# Online Appendix: Are Cash Transfers Effective at Empowering Mothers? A Structural Evaluation of Mexico's *Oportunidades*

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## 1 Data Preparation

Given that the focus of this paper is on the urban component of the Oportunidades program, I obtain the data from the PROSPERA External Evaluation datasets provided by the program's administration. Particularly, I focus on the sociodemographic module of the Urban Evaluation Surveys (ENCELURB) to obtain information regarding household consumption, asset value, income and intra-household time allocation decisions for the period of time comprised by 2002-2004. This section provides a description of the ENCELURB and the relevant information exploited for the estimation of the different characterizations of the collective household model.

The ENCELURB data was gathered in three waves. The first wave captured baseline information and was gathered in the fall of 2002, once beneficiary households had been determined but prior to the provision of any benefits. The second wave captured the first follow up information, being gathered in the fall of 2003. The third wave captured the second follow up information, being gathered during the fall of 2004. The data structure of the files provided for each of the waves is very similar across waves, with a few differences in the follow up files. There is some additional data collected in the follow up surveys that was not collected at baseline. On the other hand, there is some data that was collected at baseline but that was not collected in the following survey years.

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The following subsections describe how I build upon the data that is available across all waves of the ENCELURB to create the relevant variables used in the estimation of the model.

## 1.1 Sample Construction

For the construction of the subsample of two-parent households, this paper focuses on households in which there are no more than two adults in the households, namely the mother and the father, with any number of children younger than 25.[1] Identification of the parents used the variables pertaining individuals' relationship to head, marital status and a person's spouse, mother and father identifiers. By cross-checking each adults' spouse identifier, it is possible to double check that both adults are living maritally; cross-checking the children's mother and father identifier helps ensure that the two adults in the household are indeed their parents. Observations in which there are inconsistencies for one wave regarding a person's relationship to head and spouse id were first checked with other waves. From an original sample of 76,002 individual observations in 2002, this restriction further reduces the sample to 40,375 individual observations corresponding to 8,216 household observations. The further restriction of ensuring the stability of these household's structure across all waves combined with the restriction that the household's original 2002 poverty classification is non-missing further reduces the sample size to 5,023 households observed throughout 2002-2004, corresponding to 25,576 individual observations.[2] As this paper focuses on the use of *Oportunidades* as a distribution factor, this paper focuses on the subsample of these households that are eligible to the program, or originally classified as poor in 2002. Therefore, the final subsample used in the analysis implemented in this paper consists of 3,288 poor households.

For the construction of the subsample of single parent households, this paper focuses on households in which there is only the mother and her children without any other adult living in the household. The focus on single mothers stems from the gendered nature of the program's targeting which does not allow for the subsample of single fathers

[1]This age restriction is based on the ages specified in the 2002 ENCELURB questionnaire of the target respondents of the education component of the sociodemographic module. It also makes sense since at this point, individuals are expected to have completed at least their undergraduate studies, and no further significant investments in education are expected from the parents.

[2]The poverty classification used in the empirical strategy is obtained from the 2002 wave *cla_soc* variable which was constructed at the baseline ENCELURB wave and is based on the more detailed mix of observational and self-reported information collected in this survey than the one provided in the *tamizaje*, or *screening* dataset constructed based on the self-reported responses provided by the households.

living with no other adult in the household to be too small for the analysis implemented in this paper. Furthermore, given the intended use of the single parent households' analysis as a way to obtain further information on a potential empowerment effect behind mothers' results in two parent households, this does not constitute a significant problem. The aforementioned restriction and the requirement of observing these single parents across the three waves of the evaluation survey reduces this subsample to 1,870 households. In order to be consistent with the restriction imposed in the two parent households subsample, this paper focuses on single mother households that are classified as poor, or eligible, by the program administration. This further reduces the subsample to 1,288 poor single mother households.

## 1.2 Variable Construction

### 1.2.1 Time Use

Following Aguiar and Hurst (2007) four main time use categories are analyzed in this paper. The major time-use groups mapped to the information provided in the ENCELURB. The main categories of time use of interest include the following: (1) market work, which includes primary job work hours and secondary job work hours; (2) core household production, which includes food preparation, household care (doing laundry, dusting, ironing, doing dishes, vacuuming and maintenance), trash disposal and carrying water; (3) procurement of goods and services, which includes shopping for household items; and (4) child care hours. The level of disaggregation of the time use data provided in the ENCELURB permits the construction of a richer definition of leisure, such that $L_2^i = \bar{T} - h_M^i - h_D^i - h_K^i$, where $h_M^i$ refers to weekly market hours, $h_D^i$ to weekly total home production hours (where total home production includes core household production activities and time spent on the procurement of goods and services for the household), and $h_K^i$ to weekly child care hours.[3] Moreover, it is possible to annualize these weekly measures by multiplying these hours by 52. Thus, following Aguiar and Hurst

[3]The reference period used for inquiring about the time allocation across different categories is of a week. That is, the interviewer asks how many hours each individual household member typically devoted to each of the categories per week. A further consistency check consisted on making sure that the definition of core home production, and therefore, total home production remained homogeneous throughout the three waves. Beginning on 2003 and 2004, there were also weekly hours devoted to the care of elderly and sick people but this was not collected in the 2002 wave of the survey. Therefore, this was not included in the definition of home production as its inclusion would implicitly assign a 0 to the 2002 wave. This imposition does not suppose a major problem as a 98% of the final sample reports having devoted 0 hours to this activity.

(2007), I define three major time-use categories according to the information provided in the ENCELURB: market work, leisure and home production. For the sake of keeping the model simple with one aggregate home production technology, I aggregate the subcategories of core home production, procurement of goods and services and child care hours to obtain a measure of home production in this paper.

