APPENDIX FOR

Are Cash Transfers Effective at Empowering Mothers? A Structural Evaluation of Mexico's Oportunidades[†]

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August 18, 2025

A Data Appendix

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

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is some data that was collected at baseline but that was not collected in the following survey years. 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.

A.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

[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.

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 sub-sample that could be used in the analysis implemented in this paper consists of 3,288 poor households.

Upon dropping observations with non-missing values for *all* of the variables used in the estimation of the model such as wages, non-labor income, total private market consumption, public expenditures, hours worked, hours spent in housework, leisure hours, and sociodemographic characteristics, the sample size drops to 1,215 two-parent households (which I use in the robustness check presented in Section E to bring back non-working mothers). The biggest drops in sample size upon this restriction involves having non-missing consumption and income variables as these rely on the households responding to the full consumption and income modules of the ENCELURB. Upon imposing the condition that both parents work in the labor market, the sample size drops to 661.

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 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.

A.2 Variable Construction

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. To highlight the importance of home production in the analysis of time use, this paper implements two definitions of leisure used in the literature. The first one, Leisure Definition 1 L_1^i is constructed such that $L_1^i = \bar{T} - h_M^i$, where $\bar{T}$ denotes the total weekly time endowment available to all individuals in the household, at 168 (24 hours per day). That is, Leisure Definition 1 is the component of total time endowment that is not spent in market work.

On the other hand, the level of disaggregation of the time use data provided in the ENCELURB permits the construction of a richer definition of leisure, called Leisure Definition 2, constructed 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] That is, Leisure Definition 2 is the component of total time endowment

[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

that is not spent in a broader definition of work that accounts for time devoted to home production.

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, Angelucci, Attanasio and Shaw (2005), 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.

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

having devoted 0 hours to this activity.

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).

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 described in Section 3 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.

Children's Wage Process. Identification relies on the extent to which we can observe p^C – the price of q^D has already been normalized to 1. When making p^C a function of the potential wage offers of children, we would need to implement an imputation method. For this, it would be feasible to implement a similar method – relying on the Heckman two-step estimator – to estimate the wage regression for children.

1. *Labor force participation specification:* age, educational attainment, parents' education, regional dummies (north, west, east, south, and central). As exclusion restrictions for the selection equation, use variables capturing family socioeconomic status: electricity access, piped-water access, material of floors at home.

2. *Wage regression specification:* age, educational attainment, parents' education, and regional dummies.

Additional considerations to keep in mind to mitigate concerns of *Oportunidades*' GE effects potentially affecting the opportunity cost faced by school-aged children involve following Attanasio, Meghir and Santiago (2012) to account for the overall labor market return at the locality/community level. In this case, we could consider the following wage regression specification

[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?"

that the authors follow:

$$\ln w^g_{itc} = \alpha^g_0 + \alpha^g_1 age + \alpha^g_2 edu + \alpha^g_3 \underbrace{\ln \bar{w}_{tc}}_{\substack{\text{Avg. Adult Wage,}\\ \text{City Block}}} + \alpha^g_4 \underbrace{Type_c}_{\substack{\text{Type of}\\ \text{City Block}}} + \alpha^g_5 Min\_Age_{it} + \epsilon^g_{itc}$$

where $Type_c$ captures the type of city block in which the child resides, which can be a control or intervention city block. By also estimating the wage equation for each wave while controlling for the type of city block, we can capture the extent to which the rollout of *Oportunidades* affected the potential wages of children. Furthermore, following Todd and Wolpin (2006), I also include as control an indicator of whether a child is older than the legal minimum age for working in Mexico (set at 14 during the early 2000s). Furthermore, g denotes the gender of the child. Since the estimator is implemented separately for girls and boys, the coefficients are thus, gender-specific.

In the labor force participation equation, I follow both Todd and Wolpin (2006) in the choice of instruments to include. These include the following: a variable that captures the child's family socioeconomic status called cal_soc (captured in the ENCELURB and provided by the program's administration by aggregating asset ownership and income variables), and parental education.

Mothers' Wage Process. One of the robustness checks involves imputing the wage offers of non-working mothers as a way to include them by estimating the extensive labor supply decision outside of the model following Chiappori, Meghir and Okuyama (2024). For this, I follow a similar approach as the one implemented for the wages of children. The two steps include the following:

1. *Labor force participation specification:* age, educational attainment, regional dummies (north, west, east, south, and central). As exclusion restrictions for the selection equation, I use the number of children and variables capturing family socioeconomic status: electricity access, piped-water access, material of floors at home.

