the Health and Retirement Study, McGarry and Schoeni (1995) find that moving from the lowest to the highest income category reduces annual private transfers received by approximately 3 cents per dollar[16]. Altonji et al (1997) estimate that redistributing one dollar of income from parent to child decreases the transfers received by the child by at most 13 cents. Some early studies for developing countries also obtain positive effects of income on private transfers received, like Lucas and Stark (1985) for Botswana and Cox et al (1998) for Peru, but more recent evidence shows negative income effects that are larger in absolute value than those estimated using U.S. data. Using a regression spline, Cox et al (2004) find that a marginal increase in pre-transfer income reduces private transfers between 30 to 80 percent for those in the lowest income quintile in Philippines. However, in all these studies, the endogeneity of

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14 Barro (1974) shows that an increase in government debt, or any other forced intergenerational transfer, would have no real effect if discretionary bequests or gifts across generations are are greater than zero.

15The literature on inter vivos transfers is the most relevant to this chapter, but the altruistic model has been examined in other contexts. For instance, the empirical evidence on bequest behavior in the U.S. shows that parents tend to leave equal bequests to their children instead of compensating for their potential differences in income (Wilhelm, 1991; Menchik, 1980). This result contradicts the altruistic hypothesis. Altonji et al (1992) also reject this hypothesis using consumption data from the Panel Study of Income Dynamics.

recipient's income is a potential source of bias. Other authors look directly at the effect of specific government programs on the amount private transfers received by households in developing countries. Jensen (2003) finds that transfers from migrant children are reduced by 25 to 30% in response a large increase in pensions in South Africa. Albarran and Attanasio (2002) provide evidence of substantial crowding out of cash private transfers by Mexico's Progresa program.

The purpose of this chapter is to estimate the effect of income on the amount of private transfers received, controlling for the endogeneity of income with a public transfer program for the elderly that started in 2001 in Mexico City. The transfer from the program is relatively large and is conditioned only on the age of the individual, thus providing the exogenous variation in income that I use to instrument for total household resources. Using a sample of urban households from the National Income and Expenditure Survey (ENIGH), I estimate an instrumental variables Tobit model of the private transfers received by the household. I also estimate the effect of income on the transfers given to other households, and examine whether the income effects are different for poor households. I also repeat the estimation for individuals to see whether the results are consistent with the household level estimates.

The main finding of this chapter is that not controlling for the endogeneity of income reproduces the positive effects, or small negative effects, of income on private transfers received found in previous work for both households and individuals. In contrast, my instrumental variables strategy yields large, negative, and statistically

[16]In McGarry and Schoeni (1985), the movement from the lowest to the highest income category corresponds to an increase of at least $15,000 in total income. According to their estimates, this increase in

significant income effects. For households, my preferred estimates imply that a one peso increase in household income leads to a decrease of 28 cents in total private transfers received by households already receiving transfers and a drop in 18 cents in the expected transfers received by all urban households. The implied income elasticity of private transfers, conditioned on positive transfers received, is -0.33. For poor households, a one peso increase in income reduces cash private transfers received by 64 cents. The estimated income elasticity of private cash transfers for the poor is -0.72. These findings are consistent with the altruistic model and suggest a large potential crowding out effect of public programs, particularly those targeted towards the poor. In-kind transfers received by the poor from other households increase with income, which would be consistent with exchange, and not with altruism. Total transfers given by the poor to other households increase by 6 cents with an additional peso of income.

The results for individuals are consistent with those obtained for households. An additional peso of individual income decreases domestic cash transfers by 57 cents, and total cash transfers by 81 cents for those individuals receiving positive transfers. The expected value of domestic cash transfers decreases by 15 cents per additional peso of individual income, and the expected value of total cash transfers decreases by 20 cents per additional peso.

This chapter is organized as follows. Section 3.2 presents the theoretical framework for analyzing the motives for private transfers. Section 3.3 discusses the empirical specification used in this chapter. Section 3.4 describes the program for the elderly that is used to instrument for total income. Section 3.5 describes the data and

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income would decrease the expected annual value of transfers received by $419.

defines the variables used in the estimation. Section 3.6 presents and comments on the results. Section 3.7 concludes the chapter.

3.2. THEORETICAL FRAMEWORK

The literature examines two motives for transfers among households: altruism and exchange. The implications of altruism are explored by Becker (1974). In the altruistic model, a benevolent individual, typically assumed to be the parent, transfers resources to her children or other family members because she cares about their well-being. Under exchange, the parent or donor makes transfers to the children as a compensation for services received from them as in Bernheim et al (1985). These services could have market substitutes, like help with home production or informal care, or could involve attention, companionship or obedience to parental rules.

Cox (1987) incorporates the two motives in a single framework and derives testable predictions about the effect of recipient's income on private transfers received under each case. In this model, two individuals, a donor and a recipient, engage in transfer behavior. The donor cares about the well-being of the recipient, and the recipient provides services to the donor. The donor's utility function is

$$U_d = U_d(\underset{(+)}{c_d}, \underset{(+)}{s}, V(\underset{(+)}{c_r}, \underset{(+)}{s})) \tag{3.1}$$

where c_d and c_r are the donor's and recipient's consumption levels, s is the amount of services provided by the recipient, and $V(.,.)$ is the recipient's utility function. Both utility functions increase with own consumption. The services provided by the recipient

increase the donor's utility and decrease the recipient's utility. Since the donor is altruistic, $\frac{\partial U_d}{\partial V} > 0$. Both c_d and c_r are assumed to be normal goods.

The budget constraints are

$$c_d \leq I_d - T \tag{3.2}$$

$$c_r \leq I_r + T \tag{3.3}$$

where I_d , I_r are the incomes of the donor and the recipient, respectively, and T is the transfer that the donor makes to the recipient. By participating in this relationship, the recipient should receive a utility greater than or equal to the one she gets when she provides no services and consumes out of her own income only. Thus,

$$V(c_r, s) > V_0(I_r, 0) \tag{3.4}$$

The donor maximizes his utility by choosing s and T , subject to constraints (3.2)-(3.4)[17] . In this model, both altruism and exchange are present as motives for private transfers, but only one of them is effective at the margin depending on whether constraint (3.4) is binding.

Altruism dominates when constraint (3.4) is not binding. In this case, the recipient is strictly better off by providing services and receiving the transfer. The transfer equates the donor's marginal utility of consumption U_c with the recipient's marginal utility from

[17]In this model, the donor dominates the agreement. As noted by Cox (1987), a bargaining model would be more general and realistic, but would not allow having the altruistic motive in the same framework.

the donor's perspective $U_v V_c$. The level of services is chosen so that the marginal utility that the donor gets from them, U_s , is equal to the marginal cost of providing them for the recipient $U_v V_s$.

The main predictions are

$$\frac{\partial T}{\partial I_d} > 0$$
$$\frac{\partial T}{\partial I_r} = -1 + \frac{\partial T}{\partial I_d} < 0$$

Thus, under altruism, transfers increase with donor's income and decrease with recipient's income. Keeping $(I_r + I_d)$ constant, one dollar increase in the recipient's income should cause a one dollar reduction on transfers received when the altruistic motive dominates[18]. However, an increase in I_r alone raises $(I_r + I_d)$ and, as a result, the donor would like to increase the amount of the transfer. So, the total effect of an increase in recipient's income is negative, provided that donor's consumption is normal, but less than 1 in absolute value. Total services can either rise or fall with changes in the incomes of the donor and the recipient. It is important to note that the lower the recipient's income is, the more likely it is that constraint (3.4) is not binding. Therefore, altruism is more likely to dominate when the recipient's income is low[19] .

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[18]Andreoni (1989 and 1990) shows that if individuals get utility from the mere act of giving, or a "warm glow", the reduction in private transfers caused by an increase in recipient's income together with a decrease in donors income would be less than one-for-one.

[19]Cox et al (2004) verify this prediction by estimating a regression spline on data for the Philippines.

The exchange motive dominates when constraint (3.4) is binding. In this case, $U_c < U_v V_c$ and the last dollar transferred does not equalize the marginal utilities of consumption, but compensates the recipient for providing services to the donor. Under exchange, the comparative statics[20] are

$$\frac{\partial T}{\partial I_d} > 0$$
$$\frac{\partial T}{\partial I_r} \lesseqgtr 0$$

In contrast with altruism, exchange allows transfers to respond positively to changes in recipient's income. An increase in Ir causes a decrease in the recipient's supply of services and an upward movement along the donor's demand for services. Let the amount of the transfer be $T = ps$, where p is the implicit price of services. An increase in recipient's income raises p and lowers s. Thus, the effect on T depends on the elasticity of the donor's demand for services. If demand is inelastic because the services provided by the recipient do not have close substitutes, the amount of the transfer could increase with recipient's income.