### 1.2.2 Transfer Receipt and Program Participation Indicator

The *Oportunidades* program provides administrative data on monetary transfers made to beneficiary households. Since these are made bi-monthly, there is information on the amount provided to the household throughout 2003, the year in which the newly-incorporated beneficiary households from the urban implementation must have started receiving the program's benefits. It is assumed that if a household is not part of this dataset, then it has never been a beneficiary for the period spanned by the file which covers up to 2012 when it was last updated. While a non-participant household can still appear in the data set. Thus, the *transfer* variable used to indicate the participation status of a particular household is based on whether or not there was a transfer made to that household in any of the six bimesters for 2003. To avoid any potential problems of inconsistencies with this data, this information is supplemented with the household's poverty classification provided in the ENCELURB by merging the two files on each household's identifier. Thus, the treatment indicator used in this paper's empirical analysis, $d_i$, is defined such that it is set at one if we observe a transfer being made to individual $i$'s household which is deemed as poor by the program administration and zero otherwise.

While the socioeconomic dataset of 2002 contains a variable called *incorp* that captures the program incorporation status of each household as of 2002, **?**, suggest the use of this official administrative data on transfers made to participant households to construct an own indicator of program incorporation. While there are some differences in the distribution of households across treatment and control groups under both definitions, these differences are not significant as the two variables provide the same treatment classification of a household approximately 97.5% of the times in the final estimation sample.

### 1.2.3 Consumption Variables

For the part of the model that deals with the consumption of private and public goods within the household, the goal is to exploit the detailed consumption data contained in the ENCELURB to construct the components of the following Hicksian composite good as described in Blundell, Chiappori and Meghir (2005)

$$C = \underbrace{q^A + q^B}_{=q} + Q$$

At the household level, the ENCELURB contains information on the expenditures incurred by the household on 38 food-related consumption items for which they use a one-week reference period (among these, I have the amount the household spent not only on vegetables and other forms of food to prepare meals at home, but also the amount of money spent by the household on meals outside of home). Furthermore, I also have information on the expenditures incurred by the household on personal hygiene items (for adults and for children, separately), home cleaning supplies, fuels, personal services, rent, and recreation and entertainment.

Given the detailed consumption data provided in these datasets, I construct a measure of $Q$ and $q$ for each household. For constructing $Q$, I focus on capturing two main types of consumption items: public expenditures on children and public expenditures on household goods and services. Among public expenditures on children, I include household expenditures on children clothing and footwear, school tuition and supplies, personal hygiene items for infants, and toys. Among public expenditures on household goods and services, I include household expenditures on home cleaning supplies, fuels, rent, home appliances, home furniture, home improvement expenses, and utensils and other home items.

On the other hand, to construct $q$, I use information on the household expenditures on food, meals outside of home, non-school related transportation costs, lighters and cigarettes, newspapers and magazines, candles, personal hygiene items, personal services, recreation and entertainment (movies, nightclubs among others), adult clothing and footwear, other expenses (jewelry, insurance, vacations and/or lotteries) and medical expenses (such as doctor appointments, lab tests, birth control).

**A Note on Assignable Consumption: Information Both at the Household and Individual Level**

There are a few types of consumption that are assignable to particular types of household members or particular household members. However, data on some assignable goods is exclusive to 2004 but not available in the previous two waves. For all three waves, it is possible to distinguish expenditures on children's clothing and footwear from expenditures on adult's clothing and footwear. For the 2004 wave, there is a further distinction based on gender in terms of expenditures on clothing. This would allow for the use of clothing as an assignable good in the in an approach similar to the one implemented by Tommasi (2019) and Calvi (2020) do. Nonetheless, within the urban context I are focusing on, it is highly unlikely that the availability of such information for prior years would aid my estimation approach in a significant way since these consumption categories do not constitute a significant share of the household's budget as together, these constitute less than 1% of households' expenditures.

### 1.2.4 Income Variables: Combining the ENCELURB and the Program's Administrative Data on Bi-Monthly Disbursements to Beneficiaries

For labor market earnings, I have information reported by the individual household members who worked in the market during the 12 months prior to the interview. The questionnaire captures information on the monetary value of the earnings of each market worker and then captures the periodicity with which the household member was paid, the weekly hours worked by the individual in that job and how many months and weeks that person worked during the past 12 months. This allows me to construct a wage based on the information captured in the questionnaire. However, besides the earnings, workers could have also earned a bonus that is typically paid every 6 months (known as the aguinaldo). The wage rate used in the model accounts for both the hourly/monthly/biweekly/yearly earnings reported for each individual household member but it also incorporates the aguinaldo reported, in case s/he reports having received one.

For non-labor income, I use information available in the ENCELURB related to individual savings and other forms of non-labor income reported at the level of the individual respondent including inheritances, alimony and lottery winnings. In addition to the individual savings information provided in the ENCELURB, it is possible to obtain an additional measure of assignable nonlabor income using the amount provided by *Oportunidades* to beneficiary households under the targeting of the program that places the transfer in the hands of the household's female head. The program administration separately provides a dataset containing information on the transfers made to beneficiary households all the way to 2010. Given that I focus for the time period comprised by 2002 and 2004, I use information of transfers made to the household during the 4 quarters prior to the 4th quarter of the year of interview. This approach then attempts to use these quarters as retrospective information of the amount of money they have received from the program during the year prior to the time they are being interviewed which is the reference period the questionnaire of the ENCELURB captures for most income sources they ask about.

In addition to the types of non-labor income discussed so far, the sociodemographic module of the ENCELURB also contains highly detailed information on the asset ownership of the respondent. Besides asset ownership, the questionnaire also captures the estimated monetary value of the asset[4]. There are 16 assets that are accounted for in the questionnaire, including land, motor vehicles, electric appliances of numerous types (boiler, washer, dryer, radio, television, refrigerator, electric stove, among others) and animals for agricultural work. Since the model is not set within an inter-temporal setting, I do not keep track of assets separately and use it as a component of the aggregate household non-labor income included in the budget constraint of the model.

### 1.2.5 Bargaining Power Proxies

The sociodemographic module of the 2002 survey contains some questions related to the decision making structure of the surveyed households. There are five main questions that captures this information. The relevant variables encode the responses to the following questions

- Who decides when to take a sick child to the doctor?
- Who decides whether a child has to attend school even if the child does not want to go
- Who decides whether to make an expenditure related to children clothing and/or footwear.
- Who decides on important issues that affect all household members? (i.e. moving to a new house, changing jobs, among others)
- When there is additional income in the household, does the recipient of this extra income get to decide how to spend it?