2. *Wage regression specification:* age, educational attainment, and regional dummies.

$$\ln w^A_{itc} = \alpha^A_0 + \alpha^A_1 age + \alpha^A_2 edu + \alpha^A_3 \underbrace{\ln \bar{w}_{tc}}_{\substack{\text{Avg. Adult Wage,}\\ \text{City Block}}} + \alpha^A_4 \underbrace{Type_c}_{\substack{\text{Type of}\\ \text{City Block}}} + \epsilon^A_{itc}$$

where I also include the average labor market returns at the city block level to control for potential general equilibrium effects.

Time Use Variables. In the individual datasets of the ENCELURB, it is possible to obtain a typical weekly measure of the amount of hours each individual household member spends on market work, leisure and home production. Moreover, it is possible to annualize these weekly measures by multiplying these hours by 52. Thus, following Aguiar and Hurst (2007), I define three major time-use categories according to the information provided in the ENCELURB: market work, leisure and home production.

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

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.

B Mathematical Appendix

B.1 Parametric Form of the Estimating Conditions

Optimality Conditions. I first describe the optimality conditions that are (i) relevant for the estimation of single-parent and two-parent production technology and (ii) related to parental preferences and decision-making structure within two-parent households.

Home Production Technology. Starting with two-parent households, the estimating conditions obtained from the first order conditions implied by productive efficiency include the following:

$$\frac{w^A}{w^B} = \frac{\psi^A(\mathbf{S})}{\psi^B(\mathbf{S})} \left(\frac{h_D^A}{h_D^B}\right)^{\gamma-1} \tag{S1}$$

$$\frac{w^A}{p^C} = \frac{\psi^A(\mathbf{S})}{1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S})} \left(\frac{h_D^A}{h_D^C}\right)^{\gamma-1} \tag{S2}$$

$$\frac{w^B}{p^C} = \frac{\psi^B(\mathbf{S})}{1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S})} \left(\frac{h_D^B}{h_D^C}\right)^{\gamma-1} \tag{S3}$$

$$w^A = \frac{\rho_M}{1-\rho_M}\left[\frac{\psi^A(\mathbf{S})(h_D^A)^{\gamma-1}q^D}{\psi^A(\mathbf{S})(h_D^A)^{\gamma}+\psi^B(\mathbf{S})(h_D^B)^{\gamma}+(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^{\gamma}}\right] \tag{S4}$$

$$w^B = \frac{\rho_M}{1-\rho_M}\left[\frac{\psi^B(\mathbf{S})(h_D^B)^{\gamma-1}q^D}{\psi^A(\mathbf{S})(h_D^A)^{\gamma}+\psi^B(\mathbf{S})(h_D^B)^{\gamma}+(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^{\gamma}}\right] \tag{S5}$$

$$p^C = \frac{\rho_M}{1-\rho_M}\left[\frac{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^{\gamma-1}q^D}{\psi^A(\mathbf{S})(h_D^A)^{\gamma}+\psi^B(\mathbf{S})(h_D^B)^{\gamma}+(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^{\gamma}}\right] \tag{S6}$$

For single-parent households, the following conditions are relevant for estimation:

$$\frac{w^i}{p^C} = \frac{\phi^i(\mathbf{S})}{1-\phi^i(\mathbf{S})} \left(\frac{h_D^i}{h_D^C}\right)^{\beta-1} \tag{S7}$$

$$w^i = \frac{\rho_S}{1-\rho_S}\left[\frac{\phi^i(\mathbf{S})(h_D^i)^{\beta-1}q^D}{\phi^i(\mathbf{S})(h_D^i)^{\beta}+(1-\phi^i(\mathbf{S}))(h_D^C)^{\beta}}\right] \tag{S8}$$

$$p^C = \frac{\rho_S}{1-\rho_S}\left[\frac{(1-\phi^i(\mathbf{S}))(h_D^C)^{\beta-1}q^D}{\phi^i(\mathbf{S})(h_D^i)^{\beta}+(1-\phi^i(\mathbf{S}))(h_D^C)^{\beta}}\right] \tag{S9}$$

Parental Preferences and Two-Parent Household's Decision-Making Structure. Using the marginal rates of substitution of the different types of consumption, the estimating equations from two-parent households used to estimate the preference and Pareto weight parameters using the model parametrization presented in the paper are the following:

$$\frac{w^A}{w^B} = \frac{\lambda(\mathbf{z})}{(1-\lambda(\mathbf{z}))}\frac{\alpha_1^A(\mathbf{X})}{\alpha_1^B(\mathbf{X})}\frac{l^A}{l^B} \tag{S10}$$

$$\frac{w^A l^A}{q} = \frac{\lambda(\mathbf{z})\alpha_1^A(\mathbf{X})}{\lambda(\mathbf{z})\alpha_2^A(\mathbf{X}) + (1-\lambda(\mathbf{z}))\alpha_2^B(\mathbf{X})} \tag{S11}$$