The predictions regarding the transfer decision are the same under both motives. In the case of exchange, a transfer takes place if the donor's reservation price for the first unit of services is greater than the recipient's supply price for the first unit of services. Since both prices increase with own income, it follows that

[20]For the exchange part of the model, Cox (1987) assumes that the donor's utility function is additively separable. Relaxing this assumption does not change the sign of the derivatives of interest.

$$\frac{\partial \Pr(T > 0)}{\partial I_r} < 0$$
$$\frac{\partial \Pr(T > 0)}{\partial I_d} > 0$$

Under altruism, a transfer will occur whenever the marginal utility of consumption of the donor at the endowment point is less than the marginal utility of consumption of the recipient. Since both marginal utilities are decreasing in own income, the income derivatives for the transfer decision are the same as above.

3.3. EMPIRICAL SPECIFICATION

The relationship of interest is

$$T_h = \alpha + \beta X_h + \gamma Y_h + \varepsilon_h \tag{3.5}$$

where T_h represents the amount of private transfers received from other households. I alternatively use total private transfers, in-kind transfers, domestic cash transfers, remittances from abroad, and total cash transfers as dependent variables. X_h includes household characteristics, individual characteristics of the head of household, state and year dummies. The key independent variable is Y_h , total household income excluding private transfers. The sign and magnitude of the estimated coefficient on Y_h indicates the transfer motive that dominates at the margin. However, pre-transfer income is presumably endogenous in the transfer equation. If families adjust their total income downwards precisely because they receive private transfers, for example through reductions in labor supply, the coefficient on total income would be negatively biased.

On the contrary, a positive bias could arise if families receive larger assistance from both the government and other families because of an unobservable factor that makes them less capable of sustaining themselves.

In addition to the potential endogeneity of income, a considerable fraction of households do not receive any private transfers. As a consequence, T_h is a random variable that takes the value of zero with positive probability and it is continuous over strictly positive values. In this case, doing ordinary least squares on the whole sample, including observations with zero transfers received, or only on those households with positive transfers, is generally not a consistent estimator. A more adequate alternative is an instrumental variables Tobit (IV Tobit) described by the following equations:

$$T_h = \max(0, \alpha_1 + \beta_1 X_{1h} + \gamma Y_h + u_h) \tag{3.6}$$

$$Y_h = \alpha_2 + \beta_{21} X_{1h} + \beta_{22} X_{2h} + v_h \tag{3.6'}$$

where (u, v) are zero-mean normally distributed and independent of X_h. In this model, Y_h is endogenous if u and v are correlated.

Identification of the model requires finding a set of valid instruments X_{2h}, that is, variables that affect total income directly, and private transfers only through the effect on the endogenous variable, so that they can reasonably be excluded from the transfer equation. The next section describes the transfer program for the elderly that I use as a source of exogenous variation in household income. The usual rank condition needed for

identification is that $\beta_{22} \neq 0$, so that the instruments are relevant in explaining the endogenous variable. The coefficient of interest is γ, which measures the effect of total pre-transfer income on the amount of private transfers received.

The econometric model is estimated using maximum likelihood (MLE). Before estimating the full model using MLE, I use the two step procedure proposed by Smith and Blundell (1986) to test for the endogeneity of total household income in the transfer equation[21] . The results vary with the type of transfers and are reported in section 3.6.

3.4. DESCRIPTION OF THE PROGRAM: NUTRITION TRANSFER FOR SENIOR ADULTS

"Pension Alimentaria para Adultos Mayores" (Nutrition Transfer for Senior Adults) is a transfer program targeted at individuals 70 or older that live in Mexico City. Beneficiaries are given a debit card that can be used to purchase goods at a number of grocery stores[22]. The monthly transfer is about 60 dollars, which represents approximately 13 percent of median household income for households with at least one eligible person in the city, and can be accumulated every month. The transfer is not

[21]This procedure consists in estimating the reduced form equation of Y_h by OLS and obtaining an estimate for $\hat{\beta}_2$ and for the residual $\hat{v}_h = Y_h - X_h\hat{\beta}_2$. The second step is to estimate a standard Tobit model of T_h on X_{1h} , Y_h and $\hat{v}_h$. Testing the null hypothesis that the coefficient on $\hat{v}_h$ is equal to zero with the corresponding t-statistic reported by Tobit provides a simple test of the endogeneity of Y_h . This approach does not require any particular assumption about the distribution of the reduced form of Y_h . If exogeneity of Y_h is rejected, the second-stage Tobit standard errors and test statistics are not valid, since the estimate for $\hat{\beta}_2$ is used instead of β_2 . In this case, estimating the full model by maximum likelihood gives the correct standard errors and is more efficient.

means-tested, not taxable and does not depend on previous contributions to the social security system or on any requirement other than age. The program includes free prescription drugs and free health care in the hospitals administered by the city.

The program was first announced in January, 2001. Due to resource limitations, only relatively poor neighborhoods participated in this first stage of the program. Social workers from the city government did door-to-door visits in all neighborhoods with very high, high and medium poverty levels, enrolling age-qualifying adults regardless of household or individual income levels. Payment of transfers to about 150,000 beneficiaries started in March 2001. During the year, new enrollment applications were accepted and the number of beneficiaries increased to 250,000, which is 80% of the elderly population that have at least 3 years residing in the city according to the government's annual report for that year[23] . In September 2002, the local government announced its intention of transforming the program into a law that guarantees the right to receive the transfer to all individuals 70 or older that have at least 5 years living in the city. At the end of that same year, the program covered almost all the elderly population in poor areas[24] . In May 2003, the government announced a bill proposal to be voted for the next discussion session of the local assembly, which was approved in November of that same year. The new law establishes that all individuals 70 or older, with a minimum residence of 3 years in Mexico City, are entitled to receive a transfer no less than 50% of the legal minimum wage paid in the city, regardless of their income level.

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[22]The card must be used at authorized grocery stores, but it can be used to purchase non-food items.
[23]Informe de Trabajo 2001, Secretaria de Salud del Distrito Federal (2001 Report of Mexico City's Health Department).
[24]Informe de Trabajo 2003, Secretaria de Salud del Distrito Federal.

3.5. DATA

To estimate the effect of household pre-transfer income on private transfers received, I use the Mexican Household Income and Expenditure Survey (ENIGH) for the period 1996-2004. The survey is a nationally representative cross section collected every two years by the National Institute of Statistics (INEGI) and has detailed information on household expenditures and income from different sources. I use a sample of urban households only[25], because rural households might not be comparable to the group that experienced the policy change I use for identification. The final sample consists of 32,262 urban households of which 20% are in Mexico City. In the data, in-kind transfers and gifts received are reported at the household level, while income variables are observed at the individual level. In this chapter, I use the household as the unit of analysis, but I also report the results from individual private transfers received as an additional check. Household total income without private transfers includes labor, rent and business income, pensions, government transfers, financial income and other non-labor income. The survey has information on the monetary value of in-kind transfers and gifts received[26], cash transfers received from households within the country and remittances from abroad during the past quarter. No transfers within the household are reported and no information on the characteristics of donors is provided. I calculated the

[25]I cannot identify cities for any year before 2000. For those earlier years, I can only observe state and whether the household belongs to a locality of 100,000 people or more. So, I define a household as urban if it is in a locality of 100,000 people or more and control for state fixed effects in the estimation.

[26]For each expenditure category, the survey asks whether the household received any gifts and how much would the household have spent if it had bought the gift instead of receiving it. Thus, in-kind transfers received are valued subjectively, and not at market prices.

monthly average for both transfers and income and divided these amounts by the consumer price index to get real values.

I can explicitly identify whether in-kind transfers come from private sources or from the government only for 2002 and 2004. For the years 1996, 1998 and 2000, I observe the good or service that households received as a transfer, but not the giver. Table A3.1 shows that in 2002, 82% of all in-kinds gifts and transfers received came from other households and 11% from the government[27] . Gifts that come almost exclusively from other households are those of alcohol, food outside the home, tobacco, personal and household care, child care, clothing, household items and other. The government's participation seems to be more important in categories such as education (18%), entertainment and culture (21%), health care (61%), home improvement (10%) and transportation (17%) as would be expected. To be able to use the years before the policy change, I defined the total in-kind transfers received from other households in each year as the sum of all those categories in which the proportion of transfers received from other families exceeded 95% in 2002. I also added food transfers, even if the proportion of these transfers that come from the government (5%) is not negligible. Another potential problem with food transfers is that they might reflect increases in government in-kind transfers after 2001 rather than an increase in transfers from other families, especially among poor households in Mexico City.

[27]The remaining 7% consists of gifts or in-kind transfers provided by employers and non-profit organizations.