[4] The question that captures this information asks the following: "If you had to sell this item, how much money do you think you can ask for it?"

Typically, the responses to this type of questions are used to construct indices of decision-making power that can be used to establish an empirical relationship between bargaining power and development policies. While this is not the focus of this paper, I use these to generate a set of initial guesses for the parameters of the Pareto weight within the structural estimation implemented in the paper.

## 1.3 Supplemental State-Level Data

I use data from the country's 2000 census to compute age-specific sex ratios at the state level. For this, I define 4 different age groups: 15-25, 26-35, 35-45, and 46 and older. I take the proportion of men and women in each age group at a particular state. Upon generating a data file containing these counts and proportions at the level of the state, I can then merge it with the ENCELURB files using the information available on the surveyed households' geographical location. Then, based on the age match of the couple in a two-parent household, I construct the sex ratio specific to that age match by dividing the proportion of women of the wife's age group in the state where the couple resides by the proportion of men of the husband's age group in that state.

## 2 Inclusion of Non-Poor Households in Estimation

Table 1 presents the summary statistics obtained from the updated sample. Comparing this with the estimation sample used in the paper, we can observe that the inclusion of poor households has lead to an increase of more than 400 two-parent households, 500 single-mother households and 100 single-father households. We can also corroborate that overall, average and median expenditures, income and earnings is relatively higher within this updated sample than within the sample used so far which is consistent with the inclusion of relatively richer households of working parents. Similarly, the gender specialization patterns observed within eligible households remain when expanding the sample to include their non-poor counterparts with women spending significantly more yearly hours, on average, in housework relative to men and significantly less time working in the market relative to men. Furthermore, among two-parent and single-mother households, more than 60% of the sample is poor/eligible while this is 53% among single-father households.

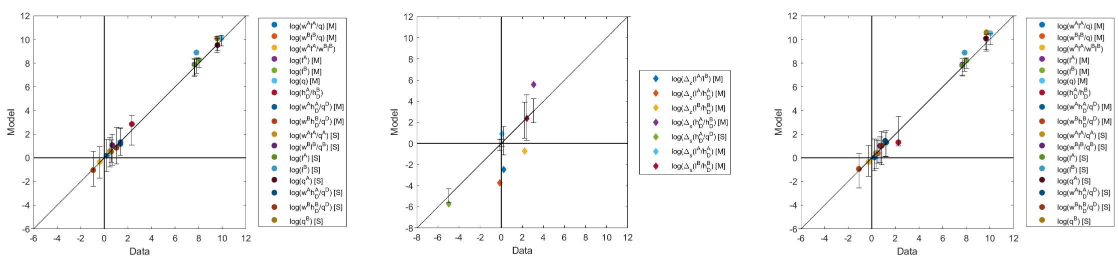
Table 1: Descriptive Statistics, Eligible and Non-Eligible Households

| | | *Two Parent* | | | *Single Mother* | | | *Single Father* | |
|---|---|---|---|---|---|---|---|---|---|
| | **Obs** | **Mean** | **Median** | **Obs** | **Mean** | **Median** | **Obs** | **Mean** | **Median** |
| *Household Characteristics:* | | | | | | | | | |
| Household Size | 1,071 | 4.88 | 5.00 | 1,354 | 3.61 | 3.00 | 240 | 1.89 | 1.00 |
| Number of children | 1,071 | 2.77 | 3.00 | 1,354 | 2.41 | 2.00 | 240 | 1.82 | 1.00 |
| Mean Age of Children in Household | 1,063 | 9.05 | 9.00 | 1,232 | 10.80 | 11.00 | 97 | 13.02 | 13.50 |
| Poor/Eligible | 1,071 | 0.62 | 1.00 | 1,354 | 0.63 | 1.00 | 240 | 0.53 | 1.00 |
| *Household Consumption:* | | | | | | | | | |
| Public Expenditures, Yearly | 1,071 | 7,943.18 | 6,750.21 | 1,354 | 5,808.47 | 5,018.80 | 240 | 3,707.31 | 2,960.97 |
| Private Consumption | 1,071 | 23,591.29 | 21,716.15 | 1,354 | 17,119.69 | 15,392.14 | 240 | 18,755.47 | 16,108.00 |
| Food Expenditures | 1,071 | 18,280.31 | 16,900.00 | 1,354 | 13,785.61 | 12,610.00 | 240 | 11,132.55 | 9,672.00 |
| *Income* | | | | | | | | | |
| Total Household Nonlabor Income | 1,071 | 8,470.64 | 4,950.00 | 1,354 | 7,298.07 | 3,472.04 | 240 | 4,607.19 | 1,822.36 |
| Wife's Share | 1,071 | 0.32 | 0.10 | 0 | . | . | 0 | . | . |
| Total Household Earnings | 1,071 | 41,556.10 | 37,303.84 | 1,354 | 17,201.25 | 14,921.53 | 240 | 26,645.05 | 24,869.22 |
| *Parental Characteristics:* | | | | | | | | | |
| Age, Mother | 1,071 | 33.80 | 33.00 | 1,354 | 39.33 | 38.00 | 0 | . | . |
| Age, Father | 1,071 | 37.24 | 36.00 | 0 | . | . | 240 | 47.05 | 46.00 |
| Years of Education, Mother | 1,071 | 6.68 | 6.00 | 1,354 | 5.83 | 6.00 | 0 | . | . |
| Years of Education, Father | 1,071 | 7.24 | 6.00 | 0 | . | . | 240 | 5.82 | 6.00 |
| Market Work Hours, Mother | 1,071 | 1,124.91 | 780.00 | 1,354 | 1,564.70 | 1,560.00 | 0 | . | . |
| Market Work Hours, Father | 1,071 | 2,249.71 | 2,496.00 | 0 | . | . | 240 | 2,165.12 | 2,496.00 |
| Child Care Hours, Mother | 1,071 | 522.31 | 364.00 | 1,354 | 315.44 | 52.00 | 0 | . | . |
| Child Care Hours, Father | 1,071 | 130.56 | 0.00 | 0 | . | . | 240 | 47.99 | 0.00 |
| Home Production Hours, Mother | 1,071 | 1,669.97 | 1,638.00 | 1,354 | 1,421.45 | 1,352.00 | 0 | . | . |
| Home Production Hours, Father | 1,071 | 220.48 | 130.00 | 0 | . | . | 240 | 723.02 | 676.00 |
| Real Wage, Mother | 1,071 | 18.54 | 10.79 | 1,354 | 14.97 | 9.58 | 0 | . | . |
| Real Wage, Father | 1,071 | 15.38 | 11.65 | 0 | . | . | 240 | 15.78 | 11.34 |