$$\frac{w^B l^B}{q} = \frac{(1-\lambda(\mathbf{z}))\alpha_1^B(\mathbf{X})}{\lambda(\mathbf{z})\alpha_2^A(\mathbf{X}) + (1-\lambda(\mathbf{z}))\alpha_2^B(\mathbf{X})} \tag{S12}$$

$$\frac{(h_D^A)^{1-\gamma}}{l^A} = \frac{\psi^A(\mathbf{S})\rho_M[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X})) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{\lambda(\mathbf{z})\alpha_1^A(\mathbf{X})[\psi^A(\mathbf{S})(h_D^A)^\gamma + \psi^B(\mathbf{S})(h_D^B)^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^\gamma]} \tag{S13}$$

$$\frac{(h_D^B)^{1-\gamma}}{l^B} = \frac{\psi^B(\mathbf{S})\rho_M[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X})) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{(1-\lambda(\mathbf{z}))\alpha_1^B(\mathbf{X})[\psi^A(\mathbf{S})(h_D^A)^\gamma + \psi^B(\mathbf{S})(h_D^B)^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^\gamma]} \tag{S14}$$

$$\frac{q^D}{q} = \frac{(1-\rho_M)[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X})) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{\lambda(\mathbf{z})\alpha_2^A(\mathbf{X}) + (1-\lambda(\mathbf{z}))\alpha_2^B(\mathbf{X})} \tag{S15}$$

$$\frac{(h_D^C)^{1-\gamma}}{q} = \frac{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))\rho_M[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X})) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{p^C[\lambda(\mathbf{z})\alpha_2^A(\mathbf{X}) + (1-\lambda(\mathbf{z}))\alpha_2^B(\mathbf{X})][\psi^A(\mathbf{S})(h_D^A)^\gamma + \psi^B(\mathbf{S})(h_D^B)^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^\gamma]} \tag{S16}$$

$$\frac{l^A}{(h_D^C)^{1-\gamma}} = \frac{p^C\lambda(\mathbf{z})\alpha_1^A(\mathbf{X})[\psi^A(\mathbf{S})(h_D^A)^\gamma + \psi^B(\mathbf{S})(h_D^B)^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^\gamma]}{w^A(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))\rho_M[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X})) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]} \tag{S17}$$

$$\frac{l^B}{(h_D^C)^{1-\gamma}} = \frac{p^C(1-\lambda(\mathbf{z}))\alpha_1^B(\mathbf{X})[\psi^A(\mathbf{S})(h_D^A)^\gamma + \psi^B(\mathbf{S})(h_D^B)^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^C)^\gamma]}{w^B(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))\rho_M[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X})) + (1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]} \tag{S18}$$

For single-parent households, the relevant conditions include the following:

$$1 = \frac{\alpha_2^i(\mathbf{X})}{\alpha_1^i(\mathbf{X})}\frac{l^i}{q^i} \tag{S19}$$

$$1 = \frac{\alpha_1^i(\mathbf{X})(\phi^i(\mathbf{S})(h_D^i)^\beta + (1-\phi^i(\mathbf{S}))(N_{ns})^\beta)}{\rho_S\phi^i(\mathbf{S})(1-\alpha_1^i(\mathbf{X})-\alpha_2^i(\mathbf{X}))}\frac{(h_D^i)^{1-\beta}}{l^i} \tag{S20}$$

$$1 = \frac{\alpha_2^i(\mathbf{X})(\phi^i(\mathbf{S})(h_D^i)^\beta + (1-\phi^i(\mathbf{S}))(N_{ns})^\beta)}{\rho_S(1-\phi^i(\mathbf{S}))(1-\alpha_1^i(\mathbf{X})-\alpha_2^i(\mathbf{X}))}\frac{(N_{ns})^{1-\beta}}{q^i} \tag{S21}$$

$$1 = \frac{(1-\rho_S)(1-\alpha_1^i(\mathbf{X})-\alpha_2^i(\mathbf{X}))}{\alpha_2^i(\mathbf{X})}\frac{q^i}{q^D} \tag{S22}$$

Quasi-Experimental Moments. It is also possible to map the optimality conditions to the observed heterogeneous responses of *Oportunidades* considering the following: **[1]** *Taking the derivative of* (S10) *w.r.t.* z^A yields

$$\begin{aligned}\Delta^{l}_{z^A}(d) &= \frac{\partial\lambda(\mathbf{z})}{\partial z^A}\frac{1}{(1-\lambda(\mathbf{z}))^2}\frac{\alpha_1^A(\mathbf{X})}{\alpha_1^B(\mathbf{X})}\frac{w^B}{w^A}\\ &= \frac{\lambda_3}{1+\exp(\boldsymbol{\lambda}'\mathbf{z})}\frac{\lambda(\mathbf{z})}{(1-\lambda(\mathbf{z}))^2}\frac{\alpha_1^A(\mathbf{X})}{\alpha_1^B(\mathbf{X})}\frac{w^B}{w^A}\end{aligned} \tag{S23}$$

where the last equality follows from the parametrization used for the Pareto weight and $\Delta^l_z(d)$ denotes the MDID estimate of the heterogeneous effect of *Oportunidades* on the spouses' leisure hours ratio with respect to the wife's share of non-labor income.