For private transfers received in cash, I observe whether they come from other families within Mexico or from abroad. Government cash transfers are reported separately in all years and are included in total household income before private transfers. In-kind and cash transfers given to other households are also reported. I add these up for each household to estimate the effect of income on total transfers given.

The independent variables used in all the estimations are household characteristics such as household size, number of children younger than 6 years old, number of children 6 to 12 years old, dummies for the presence of one and two elderly individuals and the interaction of these with a dummy for Mexico City; characteristics of the head of household such as age, years of schooling, labor force participation and dummies for whether the head is married or female; year and state dummies. A dummy for Mexico City, which for government and administrative purposes is a state called Distrito Federal is included in the state dummies. As mentioned before, the key endogenous variable is household total income excluding any private transfers received.

In this chapter, I instrument for total pre-transfer income of the household with the transfer program for the elderly described in section 3.4. In the early stage of this program, participation was restricted to households with elderly individuals in poor neighborhoods in Mexico City. At the end of 2003, the program was extended to all elderly residents in the city. In the data, I cannot observe neighborhood to control for this difference in participation among households in poor and non-poor neighborhoods. As a consequence, I define the instruments for household pre-transfer income as a dummy for one elderly individual present in the household in Mexico City in 2002, a dummy for two elderly individuals present in the household in Mexico City in the same year and similar

variables for 2004. These variables capture the eligibility of the household, regardless of the actual participation and the transfer amounts received from the program. At the same time, since each senior individual is entitled to receive a transfer, these dummies also capture the variation in the total transfer amount the household qualifies for.

I also estimate Tobit and IV Tobit specifications on a subsample of poor households to examine whether the income effects are stronger for them given that they participated in the program from the beginning. I calculate total household income excluding private and public support and divide this by the number of adults 19 years of age or older present in the household. I call a household poor if the income excluding public and private transfers per adult is less than the monthly minimum wage. Using this criterion, the sample of poor households has 8,060 observations, which represents roughly the lowest 25th percentile of the income distribution of all urban households.

3.6. RESULTS

Table 3.1 shows the means and standard errors of the relevant variables for the whole sample of urban households and for the subsample of poor households. Poor households look very similar to the whole sample in terms of household size and the number of members in different age groups that they have. However, the heads of poor households are 4 years older and 3 years less educated on average. The heads of poor households also have a lower labor force participation rate (30%) compared to the whole sample (48%), they are more likely to be female (30%) and less likely to be married. About 21% of poor households have at least one elderly person, whereas only 11% of all

urban households do. The mean total income before private transfers for the whole sample is about 3.4 times the mean income for poor households.

Table 3.2 shows that 52% of all urban households and 61% of poor households report receiving transfers from other families. A higher fraction of households receives in-kind transfers, regardless of whether they are poor or not. Only 15% of all households receive cash, while 48% acknowledge receiving some goods or services from other households. Among the poor, 54% receive transfers in kind and 27% receive cash transfers from other households. Most of the cash transfers received by urban households in the sample come from within Mexico, and a very small fraction of urban households reports receiving remittances from abroad.

In-kind transfers from other households represent 56% of total private transfers received while cash transfers, both domestic and from abroad, represent 44% of total transfers. Poor households receive a higher fraction of their total income in private transfers. Total private transfers account for 32% of household income for the poor, compared to 7% for the whole sample. Cash transfers represent 20% of household total income for the poor, which is larger than the 12% represented by in-kind transfers. Poor households are less likely to transfer cash or goods and services to other households. About 21% of the whole sample report giving private transfers compared to only 9% among the poor.

Table 3.1: Descriptive Statistics

	All		Poor	
	Mean	S.E.	Mean	S.E.
Household size	4.03	0.011	4.03	0.024
Number of kids less than 6 years old	0.46	0.004	0.47	0.009
Number of kids 6-12 years old	0.58	0.005	0.52	0.009
Number of adults 19-69 years old	2.36	0.007	2.38	0.016
Characteristics of the head of household				
Female head	0.22	0.002	0.30	0.005
Age	45.20	0.085	49.64	0.207
Years of education	9.42	0.028	6.33	0.047
Labor force participation	0.48	0.003	0.30	0.005
Married head	0.62	0.003	0.53	0.006
Dummy for 1 elderly individual in the household	0.09	0.002	0.17	0.004
Dummy for 2 elderly individuals in the household	0.02	0.001	0.05	0.002
Dummy for at least one elderly individual in the household	0.11	0.002	0.21	0.005
Dummy for at least one elderly individual in the household in Mexico City	0.03	0.001	0.05	0.002
Mexico City dummy	0.20	0.002	0.19	0.004
Total household income without private transfers	8460.98	68.648	2463.58	19.02
Total household income with private transfers	8733.80	68.755	3092.02	25.59
Total government transfers received	26.64	1.903	41.87	3.22
Private transfers received				
In-kind transfers	353.58	5.897	365.74	9.87
Domestic cash transfers	215.36	6.327	498.00	20.55
Remittances	57.46	3.740	130.45	9.83
Total cash transfers	272.82	7.354	628.44	22.63
Total transfers received	626.40	9.958	994.18	26.98
Private transfers given				
In-kind transfers	109.48	6.506	13.72	1.51
Cash transfers	124.94	5.241	12.19	1.02
Total transfers given	234.42	8.718	25.91	1.85
Number of observations	32,242		8,060	

Source: Author's calculations using a nationally representative sample of urban households from the National Income and Expenditure Survey for Mexico (ENIGH), for the years 1996, 1998, 2000, 2002 and 2004. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage. An "elderly individual" is a person who is age 70 or older. Household income and transfers are in real pesos per month. Nominal values were deflated using the Mexican Consumer Price Index (INPC).

Table 3.2: Transfer Behavior among Households

	All	Poor
Proportion of households receiving private transfers		
In-kind transfers	0.48	0.54
Domestic cash transfers	0.13	0.27
Remittances	0.02	0.05
Any cash transfers	0.15	0.31
Any transfer	0.52	0.61
Proportion of households giving private transfers		
In-kind transfers	0.10	0.04
Cash transfers	0.15	0.05
Any transfer	0.21	0.09
Private transfers as a fraction of total household income		
Transfers received		
In-kind transfers	0.04	0.12
Domestic cash transfers	0.02	0.16
Remittances	0.01	0.04
Total cash transfers	0.03	0.20
Total transfers	0.07	0.32
Transfers given		
In-kind transfers	0.01	0.005
Cash transfers	0.01	0.005
Total transfers given	0.03	0.01
Number of observations	32,232	8,060

Source: Author's calculations using a nationally representative sample of urban households from the National Income and Expenditure Survey for Mexico (ENIGH), for the years 1996, 1998, 2000, 2002 and 2004. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage. Household income and private transfers are monthly values.

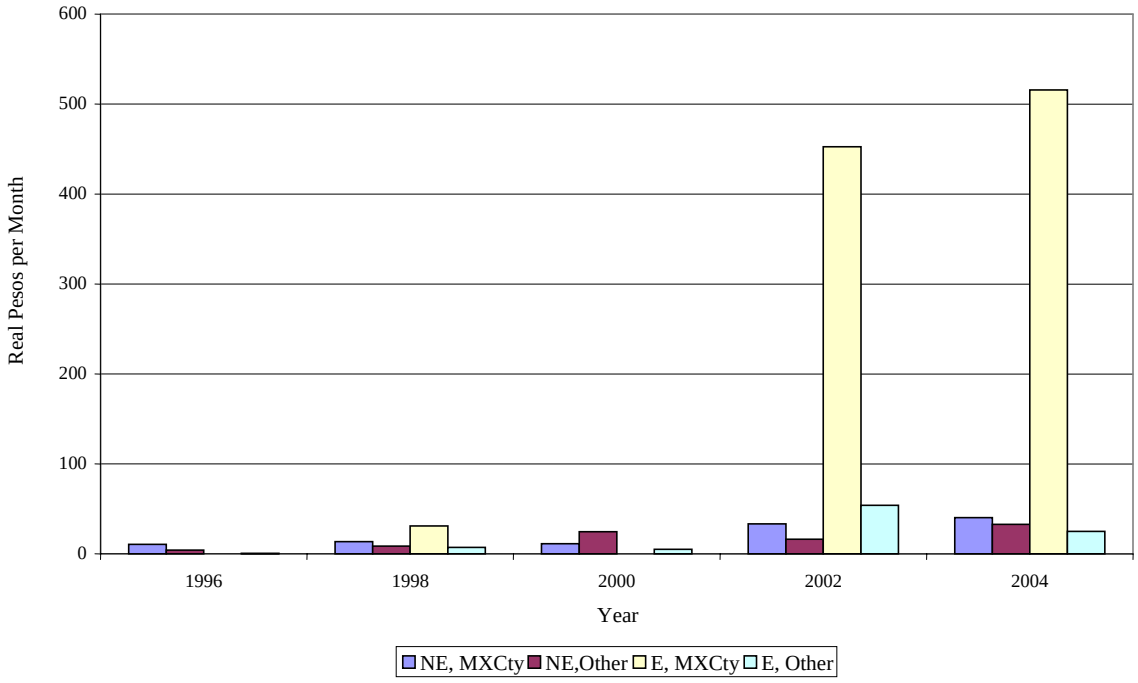
The identification strategy relies on the exogenous increase in income experienced by households with at least one elderly individual in Mexico City after 2001. Table 3.3 presents the average government transfers received in each year by four different groups: households with no elderly individuals in at outside of Mexico City and households with elderly individuals in and outside of Mexico City.