## 2.1 Model Fit by Specifications Used

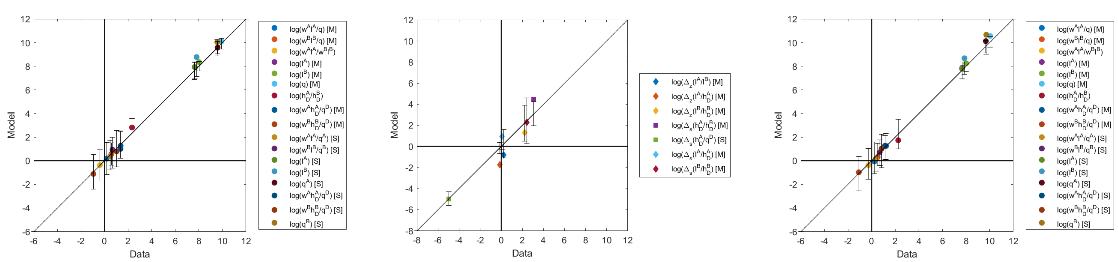
We use the same set of moment conditions used in the Estimation section of the paper. More specifically, we define the theoretical moments for both poor and non-poor households, but define the experimental moments described in only for poor, eligible households. Figure 1 - Figure 4 present the model fit checks implemented for each of the four specifications considered. For the experimental moments, there is a further distinction between those that are untargeted in each specification (represented by diamonds) and those that were targeted (represented by squares) in each of the specifications considered.

Figure 1: Model Fit Specification 1




Poor Households' Theoretical Moments | Poor Households' Theoretical Moments | Non-Poor Households' Theoretical Moments

Figure 2: Model Fit Specification 2

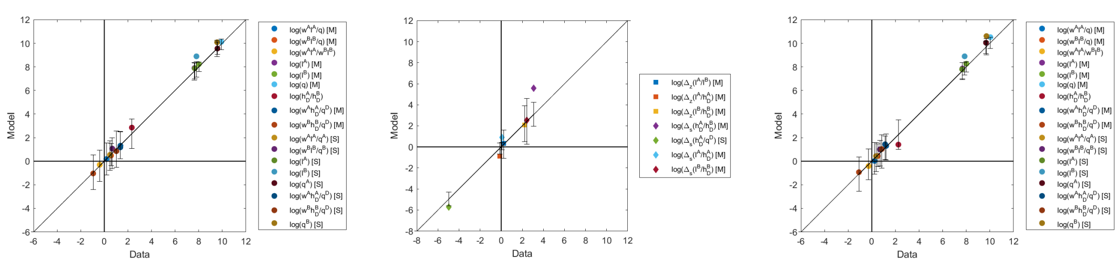



Poor Households' Theoretical Moments | Poor Households' Experimental Moments | Non-Poor Households' Theoretical Moments

As discussed in the results presented in the Estimation section, all specifications seem to be fitting the theoretical moments relatively well. The only theoretical moments that seem to be off are the ones related to single-father households for both poor and non-poor. However, this might be expected given that these households represent a relatively small share of the estimation sample so that most of the estimation related to fathers' preferences might be driven by the sample of married fathers for which we have information from a larger number of households. Overall, the model seems to be over-predicting single fathers' leisure hours and private market consumption.

The model hits the experimental moments related to the effect of *Oportunidades* on the leisure-to-home time ratios of both fathers and mothers through the effect on the production shifter (number of children attending school) despite the fact that these remain untargeted in all of the specifications. However, specifications 1 and 2 fail to fit the experimental moments related to the effect of *Oportunidades* on the spouses' leisure ratio, and their individual leisure-to-home time ratios through the program's effect on the distribution factor $z^A$ (i.e. the mothers' share of non-labor income). Both specifications 3 and 4 target these remaining experimental moments, improving the model fit of these moments even though the model seems to be slightly under-predicting the effect of the program on mothers' leisure-to-home time ratio through its effect on $z^A$. Nonetheless, this constitutes a better fit than the one yielded by specifications 1 and 2. As observed in the estimation of the model over the smaller sample of poor households, a significant difference in the results obtained from specifications that leave these moments untargeted and these that target them is that we obtain a coefficient for $z^A$ in the Pareto weight that is higher in the specifications in which these moments are targeted.

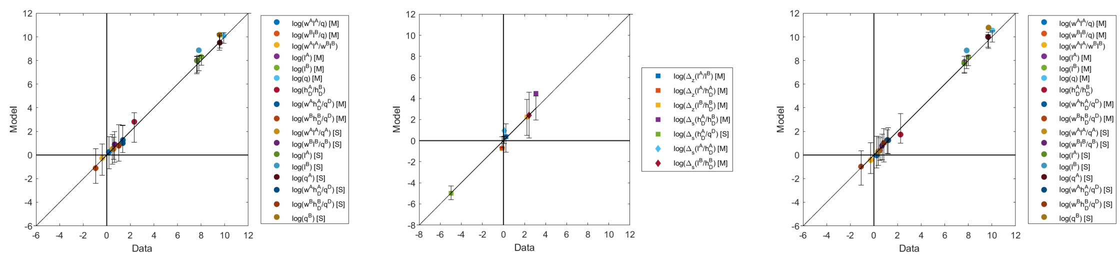
Figure 3: Model Fit Specification 3




Poor Households' Theoretical Moments | Poor Households' Experimental Moments | Non-Poor Households' Theoretical Moments

Regarding the moments related to the program's impact on the domestic input ratios through the effect on the production shifter for both two-parent and single-parent households, we can see that specifications that target the experimental moment for single-parent households fit this moment better. On the other hand, the model fit of

Figure 4: Model Fit Specification 4




Poor Households' Theoretical Moments

Poor Households' Experimental Moments

Non-Poor Households' Theoretical Moments

this experimental moment improves once we target it in estimation, but it is still left slightly over-predicted by the estimates obtained for specifications 2 and 4. Simultaneously, these specifications seem to fit the theoretical moment related to spouses' home time ratios among non-poor households relatively better.

Overall, we find that the specifications that target the experimental moments related to the impact of *Oportunidades* on spouses' time use ratios through its effect on the distribution factor do a relatively better job at fitting the data than the specifications that leave these moments untargeted. In order to exploit the use of the exogenous variation of the program in both steps of the GMM estimator implemented, we choose the fourth specification to carry out the identification of poor mothers within non-poor households and the evaluation of the program's impact on intrahousehold bargaining and individual welfare.

## 2.2 Results

Table 2 presents the estimates and computed standard errors obtained for specifications 1-4 using an optimal weight matrix. Given the slight difference between the results obtained from the estimation of the model on the sub-sample poor households and those obtained from the estimation of the model on the larger sample including non-poor households now, the interpretation of the results in Table 2 is similar to the one discussed in the paper. The key point of departure with the results obtained from the estimation without the non-poor households can be found in the estimate obtained for the coefficient related to the production shifter for two-parent households as its magnitude increased upon the inclusion of non-poor households in the estimation of the model.

Table 2: Structural Estimation Results, Model with Home Production

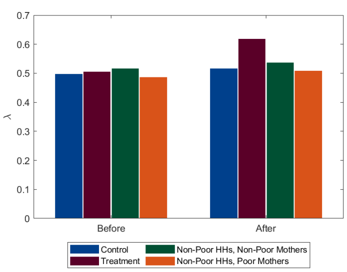
| | (1) | | (2) | | (3) | | (4) | |
|---|---|---|---|---|---|---|---|---|
| | **Estimate** | **SE** | **Estimate** | **SE** | **Estimate** | **SE** | **Estimate** | **SE** |
| *Home Production Parameters, Two-Parent HHs:* | | | | | | | | |
| $\gamma$ | 0.9106 | 0.0003 | 0.8468 | 0.0151 | 0.9106 | 0.0003 | 0.8468 | 0.0151 |
| $\rho$ | 0.8114 | 7.0477E-05 | 0.8028 | 0.0014 | 0.8114 | 7.0477E-05 | 0.8028 | 0.0014 |
| $\psi_2$ [$n_s$] | 0.1158 | 8.7694E-06 | 0.2033 | 0.0026 | 0.1158 | 8.7694E-06 | 0.2033 | 0.0026 |
| Sample mean $\psi(\mathbf{S})$ = | 0.5449 | | 0.5775 | | 0.5449 | | 0.5775 | |
| *Home Production Parameters, Single-Mother HHs:* | | | | | | | | |
| $\beta$ | -1.1820 | 0.0019 | -1.0750 | 0.0007 | -1.1820 | 0.0019 | -1.0750 | 0.0007 |
| $\phi_2$ [$n_s$] | -0.0322 | 0.0012 | -0.0647 | 8.8636E-05 | -0.0322 | 0.0012 | -0.0647 | 8.8636E-05 |
| Sample mean $\phi(\mathbf{S})$ = | 0.4874 | | 0.4748 | | 0.4874 | | 0.4748 | |
| *Home Production Parameters, Single-Father HHs:* | | | | | | | | |
| $\beta$ | -0.6173 | 0.0030 | -0.6564 | 0.0004 | -0.6173 | 0.0030 | -0.6564 | 0.0004 |
| $\phi_2$ [$n_s$] | -0.0363 | 0.0006 | -0.2254 | 0.0005 | -0.0363 | 0.0006 | -0.2254 | 0.0005 |
| Sample mean $\phi(\mathbf{S})$ = | 0.4858 | | 0.4146 | | 0.4858 | | 0.4146 | |
| *Wife's Preference for Leisure Parameters:* | | | | | | | | |
| $\alpha_{1,1}^A$ [Constant] | -0.0685 | 0.0093 | -0.2083 | 0.0022 | 0.0521 | 0.0275 | 0.1031 | 0.0008 |
| $\alpha_{1,2}^A$ [Age] | 0.0113 | 0.3312 | 0.0101 | 0.0833 | 0.0090 | 0.9405 | 0.0003 | 0.0297 |
| $\alpha_{1,3}^A$ [Education] | -0.0032 | 0.0593 | -0.0004 | 0.0139 | -0.0132 | 0.1833 | -0.0045 | 0.0054 |
| $\alpha_{1,4}^A$ [Number of Children] | -0.0651 | 0.0246 | 0.0048 | 0.0058 | -0.0537 | 0.0756 | 0.0582 | 0.0022 |
| Sample mean $\alpha_1^A(\mathbf{X})$ = | 0.4082 | | 0.3926 | | 0.4095 | | 0.4189 | |
| *Wife's Preference for Private Consumption Parameters:* | | | | | | | | |
| $\alpha_{2,1}^A$ [Constant] | -3.1301 | 0.0080 | -3.0044 | 0.0028 | -1.7549 | 0.0092 | -1.7784 | 0.0007 |
| $\alpha_{2,2}^A$ [Age] | 0.0666 | 0.3001 | 0.0682 | 0.1034 | 0.0401 | 0.3222 | 0.0419 | 0.0258 |
| $\alpha_{2,3}^A$ [Education] | 0.0301 | 0.0484 | 0.0259 | 0.0169 | -0.0035 | 0.0618 | -0.0016 | 0.0042 |
| $\alpha_{2,4}^A$ [Number of Children] | 0.0136 | 0.0204 | 0.0247 | 0.0072 | -0.0416 | 0.0257 | -0.0267 | 0.0018 |
| Sample mean $\alpha_2^A(\mathbf{X})$ = | 0.2385 | | 0.2718 | | 0.2392 | | 0.2516 | |
| *Husband's Preference for Leisure Parameters:* | | | | | | | | |
| $\alpha_{1,1}^B$ [Constant] | 3.1902 | 0.0058 | 2.7511 | 0.0005 | 3.7946 | 0.0095 | 3.3035 | 4.60071E-05 |
| $\alpha_{1,2}^B$ [Age] | -0.0029 | 0.2248 | -0.0023 | 0.0194 | -0.0012 | 0.3542 | -0.0021 | 0.0012 |
| $\alpha_{1,3}^B$ [Education] | -0.0639 | 0.0406 | -0.1099 | 0.0031 | -0.0437 | 0.0703 | -0.0850 | 0.0005 |
| $\alpha_{1,4}^B$ [Number of Children] | -0.1009 | 0.0128 | 0.2820 | 0.0009 | -0.3210 | 0.0235 | -0.2199 | 0.0002 |
| Sample mean $\alpha_1^B(\mathbf{X})$ = | 0.7486 | | 0.7731 | | 0.8063 | | 0.7193 | |
| *Husband's Preference for Private Consumption Parameters:* | | | | | | | | |
| $\alpha_{2,1}^B$ [Constant] | 1.1138 | 0.0016 | 1.0266 | 0.0002 | 1.3616 | 0.0027 | 1.6368 | 0.0001 |
| $\alpha_{2,2}^B$ [Age] | 0.0014 | 0.0635 | 0.0021 | 0.0081 | -0.0021 | 0.1177 | -0.0021 | 0.0045 |
| $\alpha_{2,3}^B$ [Education] | 0.0204 | 0.0166 | 0.0541 | 0.0014 | 0.0187 | 0.0224 | 0.0247 | 0.0011 |
| $\alpha_{2,4}^B$ [Number of Children] | -0.1485 | 0.0060 | -0.2915 | 3.40227E-05 | -0.2347 | 0.0137 | -0.4324 | 0.0004 |
| Sample mean $\alpha_2^B(\mathbf{X})$ = | 0.1814 | | 0.1655 | | 0.1319 | | 0.1860 | |
| *Pareto Weight Parameters:* | | | | | | | | |
| $\lambda_0$ [Constant] | 0.6827 | 0.0065 | 0.5060 | 0.0012 | 0.8787 | 0.0776 | 1.1154 | 0.0014 |
| $\lambda_1$ [$w^A/w^B$] | 0.0539 | 0.0106 | -0.0534 | 0.0020 | 0.0450 | 0.1209 | 0.0450 | 0.0022 |
| $\lambda_2$ [y] | -0.0072 | 0.0533 | 0.0089 | 0.0100 | 0.0042 | 0.6980 | 0.0053 | 0.0127 |
| $\lambda_3$ [$z^A$] | 0.0980 | 0.0015 | 0.2080 | 0.0003 | 0.7120 | 0.0886 | 0.7406 | 0.0016 |
| $\lambda_4$ [Sex ratio] | -0.5856 | 0.0058 | -0.3613 | 0.0011 | -1.0207 | 0.0700 | -1.3695 | 0.0013 |
| Sample mean $\lambda(\mathbf{z})$ = | 0.5419 | | 0.5499 | | 0.5414 | | 0.5219 | |
| Additional Restriction, Step 2A | No | | Yes | | No | | Yes | |
| Additional Restriction, Step 2B | No | | No | | Yes | | Yes | |