Table 3.3: Average Monthly Government Transfers Received by the Household

Year	Not Elderly, Mexico City	Not Elderly, Not Mexico City	Elderly, Mexico City	Elderly, Not Mexico City
1996	10.66	4.27	0	0.6
1998	13.54	8.47	31	7.31
2000	11.3	24.47	0	4.95
2002	33.34	16.26	452.48	54.06
2004	40.36	32.74	515.77	24.95
Number of observations	23,104	5,617	886	2,655

Source: Author's calculations using a nationally representative sample of urban households from the National Income and Expenditure Survey for Mexico (ENIGH), for the years 1996, 1998, 2000, 2002 and 2004. Households are classified as "elderly" if they have at least one member who is age 70 or older. "Not elderly" households have no members over the age of 70. Government transfers are in real pesos per month. Nominal values were deflated using the Mexican Consumer Price Index (INPC). The group of households affected by the transfer program after 2001 is the one labeled as "Elderly, Mexico City".

Figure 3.1: Average Government Transfers Received by the Household



These government transfers do not include any social security benefits, but only payments from cash transfer programs. The average transfers for most groups are fairly small, probably because until very recently the largest government programs in Mexico were targeted at rural households[28] . However, after 2000 households with elderly individuals in Mexico City experience a large increase in average government transfers compared to all the other groups, as can be seen in Figure 3.1. The average amount of 452 pesos per month which is close to the actual 636 pesos per month that each elderly individual was entitled to in 2002. The average amount of government transfers received by the group of qualifiying households increased from 2002 to 2004, probably due to the extension of the program to all elderly city residents in 2003.

As mentioned in section 3.3, I use the Smith-Blundell two-step procedure to test for the exogeneity of pre-transfer household income in the transfer equations. The results vary with the type of transfer. For the whole sample, I cannot reject that income is exogenous for domestic cash transfers, remittances and total cash transfers, but I definitely reject exogeneity for in-kind transfers and for total transfers received. For the subsample of poor households, exogeneity of income is rejected for all types of transfers except domestic cash transfers.

Table 3.4 presents the estimated coefficients for total private transfers received using a Tobit with and without instrumental variables using the sample of all urban households.

[28]Procampo and Progresa are among the largest federal cash transfer programs in Mexico and they are both targeted towards the rural sector. Progresa was extended to urban households after 2000.

Table 3.4: Tobit and IV Tobit Estimation of Total Private Transfers Received.

All Urban Households

	Tobit	IV Tobit
Household size	-68.94	262.23
	(21.80)	(60.37)
Number of kids<6	70.88	-403.62
	(30.36)	(73.44)
Number of kids 6-12	-63.13	-410.04
	(31.18)	(65.61)
Number of adults 19-69	-59.09	1124.09
	(28.01)	(88.38)
Female head	732.51	404.96
	(50.31)	(164.28)
Age of head	-21.19	51.69
	(1.46)	(7.93)
Head's education	10.05	739.46
	(3.83)	(53.16)
Head's LFP	-1136.41	-349.60
	(63.11)	(177.24)
Married head	-240.24	59.35
	(44.06)	(112.36)
Household income before private transfers	0.002	-0.79
	(0.002)	(0.04)
1 elderly individual dummy	325.77	572.83
	(78.37)	(226.89)
2 elderly individuals dummy	1135.59	1352.73
	(144.43)	(333.60)
1 elderly *Mexico City	233.39	27.77
	(133.64)	(189.98)
2 elderly*Mexico City	180.05	-142.82
	(248.76)	(311.37)
Mexico City dummy	-29.32	59.05
	(162.70)	(197.29)
Number of observations	32,232	32,232

Sample: All urban households. Estimation: Maximum Likelihood. All estimations include state and year dummies. Standard errors, clustered at the state level, are in parentheses. An “elderly individual” is a person who is age 70 or older. Household income and transfers are in real pesos per month. The key endogenous variable is total household income before private transfers. The instruments are the interactions of a dummy for one or two elderly individuals in the household, a dummy for Mexico City and a dummy for the years after the program started. Nominal values were deflated using the Mexican Consumer Price Index (INPC).

Number of children younger than 6 years old in the household has a positive effect using a regular Tobit and a negative effect on total private transfers received using

IV Tobit. Number of kids 6 to 12 years old has a negative and significant effect on total private transfers received for both estimation methods. Households with a female head receive a significantly larger amount of transfers from other households. The years of education of the head have a positive and significant effect, which probably reflects that more educated people have access to better private networks. Labor force participation of the head of household reduces total transfers received. Households with elderly individuals receive significantly larger transfers and households with two elderly individuals receive more than households with only one. Residing in Mexico City, with or without elderly individuals, does not have a significant effect on the private transfers received.

The key result in Table 3.4 is that the coefficient on total pre-transfer income obtained from the Tobit without instrumental variables is positive and not significant, which reproduces the results of some previous studies for developed countries. A positive coefficient on income contradicts altruism as a motive for private transfers. In contrast, the second column shows that properly instrumenting for total pre-transfer income gives a negative and significant coefficient, which is consistent with both exchange and altruism, and implies that government transfer programs crowd-out private aid between families.

Table 3.5a reports the estimated coefficient on pre-transfer income for different types of private transfers with and without using instrumental variables. As before, treating total household income as exogenous gives positive or smaller negative coefficients. For instance, for the whole sample, the coefficient on income for in-kind

transfers is positive, small and significant when income is not instrumented for, but negative and significant for the IV Tobit.

Table 3.5a: Household Amount of Private Transfers. Income Coefficients

	Tobit	IV Tobit
All households		
In-kind transfers received	0.005	-0.414
	(0.001)	(0.063)
Total cash transfers	-0.085	-0.234
	(0.007)	(0.080)
Total transfers received	0.002	-0.785
	(0.002)	(0.037)
Total transfers given	0.086	-0.165
	(0.002)	(0.003)
Poor households		
In-kind transfers received	-0.16	1.01
	(0.02)	(0.22)
Domestic cash transfers	-1.52	-1.68
	(0.06)	(0.40)
Remittances	-1.74	-4.39
	(0.19)	(0.65)
Total cash transfers	-1.68	-2.69
	(0.06)	(0.42)
Total transfers received	-0.93	0.36
	(0.04)	(0.57)
In-kind transfers excluding food	-0.18	0.57
	(0.02)	(0.19)
Total transfers received excl.food	-1.03	-0.59
	(0.04)	(0.51)
Total transfers given	0.07	0.74
	(0.01)	(0.07)

Estimation: Maximum Likelihood. All estimations include state and year dummies. Standard errors, clustered at the state level, are in parentheses. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage. The key endogenous variable is total household income before private transfers. The instruments are the interactions of a dummy for one or two elderly individuals in the household, a dummy for Mexico City and a dummy for the years after the program started. Household income and transfers are in real pesos per month. Nominal values were deflated using the Mexican Consumer Price Index (INPC).

For the poor sample, I estimated Tobit equations for domestic cash transfers and remittances separately. For poor households, total income presents negative and significant coefficients for all the different types of transfers without using instrumental variables. However, the estimated coefficients become larger in absolute value when income is properly instrumented for. The only exception is the estimated coefficient of income for in-kind transfers received by the poor, which becomes positive and significant. A positive coefficient on income is not consistent with altruism. I tried excluding food transfers from in-kind transfers and from total transfers received because, as mentioned before, food transfers might reflect an increase in government transfers experienced after 2000 by poor households in Mexico City[29] . In fact, Figure A3.1 in the appendix shows that poor households in Mexico City experienced a sharp increase in the fraction of in-kind transfers that they receive in food after 2002, compared to similar households in other cities. Figure A3.2 shows that this increase is due mostly to an increase in the government food transfers received by poor households in Mexico City in 2004. Private transfers in food received by poor households in and outside of Mexico City do not differ significantly in 2002 or 2004, as can be seen in Figure A3.3. After excluding food from in-kind transfers received, the income coefficient estimated by IV Tobit is still positive and significant, but smaller. The effect of income on total transfers received excluding food is negative, but not significant.