*Notes:* The normalization imposed for $\psi(\mathbf{S})$, $\phi^A(\mathbf{S})$ and $\phi^B(\mathbf{S})$, render $\psi_1^A = \psi_1^B = 0$, and $\phi_1 = 0$ for both mothers and fathers.

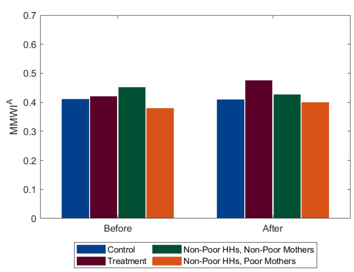
## 2.3 Program Evaluation

As before, we use the fourth specification to evaluate the impact of the program on the intrahousehold allocation of bargaining power and individual welfare. Before assessing the impact of the program, we first check what the distribution of bargaining power and the different money metric individual welfare measures is at the program's baseline and followup years for four different groups of households: treatment (poor households that receive the transfer), control (poor households that did not receive the transfer), non-poor (ineligible households) with a non-poor mother (as identified using the individual poverty analysis implemented in the section above) and non-poor (ineligible households) with a non-poor mother as identified in the previous section. Figure 5 presents these data checks.

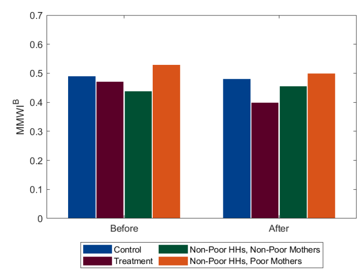
Figure 5: Overall Impact of *Oportunidades* on Intrahousehold Bargaining Power and Individual Welfare



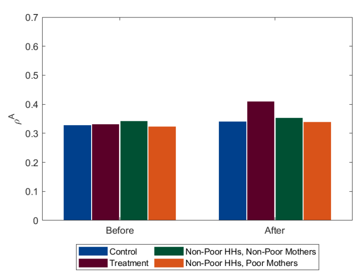

Pareto Weight



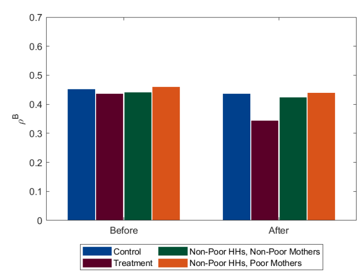

MMWI, Wife




MMWI, Husband




Sharing Rule, Wife




Sharing Rule, Husband

Throughout the formal evaluation of the program, we consider two alternative control groups used in the analysis. The first control group used is the same as the one used so far, consisting only of poor households that did not to participate in the program. The relevant results are presented in both level and percentage terms in Tables 3 and 4, respectively. The results indicate that participation in the program increased poor beneficiary mothers' bargaining power by almost 21.4% relative to poor non-participant mothers. This is consistent with an 18.18% and 22.52% increase in their MMWI and sharing rule, respectively. Furthermore, we find that participation in *Oportunidades* increased domestic production by approximately 17% relative to their non-participant poor counterparts.