[29]The mayor of Mexico City decided to compensate poor households for the increase in the price of subsidized milk implemented by the federal government in 2001. In addition, I suspect that some elderly households in Mexico City might have reported the transfer from the program as a food transfer.

Table 3.5a also reports the results for the amount of transfers given by the household. For all urban households, the effect of income is positive without using instrumental variables and becomes negative and significant in the IV Tobit estimation. This result contradicts both altruism and exchange, since both motives predict a positive effect of the donor's income on the amount of transfers given. For poor households, properly instrumenting for income gives a larger positive and significant effect of this variable on the amount of transfers given by the household.

Table 3.5b reports the marginal effects of income on the probability of receiving or giving positive transfers. For the probit model without instrumenting for total income, the income effects on private transfers received are all negative and significant, and those on total transfers given are positive and significant, which is consistent with the predictions of the model. The marginal effects obtained from the IV Tobit estimation present mostly the same sign as those from the probit estimation, but they are larger in absolute value. This implies that an increase in income decreases the probability of receiving private transfers and raises the probability of giving a transfer by more than when the endogeneity of income is not controlled for. The transfer decision is more responsive to income once this variable is instrumented for. However, two results contradict the predictions of the model. For all urban households, instrumenting for total pre-transfer income gives a negative and significant coefficient for transfers given. For poor households, the income effect estimated with IV Tobit is positive and significant for the private in-kind transfers received

.

Table 3.5b: Transfer Decision. Marginal Effects of Income

	Probit	IV Tobit
All households		
In-kind transfers received	-5.8×10^{-7}	-3.3×10^{-5}
	(2.6×10^{-7})	(1.6×10^{-5})
Total cash transfers	-5.1×10^{-6}	-1.9×10^{-5}
	(2.7×10^{-7})	(1×10^{-5})
Total transfers received	-1.1×10^{-6}	-3.4×10^{-5}
	(2.6×10^{-7})	(1.2×10^{-5})
Total transfers given	6.6×10^{-6}	-1.1×10^{-5}
	(9.3×10^{-7})	(9.8×10^{-7})
Poor households		
In-kind transfers received	-4.3×10^{-5}	2.4×10^{-4}
	(1×10^{-5})	(1×10^{-5})
Domestic cash transfers	-1.2×10^{-4}	-1.3×10^{-4}
	(5.1×10^{-6})	(2×10^{-5})
Remittances	-1.4×10^{-5}	-4.3×10^{-5}
	(1.7×10^{-6})	(2×10^{-5})
Total cash transfers	-1.4×10^{-4}	-2.2×10^{-4}
	(1×10^{-5})	(2×10^{-5})
Total transfers received	-8×10^{-5}	4.7×10^{-5}
	(1×10^{-5})	(3×10^{-5})
In-kind transfers excluding food	-4.5×10^{-5}	1.4×10^{-4}
	(1×10^{-5})	(1×10^{-5})
Total transfers received excl.food	-9.8×10^{-5}	-7.7×10^{-5}
	(1×10^{-5})	(3×10^{-5})
Total transfers given	1.3×10^{-5}	1.5×10^{-4}
	(0.00)	(1×10^{-5})

Estimation: Maximum Likelihood. All estimations include state and year dummies. Standard errors, clustered at the state level, are in parentheses. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage. The table reports the marginal effect of household income before private transfers on the probability of receiving or giving positive transfers. The instruments for income in the IV Tobit are the interactions of a dummy for one or two elderly individuals in the household, a dummy for Mexico City and a dummy for the years after the program started. Household income and transfers are in real pesos per month. Nominal values were deflated using the Mexican Consumer Price Index (INPC).

The first-step coefficients of the instruments are presented in Table 3.6. Almost all the instruments have a positive and significant effect on household income without

private transfers, regardless of the sample used for estimation. Thus, the instruments are relevant to explain the endogenous variable and have a positive effect on it as would be expected. The only exception is the interaction of one elderly in the household with the Mexico City dummy and the dummy for 2004 in the income equation for all urban households, which presents a negative and significant coefficient.

Table 3.6: Instruments in First Step IV Tobit

Dependent Variable: Household Income Before Private Transfers

	All	Poor
One elderly×Mexico City×2002	802.52	190.16
	(130.05)	(49.72)
One elderly×Mexico City×2004	-654.17	339.19
	(265.19)	(29.41)
Two elderly×Mexico City×2002	2341.06	882.08
	(95.75)	(37.20)
Two elderly×Mexico City×2004	570.93	846.44
	(227.26)	(35.43)
Number of observations	32,232	8,060

Estimation: Maximum Likelihood. All estimations include state and year dummies. Standard errors, clustered at the state level, are in parentheses. Household income is in real pesos per month. Nominal values were deflated using the Mexican Consumer Price Index (INPC). Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage. An "elderly individual" is a person who is age 70 or older. The instruments are the interactions of a dummy for one or two elderly individuals in the household, a dummy for Mexico City and a dummy for the years after the program started.

The coefficient on pre-transfer income obtained by Tobit, with or without instrumental variables, does not by itself tell us the magnitude of the marginal effect. This magnitude is important to infer how much a government transfer program would crowd out private sources of support for the household. In addition, the altruistic model predicts that the marginal effect of an increase in household income should be negative and large

in absolute value. I calculate the marginal effects of income at the mean of the independent variables and also the following decomposition proposed by McDonald and Moffit (1980) for my instrumental variables Tobit estimates:

$$\frac{\partial E(T \mid X,Y)}{\partial Y} = \frac{\partial \Pr(T > 0 \mid X,Y)}{\partial Y} E(T \mid X,Y,T > 0 + \Pr(T > 0) \frac{\partial E(T \mid X,Y,T > 0)}{\partial Y}$$

The first term in the decomposition is the marginal effect of income on the probability of receiving positive transfers, weighted by the expected value of transfers if these are positive. The second term is the marginal effect of income on the amount of transfers received for those households receiving positive transfers weighted by the probability of transfers received being positive. Thus, the decomposition above provides information on how much of the total change in the expected value of transfers received comes from a change in the probability of receiving positive transfers and how much can be attributed to a change in the amount of transfers received conditioned on receiving positive transfers. I also calculate a similar expression for the private transfers given to other households.

Table 3.7a presents the relevant terms of the decomposition described above for private transfers received, for the sample of all urban households and for the poor. For the whole sample, the fifth column shows that an extra peso in income reduces in-kind transfers by 14 cents, cash transfers by 1.5 cents and total transfers by 28 cents for those already receiving transfers. The effect on total transfers is large relative to previous

findings for developed countries and it is comparable to magnitudes obtained by recent studies for some developing countries. The last column shows the effect on the unconditional expected value of transfers received. An additional peso of pre-transfer income reduces the expected value of in-kind transfers by 9.2 cents and 74% of this reduction comes from a decrease in the transfers received by those already receiving positive in-kind transfers. For cash transfers, the effect is negative but very small and mostly composed by a reduction in the probability of receiving such a transfer. The effect of an increase in income on the expected value of total transfers received is to decrease them by 18 cents and most of this effect can be attributed to a reduction in the amount of total transfers received for those households receiving transfers.

For poor households, a one peso increase in income raises the expected value of in-kind transfers conditioned on receiving positive transfers by 19 cents and the unconditional expectation by 35 cents. In contrast, a similar increase in income reduces domestic cash transfers by 36 cents and remittances by 52 cents for poor families receiving positive transfers. Total cash transfers are reduced by roughly 64 cents both for those above the limit and for all poor households, which constitutes a large negative effect. Most of the fall in cash transfers for these households comes from a decrease in the probability of receiving positive transfers rather than from a drop in the amount received if above the limit. For total transfers received the income effect is an increase of 16 cents. Excluding food from in-kind transfers results in a smaller positive income effect of 16 cents per additional peso. In this case, the marginal effect on total transfers is a reduction of 24 cents per additional peso of income for all poor households. The results for cash transfers received, which are measured more accurately than in-kind transfers

received in my data, suggests a large potential crowding out effect of public programs among the poor. They are also consistent with altruism, which predicts that the negative effect of recipient's income on transfers received should be close to 1 in absolute value. Most of the large negative effects on total transfers received by the poor are due to a reduction in the probability of receiving any transfers.

Table 3.7a: Marginal Effects of Income on Private Transfers Received

	Change in Pr (t>0)			Change in t for households with t>0			
	dPr(t>0)/dY	E(t|t>0)	dPr(t>0)/dY× E(t|t>0)	Pr(t>0)	dE(t|t>0)/dY	Pr(t>0) × dE(t|t>0)/dY	dE(t)/dY
All households							
In-kind	-0.000033	730.11	-0.024	0.480	-0.143	-0.068	-0.092
Total cash	-0.000019	1839.01	-0.034	0.150	-0.064	-0.010	-0.044
Total	-0.000034	1187.50	-0.040	0.520	-0.276	-0.144	-0.184
Poor households							
In-kind	0.000240	674.72	0.162	0.542	0.347	0.188	0.350
Domestic cash	-0.000130	1842.06	-0.239	0.270	-0.358	-0.097	-0.336
Remittances	-0.000043	2689.06	-0.116	0.049	-0.523	-0.025	-0.141
Total cash	-0.000220	2044.09	-0.450	0.307	-0.629	-0.193	-0.643
Total	0.000047	1587.39	0.075	0.626	0.133	0.083	0.158
In-kind w/o food	0.000140	671.62	0.094	0.453	0.175	0.079	0.173
Total w/o food	-0.000077	1652.81	-0.127	0.564	-0.199	-0.112	-0.240

Marginal effects calculated at the mean of the independent variables using the results of IV Tobit and the decomposition for Tobit models proposed by McDonald and Moffit (1980): dE(t|)/dY= dProb(t>0)/dY × E(t| t>0) + Prob(t>0) × dE(t|t>0)/dY. The marginal effect of income on the expected value of private transfers received is the sum of the marginal effect of income on the probability of receiving private transfers multiplied by the expected value of transfers conditioned on receiving positive transfers, and the marginal effect of income on the expected value of transfers for those households that receive positive transfers multiplied by the probability of receiving positive transfers. Households are classified as “poor” if their monthly income per adult is less than or equal to one monthly minimum wage.

Table 3.7b reports the decomposition of marginal effects for transfers given to other households. The negative effect of income on transfers given for the sample of all

urban household contradicts both altruism and exchange, but it is small in magnitude. According to my estimates, an increase in income would reduce the expected value of transfers given by 2 cents. For the poor, a one peso increase in income raises transfers given by 6 cents, and most of this effect is due to an increase in the probability of making a transfer.

Table 3.7b: Marginal Effects of Income on Private Transfers Given

	Change in Pr (t>0)			Change in t for households with t>0			
	dPr(t>0)/dY	E(t|t>0)	dPr(t>0)/dY× E(t|t>0)	Pr(t>0)	dE(t|t>0)/dY	Pr(t>0) × dE(t|t>0)/dY	dE(t)/dY
All households Total given	-0.000011	1091.161	-0.012	0.2148	-0.03776	-0.008	-0.020
Poor households Total given	0.0001538	300.44	0.046	0.08622	0.1419879	0.012	0.058

Marginal effects calculated at the mean of the independent variables using the results of IV Tobit and the decomposition for Tobit models proposed by McDonald and Moffit (1980): dE(t|)/dY= dProb(t>0)/dY × E(t| t>0) + Prob(t>0) × dE(t|t>0)/dY. The marginal effect of income on the expected value of private transfers given is the sum of the marginal effect of income on the probability of giving private transfers multiplied by the expected value of transfers conditioned on giving positive transfers, and the marginal effect of income on the expected value of transfers for those households that give positive transfers multiplied by the probability of giving positive transfers. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage.

Table 3.8 shows the income elasticities calculated at the means of pre-transfer income for the whole sample and for the poor. For all urban households, the income elasticity of total private transfers received is -0.33. For the poor the income elasticity of cash transfers is -0.72. For all urban households, the income elasticity of transfers given

is -0.13. As mentioned before, this negative elasticity contradicts both altruism and exchange. For the poor, the income elasticity of transfers given is 0.63.

Table 3.8: Income Elasticity of Private Transfers

	All households	Poor households
Transfers received		
In-kind transfers	-0.32	0.66
Domestic cash transfers	-	-0.45
Remittances	-	-0.52
Total cash transfers	-0.17	-0.72
Total transfers	-0.33	0.13
In-kind transfers excluding food	-	0.40
Total transfers excluding food	-	-0.21
Transfers given		
Total transfers	-0.13	0.63
Mean income before private transfers	8460	2463

Elasticities calculated at the mean of the independent variables using the results of IV Tobit. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage.

In summary, an increase in household pre-transfer income substantially decreases the private transfers received, which implies a large crowding out effect of government transfer programs on private support. What if individuals who lived in separate households before the program and used to transfer resources to the elderly are encouraged to move in with them a result of the program? As mentioned before, my data measure transfers that take place between different households, but not transfers occurring within the same household. If the program encourages individuals to move in with the elderly, then the large decrease in transfers I obtain could be due not to crowding out, but to the fact that I cannot observe whether the new residents in elderly households

continue to transfer resources to them while living in the same household. The same problem would affect my results if the elderly move in with other relatives after the policy change. In this case, I cannot observe transfers within the household, but I am also missing the fact that the elderly might be receiving an implicit transfer in the form of housing.

I approach this problem in two ways. First, in all my estimations I already controlled for household variables that would be affected if the program changed the living arrangements of the elderly, like the characteristics of the head, household size or the number of household members in different age groups. Second, I directly estimate the effect of the program on the living arrangements of individuals age 60 or older in urban households. As an additional check, I estimate the effect of individual pre-transfer income on the amount of private transfers received.

The sample for these checks has 9,792 individuals age 60 or older in urban areas. Of them, only individuals age 70 or older that live in Mexico City after 2001 are affected by the program. Individuals age 70 or older outside of Mexico City, and individuals 60-69 years old in or outside of Mexico City, act as a control group. For the living arrangements, I estimate a linear probability model of the probability of living alone[30] by ordinary least squares (OLS), and directly include the interactions of a dummy for being of age 70 or older with a dummy for residing Mexico City and a dummy for either 2002 or 2004, in the estimation. Alternatively, I instrumented for total individual income using the same interactions mentioned before and estimate the effect of income on the

[30] I define living alone if a person age 60 or older lives by herself, or with the spouse and no one else in the household.

probability of living alone with two-stage least squares (2SLS). In these estimations, I include other individual controls like years of schooling, a dummies for female and for married, dummies for being 65-69 years old and for being age 70 or older, and state and year dummies. The OLS results, not reported, show that being 70 or older in Mexico City after the program started has a positive, but not significant effect on the probability of living alone. In addition, the 2SLS show that individual income, instrumented with the interactions mentioned before, has a positive and not significant effect on the probability of living alone. I repeated these estimations separately for men and women, and for singles, since they might be more prone to change their living arrangements than married couples after a policy change, and got very similar results. Thus, I conclude that the large negative effect of income on private transfers that I obtain in this chapter is not due to a change in the living arrangements of the elderly.

As mentioned before, I also check whether the results from an individual level estimation are consistent with the household level estimation reported in Tables 3.4-3.8. In my data, I observe private cash transfers for individuals, but not in-kind transfers. However, and advantage of cash transfers is that they are presumably more accurately measured in these data. Table 3.9 shows the estimated income coefficients for domestic private cash transfers and for total cash transfers received by individuals. In these estimations, I control for the same individual characteristics included in the living arrangement estimations. The endogenous variable is individual non-labor income excluding private transfers received, and the instruments are interactions of a dummy for being age 70 or older, a dummy for living in Mexico City, and dummies for 2002 and 2004 alternatively. The results in Table 3.9 are very similar to those found for the

household level estimation. Without instrumenting for individual pre-transfer income, the Tobit coefficient is positive and significant, as in previous studies that do not control for the endogeneity of income, whereas the IV Tobit income coefficients are negative and significant. This implies that an increase in individual's income decreases private transfers received in cash, which confirms the crowding out result found for households.

Table 3.9: Individual Amount of Private Transfers Received.

Income Coefficients

	Tobit	IV Tobit
Domestic cash	0.022	-1.855
	(0.005)	(0.138)
Total cash	0.023	-2.507
	(0.005)	(0.182)
Number of observations	9792	9792

Estimation: Maximum Likelihood. Sample: Individuals age 60 or older. All estimations include state and year dummies. Standard errors, clustered at the state level, are in parentheses. The key endogenous variable is individual income before private transfers. The instruments are the interactions of a dummy for being age 70 or older, a dummy for Mexico City and a dummy for the years after the program started. Individual income and transfers are in real pesos per month. Nominal values were deflated using the Mexican Consumer Price Index (INPC).

Table 3.10 presents the marginal effects for the sample of individuals. An additional peso of individual income decreases domestic cash transfers by 57 cents, and total cash transfers by 81 cents for those individuals that receive positive transfers. These are very large negative effects. However, since approximately 15 percent of individuals report receiving positive cash transfers, the last column of Table 3.10 shows that the expected value of domestic cash transfers decreases by 15 cents per additional peso of

individual income, and the expected value of total cash transfers decreases by 20 cents per additional peso. Most of the negative effect comes from the decrease in cash transfers for those individuals who actually receive them. These effects are not so far from the effects estimated at the household level, thus confirming that private transfers decrease substantially with income and that government transfer programs can crowd out private support.