Table 3: Overall Impact of *Oportunidades* on Beneficiary Households

| | Pareto Weight | MMWI, A | MMWI, B | $\rho^A$ | $\rho^B$ | Q | $\theta_Q$, A | $\theta_Q$, B |
|---|---|---|---|---|---|---|---|---|
| MDID | 0.119*** | 0.083*** | -0.096*** | 0.083*** | -0.105*** | 379.865** | 1.221 | -2.356** |
| | (0.005) | (0.013) | (0.015) | (0.004) | (0.006) | (162.427) | (2.530) | (0.956) |
| *N* | 478 | 478 | 478 | 478 | 478 | 478 | 478 | 478 |

[1] As in the model, A denotes the mother and B denotes the father.

Table 4: Overall Impact of *Oportunidades* on Beneficiary Households, Percentage Change

| | Pareto Weight | MMWI, A | MMWI, B | $\rho^A$ | $\rho^B$ | Q | $\theta_Q$, A | $\theta_Q$, B |
|---|---|---|---|---|---|---|---|---|
| MDID | 21.387*** | 18.182*** | -22.235*** | 22.524*** | -27.077*** | 17.196** | 3.049 | -44.375*** |
| | (0.935) | (3.044) | (3.651) | (1.233) | (1.579) | (7.858) | (12.305) | (12.004) |
| *N* | 478 | 478 | 478 | 478 | 478 | 478 | 478 | 478 |

[1] As in the model, A denotes the mother and B denotes the father.

An alternative control group considered consists of both poor households that did not participate in the program and those deemed as non-poor by the program administration. The relevant results are presented in both level and percentage terms in Tables 5 and 6, respectively. The results show that while the Pareto weight and individual welfare results are robust (though slightly lower in magnitude) to the inclusion of all non-poor households in the control group, the lack of an impact in the domestic production of $Q$ constitutes one of the main departures with the results obtained so far only among poor households. This might be reflective of the inclusion of non-poor households in the control group that can afford to secure higher levels of inputs of production.

Table 5: Overall Impact of *Oportunidades* on Beneficiary Households – Including Non-Poor Households in the Control Group

| | Pareto Weight | MMWI, A | MMWI, B | $\rho^A$ | $\rho^B$ | Q | $\theta_Q$, A | $\theta_Q$, B |
|---|---|---|---|---|---|---|---|---|
| MDID | 0.118*** | 0.075*** | -0.085*** | 0.084*** | -0.098*** | 54.623 | -2.298 | -4.064*** |
| | (0.005) | (0.013) | (0.014) | (0.003) | (0.005) | (138.670) | (2.620) | (1.212) |
| *N* | 713 | 713 | 713 | 713 | 713 | 713 | 713 | 713 |

[1] As in the model, A denotes the mother and B denotes the father.

Table 6: Overall Impact of *Oportunidades* on Beneficiary Households, Percentage Change – Including Non-Poor Households in the Control Group

| | Pareto Weight | MMWI, A | MMWI, B | $\rho^A$ | $\rho^B$ | Q | $\theta_Q$, A | $\theta_Q$, B |
|---|---|---|---|---|---|---|---|---|
| MDID | 21.177*** | 17.518*** | -18.887*** | 22.782*** | -25.664*** | 2.584 | -7.479 | -62.618*** |
| | (0.907) | (2.844) | (3.689) | (0.969) | (1.286) | (6.132) | (9.022) | (9.156) |
| *N* | 713 | 713 | 713 | 713 | 713 | 713 | 713 | 713 |

[1] As in the model, A denotes the mother and B denotes the father.

# 3 Estimation with No Home Production

We estimate a simplified version of the model without home production to check the robustness of the results we obtain from estimating the model. To implement this, we define a new leisure measure defined as all total time endowment not spent on market work and keep a similar model setup as before with the difference that now the public good $Q$ will capture only the household's public expenditures and keep the same specification for parental preferences and the Pareto weight. We implement this estimation approach using a GMM in which the moment conditions are obtained from the optimality conditions from both single-parent and two-parent households that allows us to derive the demands for leisure, aggregate private consumption and public consumption for two-parent households and for leisure, private market consumption and public consumption for single-parent households. The model fit checks are presented in Figure 6. The results are presented in Table 7. These include the following for two-parent households:

$$
\begin{aligned}
l^{A*} &= \frac{\alpha_1^A(\mathbf{X}^A)\lambda(\mathbf{z})\bar{Y}}{w^A} \\
l^{B*} &= \frac{\alpha_1^B(\mathbf{X}^B)(1-\lambda(\mathbf{z}))\bar{Y}}{w^B} \\
q^* &= q^{A*} + q^{B*} = (\lambda(\mathbf{z})\alpha_2^A(\mathbf{X}^A) + (1-\lambda(\mathbf{z}))\alpha_2^B(\mathbf{X}^B))\bar{Y} \\
Q^* &= (\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X}^A)-\alpha_2^A(\mathbf{X}^A)) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X}^B)-\alpha_2^B(\mathbf{X}^B)))\bar{Y}
\end{aligned}
$$