Table 3.10: Marginal Effects of Income on Individual Private Transfers Received

	Change in Pr (t>0)			Change in t for individuals with t>0			
	dPr(t>0)/dY	E(t|t>0)	dPr(t>0)/dY× E(t|t>0)	Pr(t>0)	dE(t|t>0)/dY	Pr(t>0) × dE(t|t>0)/dY	dE(t)/dY
Domestic cash	-0.00006	1187.9	-0.074	0.143	-0.573	-0.082	-0.156
Total cash	-0.00006	1254.9	-0.080	0.157	-0.809	-0.127	-0.207

Marginal effects calculated at the mean of the independent variables using the results of an IV Tobit on a sample of individuals age 60 and older. The table reports the decomposition for Tobit models proposed by McDonald and Moffit (1980): $dE(t|)/dY = dProb(t>0)/dY \times E(t|\ t>0) + Prob(t>0) \times dE(t|t>0)/dY$. The marginal effect of income on the expected value of private transfers received is the sum of the marginal effect of income on the probability of receiving private transfers multiplied by the expected value of transfers conditioned on receiving positive transfers, and the marginal effect of income on the expected value of transfers for those individuals that receive positive transfers multiplied by the probability of receiving positive transfers.

3.7. CONCLUSION

Understanding transfer behavior among households is important because private transfers can neutralize or reinforce government redistributive efforts depending on whether they are motivated by altruism or exchange. Previous evidence for the U.S. suggests that crowding out of private transfers by government programs is negligible and that altruism is not the primary motive for transfer behavior. Evidence for developing countries suggests larger negative effects. However, existing studies fail to account for

the endogeneity of household pre-transfer income, which could seriously bias their estimates. In this chapter, I address this endogeneity by using the exogenous variation in income caused by a public transfer program for the elderly that started in 2001 in Mexico City. I estimate an instrumental variables Tobit model on a sample of urban households and examine whether the effects are larger for the poor. In addition, I repeat the estimation for a sample of individuals to check if the results are consistent with the household level estimates.

The main finding of this chapter is that not controlling for the endogeneity of total income reproduces the results of previous work, i.e. the estimated coefficient of income on the transfer equation is either positive, or negative but small, for both the household and the individual level estimations. In contrast, my instrumental variables strategy yields large, negative and statistically significant income effects. For households, my preferred estimates imply that a one peso increase in household income leads to a decrease of 28 cents in total private transfers received by households already receiving transfers and a drop in 18 cents in the expected transfers received by all urban households. For all urban households, the reduction in total private transfers is mostly due to a decrease in the amount received by those households with positive transfers. The implied income elasticity of private transfers, conditioned on positive transfers received, is -0.33. For poor households, a one peso increase in income reduces cash private transfers received by 64 cents, implying an income elasticity of -0.72. Total transfers without food received by the poor decrease by 24 cents per additional peso of income. The reduction in private transfers received by the poor is mostly due to a decrease in the probability of receiving a transfer. These findings are consistent with the altruistic model and suggest a large

potential crowding out effect of public programs, particularly those targeted towards the poor. In addition, I show that these large negative income effects are not due to a change in the living arrangements of the elderly caused by the program.

In-kind transfers received by the poor from other households increase with income, which would be consistent with exchange but not with altruism. However, this positive effect becomes smaller after excluding food transfers, which possibly reflect an increase in government transfers for the poor in Mexico City after 2001. Total transfers given by the poor increase by 6 cents per additional peso of income and they decrease by 2 cents for the whole sample. For all urban households, the negative income effect on transfers given contradicts both motives for private transfers examined in this chapter, but it is small in magnitude.

For individuals, an additional peso of individual income decreases domestic cash transfers by 57 cents, and total cash transfers by 81 cents for those receiving positive transfers. The expected value of domestic cash transfers decreases by 15 cents per additional peso of individual income, and the expected value of total cash transfers decreases by 20 cents per additional peso.

The possibility of implementing a similar program for the elderly at the national level is currently being debated in Mexico. My results suggest that the extension of the program can have an important crowding-out effect on the cash private support received by poor households nationwide. As a consequence, the program would not be completely effective in increasing the incomes of the elderly, but could end up benefiting the donors of these households instead. For instance, my estimates for poor urban households imply that an additional peso of income reduces the remittances they receive from abroad by 14

cents. However, remittances could decrease more if rural elderly households are incorporated into the program, because these households receive an important fraction of their cash private transfers from the United States. Moreover, a survey carried out by the Mexican Central Bank reveals that the main recipients of remittances are the migrants' parents, who are more likely to be elderly. Thus, the burden of supporting the poor elderly in rural areas, which is currently borne in part by individuals working abroad, could be partially shifted towards the residents of Mexico as a result of the extension of the program.

Appendix

Table A1.1: Restricted OLS: Social Security Definition

Dependent Variable: Log (real wage)

	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Formal	0.285	0.004	0.158	0.005
Age	0.043	0.001	0.041	0.001
Age squared	-0.0004	0.00001	-0.0004	0.00001
Male	0.007	0.004	0.015	0.004
Married	0.109	0.004	0.096	0.004
6 to 10 workers	-	-	0.123	0.007
11 to 15 workers	-	-	0.176	0.009
16 to 50 workers	-	-	0.186	0.007
51 to 100 workers	-	-	0.190	0.009
101 to 250 workers	-	-	0.206	0.009
More than 250 workers	-	-	0.348	0.006
Literate but no formal schooling	0.057	0.023	0.046	0.023
Some elementary school	0.155	0.014	0.131	0.014
Elementary completed	0.301	0.014	0.262	0.013
Some secondary schooling	0.438	0.015	0.382	0.014
Secondary completed	0.459	0.014	0.399	0.014
Some high school	0.706	0.014	0.628	0.014
High school completed	0.699	0.015	0.617	0.015
Some college	0.865	0.015	0.775	0.015
College degree	1.331	0.014	1.222	0.014
Graduate	1.646	0.020	1.521	0.020
Mining	0.411	0.029	0.327	0.029
Manufacturing	0.189	0.017	0.123	0.017
Electricity, gas and water	0.314	0.022	0.190	0.021
Construction	0.136	0.018	0.133	0.018
Retail trade	-0.004	0.017	-0.018	0.017
Transportation	0.156	0.018	0.141	0.018
Finance	0.473	0.022	0.392	0.021
Services	0.232	0.017	0.170	0.017
Dummy for 2nd quarter 1996	-0.032	0.003	-0.032	0.003
Constant	0.728	0.025	0.759	0.025
Number of observations	111360		111360	

Table A1.2: Transitions between sectors. Social Security Definition

	Proportion	Observations
1st Q 1996 to 2nd Q 1996		
Formal to formal	0.62	34401
Formal to informal	0.07	3755
Informal to formal	0.07	3863
Informal to informal	0.25	13661
Total	1	55680
1st Q 1996 to 1st Q 1997		
Formal to formal	0.63	6776
Formal to informal	0.07	711
Informal to formal	0.09	1036
Informal to informal	0.21	2300
Total	1	10823

Proportions with respect to total sample size

Table A1.3: First-difference estimation. Social Security definition

	Coefficient	Robust S.E.
Formal to informal	-0.126	0.009
Informal to formal	0.077	0.009
Informal to informal	-0.036	0.005
DAge	0.024	0.013
DAge squared	-0.001	0.0002
DMarried	0.025	0.025
D6 to 10 workers	0.045	0.008
D11 to 15 workers	0.067	0.010
D16 to 50 workers	0.094	0.009
D51 to 100 workers	0.114	0.011
D101 to 250 workers	0.099	0.012
DMore than 250 workers	0.134	0.010
DLiterate but no formal schooling	0.067	0.072
DSome elementary school	0.065	0.085
DElementary completed	0.086	0.090
DSome secondary schooling	0.085	0.095
DSecondary completed	0.123	0.095
DSome high school	0.120	0.094
DHigh school completed	0.119	0.097
DSome college	0.159	0.098
DCollege degree	0.108	0.100
DGraduate	0.216	0.115
DMining	0.028	0.055
DManufacturing	0.010	0.034
DElectricity, gas and water	0.102	0.052
DConstruction	0.033	0.035
DRetail trade	-0.034	0.034
DTransportation	0.024	0.038
DFinance	0.084	0.046
DServices	0.028	0.034
Number of observations	55380	

Table A3.1: In-Kind Transfers Received by Consumption Category

	All	Poor
Food	0.08	0.11
Alcohol	0.004	0.001
Food outside the home	0.39	0.33
Tobacco	0.00	0.00
Subsidized food	0.00	0.00
Public transportation	0.03	0.02
Household cleaning supplies and services	0.01	0.01
Personal Care	0.02	0.02
Education	0.07	0.07
Child care	0.001	0.001
Entertainment	0.01	0.01
Housing and utilities	0.03	0.06
Clothing	0.06	0.06
Furniture and household appliances	0.005	0.004
Health care	0.15	0.19
Home improvement	0.02	0.02
Electronics	0.01	0.01
Transportation	0.04	0.03
Other	0.08	0.04

Source: Author's calculations using a nationally representative sample of urban households from the National Income and Expenditure Survey for Mexico (ENIGH), for the years 1996, 1998, 2000, 2002 and 2004. The table reports the proportion that in-kind transfers received in each consumption category represent in total in-kind transfers received by the household. Households are classified as "poor" if their monthly income per adult is less than or equal to one monthly minimum wage.

Table A3.2: In-kind Transfers by Source in 2002

	Government	Other Households
Food	0.05	0.93
Alcohol	0.01	0.99
Food outside the home	0.02	0.98
Tobacco	0.00	1.00
Subsidized food	0.00	0.00
Public transportation	0.00	0.00
Household cleaning supplies and services	0.01	0.97
Personal Care	0.01	0.98
Education	0.18	0.63
Child care	0.02	0.98
Entertainment	0.21	0.76
Housing and utilities	0.03	0.95
Clothing	0.00	0.99
Furniture and household appliances	0.01	0.99
Health care	0.61	0.32
Home improvement	0.10	0.89
Electronics	0.01	0.98
Transportation	0.17	0.78
Other	0.02	0.97
Total	0.11	0.82

Source: Author's calculations using a nationally representative sample of urban households from the National Income and Expenditure Survey for Mexico (ENIGH), for 2002. The table reports the fraction of in-kind transfers in each consumption category that come from the government or from other households. The remaining 7 percent of total in-kind transfers received comes from employers and private institutions.

Figure A3.1: Fraction of In-kind Transfers Received in Food. Poor Households

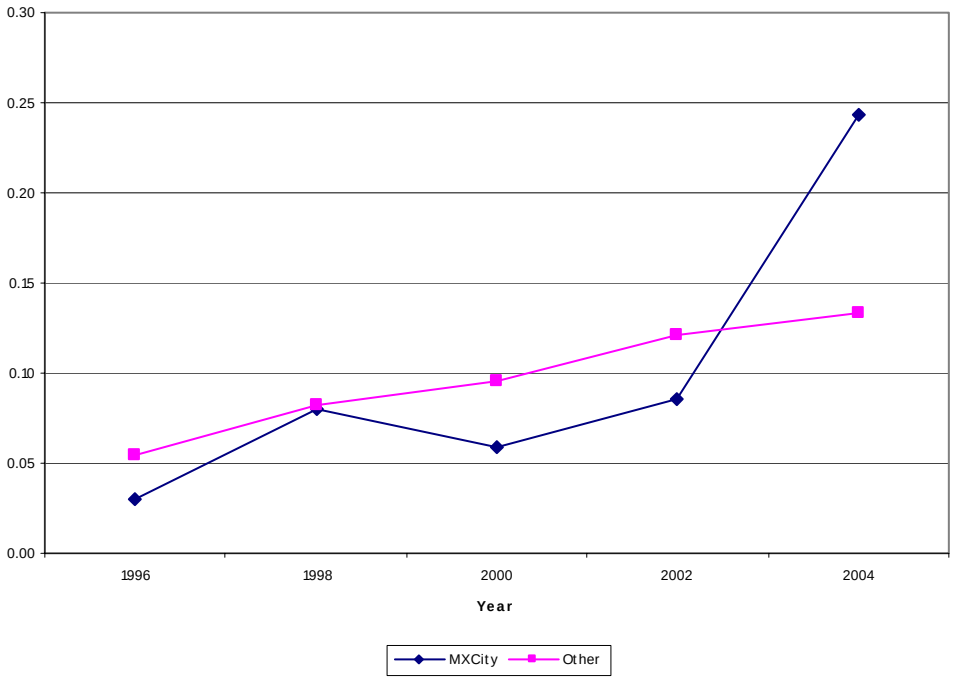


Figure A3.2: Average Government Food Transfers. Poor Households

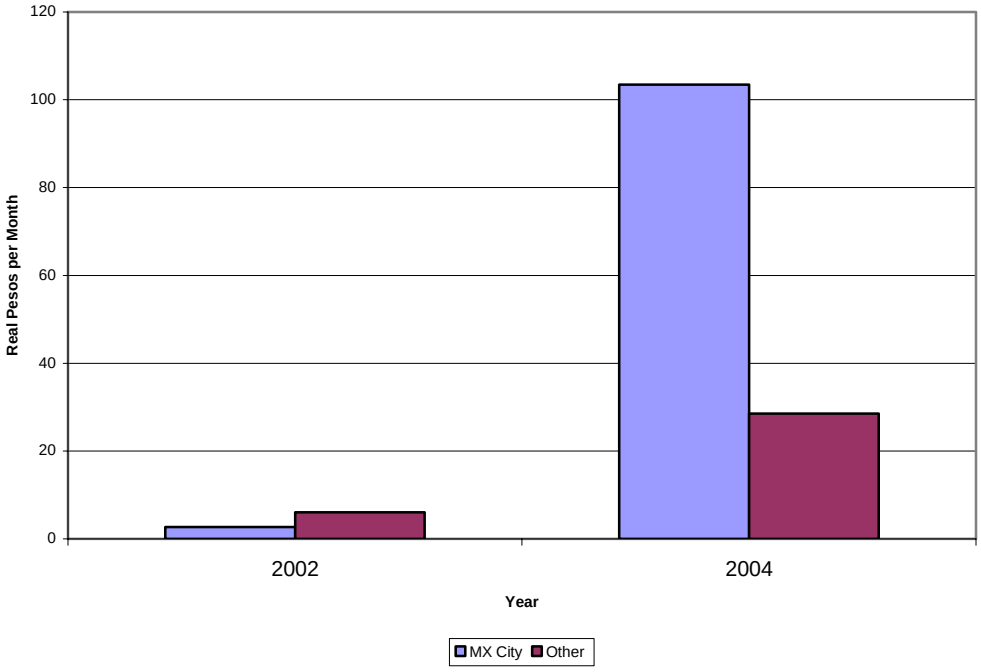
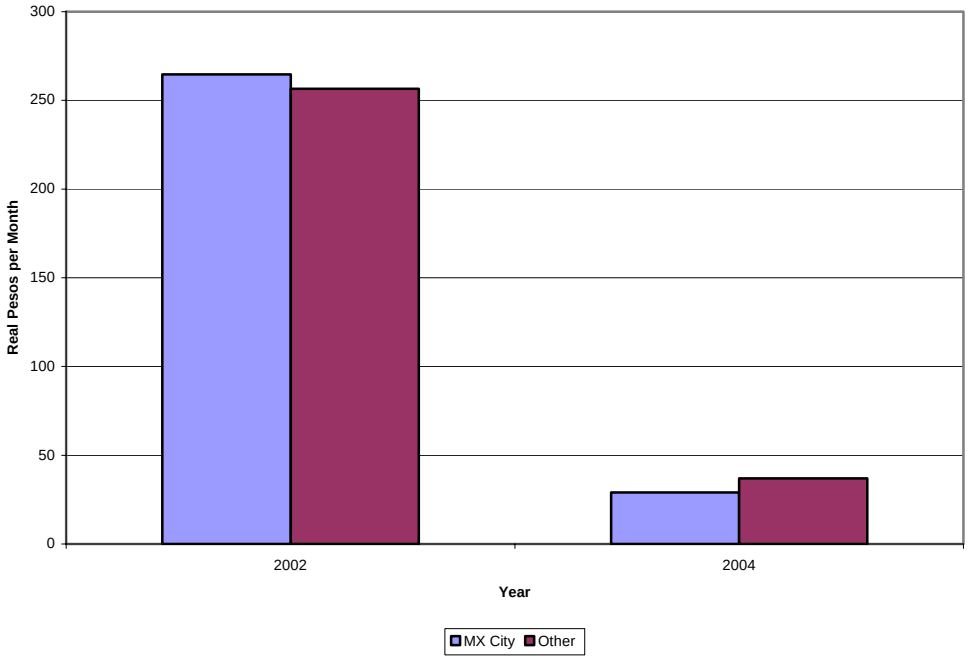


Figure A3.2: Average Private Food Transfers. Poor Households



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