For single-parent households we also have

$$
\begin{aligned}
l^{i*} &= \frac{\alpha_1^i(\mathbf{X}^i)\bar{Y}}{w^i} \\
q^{i*} &= \alpha_2^i(\mathbf{X}^i)\bar{Y} \\
Q^* &= (1-\alpha_1^i(\mathbf{X}^i)-\alpha_2^i(\mathbf{X}^i))\bar{Y}
\end{aligned}
$$

The results for the evaluation of the program's impact on mothers' bargaining power and individual welfare measures and how this contrasts the evaluation implemented using the model with home production are presented in Table 8, showing that the documented effects on these outcomes diverge to what we originally obtained from the model

Table 7: Structural Estimation Results, Model without Home Production

| | **Estimate** | **SE** |
|---|---|---|
| *Pareto Weight:* | | |
| $\lambda_0$ [Constant] | 0.9206 | 0.0086 |
| $\lambda_1$ [$w^A/w^B$] | 0.0440 | 0.0091 |
| $\lambda_2$ [y] | -0.0934 | 0.0265 |
| $\lambda_3$ [$z^A$] | 0.0162 | 0.0034 |
| $\lambda_4$ [Sex ratio] | -0.9818 | 0.0077 |
| Sample mean $\lambda(\mathbf{z})$ = | 0.3470 | |
| *Wife's Preference for Leisure:* | | |
| $\alpha^A_{1,1}$ [Constant] | 6.7481 | 0.0181 |
| $\alpha^A_{1,2}$ [Age] | 0.0000 | 0.0000 |
| $\alpha^A_{1,3}$ [Education] | 0.1019 | 0.1387 |
| $\alpha^A_{1,4}$ [Number of Children] | 0.0428 | 0.0504 |
| Sample mean $\lambda(\mathbf{z})$ = | 0.8997 | |
| *Wife's Preference for Private Consumption:* | | |
| $\alpha^A_{2,1}$ [Constant] | -9.9728 | 0.0002 |
| $\alpha^A_{2,2}$ [Age] | 0.0101 | 0.0051 |
| $\alpha^A_{2,3}$ [Education] | 0.0317 | 0.0010 |
| $\alpha^A_{2,4}$ [Number of Children] | -0.0141 | 0.0005 |
| Sample mean $\lambda(\mathbf{z})$ = | 0.0823 | |
| *Husband's Preference for Leisure:* | | |
| $\alpha^B_{1,1}$ [Constant] | 2.5348 | 0.0002 |
| $\alpha^B_{1,2}$ [Age] | 0.0024 | 0.0086 |
| $\alpha^B_{1,3}$ [Education] | 0.0157 | 0.1816 |
| $\alpha^B_{1,4}$ [Number of Children] | -0.0477 | 0.0016 |
| Sample mean $\lambda(\mathbf{z})$ = | 0.5020 | |
| *Husband's Preference for Private Consumption:* | | |
| $\alpha^B_{2,1}$ [Constant] | 3.1581 | 0.0002 |
| $\alpha^B_{2,2}$ [Age] | 0.0000 | 0.0012 |
| $\alpha^B_{2,3}$ [Education] | -0.0339 | 0.0023 |
| $\alpha^B_{2,4}$ [Number of Children] | -0.0859 | 0.0008 |
| Sample mean $\lambda(\mathbf{z})$ = | 0.4067 | |

Figure 6: Model Fit Checks

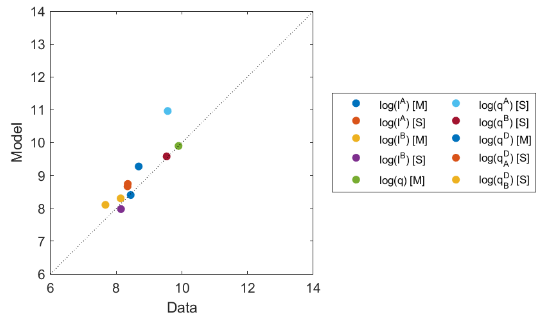



Table 8: Overall Impact of *Oportunidades* on Beneficiary Households, Percentage Change; Comparison of Model Predictions

| | Pareto Weight | MMWI, A | MMWI, B | $\rho^A$ | $\rho^B$ | Q |
|---|---|---|---|---|---|---|
| *(a) Model **with** Home Production* | | | | | | |
| MDID | 23.807*** | 19.559*** | -25.081*** | 25.513*** | -28.869*** | 24.611*** |
| | (0.963) | (4.133) | (3.644) | (1.297) | (1.326) | (6.843) |
| *(b) Model **without** Home Production* | | | | | | |
| MDID | -39.323*** | -18.647*** | 15.612*** | -32.170 | 32.817* | - |
| | (8.794) | (5.953) | (4.903) | (19.783) | (17.271) | - |
| *N* | 478 | 478 | 478 | 478 | 478 | 478 |

[1] As in the model, A denotes the mother and B denotes the father.

[2] Coefficients reported correspond to percentage changes.

that account for the domestic production of $Q$. It is worth noting that the impact of the program on $Q$ is omitted here for the model with no home production since it coincides with the observed impact of the program on households' public expenditures presented in the last column of Table 2 of the paper.

# 4 Supplemental Tables and Figures

Table 9: Overall Impact of *Oportunidades* on Two-Parent Beneficiary Households in which Mothers do not Work

| | Leisure, Mother | Home Prod., Mother | Leisure, Father | Home Prod., Father | Market Work, Father | Public Exp. |
|---|---|---|---|---|---|---|
| MDID | 241.275** | -241.275** | -131.267 | 9.637 | 119.655 | 648.493*** |
| | (119.868) | (119.868) | (115.502) | (28.186) | (113.741) | (118.961) |
| Mean | 3,149.81 | 2,674.19 | 3,324.76 | 174.15 | 2,325.09 | 4,729.65 |
| *N* | 1187 | 1187 | 1188 | 1188 | 1188 | 1188 |

[1] Monetary values reported in 2002 MXN pesos. 1USD = 10.43 MXN pesos. [2] All measures are annualized.
[3] Bootstrapped standard errors (100 repetitions).

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