An additional set of quasi-experimental moments that can be used can be obtained from taking the derivatives of the MRS of the spouses' private market consumption and public consumption:

[2] *Taking the derivative of* (S17) *w.r.t.* p^C yields

$$\begin{aligned}\frac{l^A}{N_{ns}} &= \frac{p^C\lambda(\mathbf{z})\alpha_1^A(\mathbf{X})[\psi^A(\mathbf{S})(h_D^A/N_{ns})^\gamma+\psi^B(\mathbf{S})(h_D^B/N_{ns})^\gamma+(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))]}{w^A(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))\rho_M[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}\\ \frac{\partial}{\partial p^C}\left[\frac{l^A}{N_{ns}}\right] &= \kappa^A\frac{\partial}{\partial p^C}\left[p^C\left(\psi^A(\mathbf{S})(h_D^A/N_{ns})^\gamma+\psi^B(\mathbf{S})(h_D^A/N_{ns})^\gamma+(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))\right)\right]\\ \Delta^{l,N}_{p^C}(d,A) &= \kappa^A\{\left(\psi^A(\mathbf{S})(h_D^A/N_{ns})^\gamma+\psi^B(\mathbf{S})(h_D^A/N_{ns})^\gamma+(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))\right)\\ &\quad+p^C\gamma\left(\psi^A(\mathbf{S})(h_D^A/N_{ns})^{\gamma-1}\Delta^{h_D,N}_{p^C}(d,A)+\psi^B(\mathbf{S})(h_D^B/N_{ns})^{\gamma-1}\Delta^{h_D,N}_{p^C}(d,B)\right)\}\end{aligned} \tag{S24}$$

where

$$\kappa^A = \frac{\lambda(\mathbf{z})\alpha_1^A(\mathbf{X})}{w^A\rho_M(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}$$

B.2 Derivation of Individual Welfare within a Collective Household Framework

Characterizing individual welfare within a collective framework involves quantifying the economies of scale in consumption and production reaped by the household's decision makers. When there is some type of consumption that is both domestically produced and shared within the household, this entails characterizing how they are sharing the costs of this type of consumption, which is dependent upon the household's production technology. Thus, this section presents the different building blocks used in defining individual welfare within collectivity.

The Per-Unit Cost of Producing the Domestic Good: Two-Parent Households. Given the specification imposed so far on the household's production technology of two-parent households, we have that

$$
\begin{aligned}
P(w^A, w^B, p^C; \mathbf{S}) = \Bigg(\rho_M^{\rho_M} \Bigg[\psi^A(\mathbf{S}) \left(\frac{\psi^A(\mathbf{S})(w^A)^{-1}}{\psi^A(\mathbf{S}) + \psi^B(\mathbf{S}) \left(\frac{\psi^B(\mathbf{S})}{\psi^A(\mathbf{S})} \frac{w^A}{w^B} \right)^{\frac{\gamma}{1-\gamma}} + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S})) \left(\frac{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))}{\psi^A(\mathbf{S})} \frac{w^A}{p^C} \right)^{\frac{\gamma}{1-\gamma}}} \right) \\
+ \psi^B(\mathbf{S}) \left(\frac{\psi^B(\mathbf{S})(w^B)^{-1}}{\psi^A(\mathbf{S}) \left(\frac{\psi^A(\mathbf{S})}{\psi^B(\mathbf{S})} \frac{w^B}{w^A} \right)^{\frac{\gamma}{\gamma-1}} + \psi^B(\mathbf{S}) + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S})) \left(\frac{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))}{\psi^B(\mathbf{S})} \frac{w^B}{p^C} \right)^{\frac{\gamma}{1-\gamma}}} \right) + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S})) \\
\left(\frac{(1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S}))(p^C)^{-1}}{\psi^A(\mathbf{S}) \left(\frac{\psi^A(\mathbf{S})}{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))} \frac{p^C}{w^A} \right)^{\frac{\gamma}{\gamma-1}} + \psi^B(\mathbf{S}) \left(\frac{\psi^B(\mathbf{S})}{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))} \frac{p^C}{w^B} \right)^{\frac{\gamma}{1-\gamma}} + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S}))} \right) \Bigg]^{\frac{\rho_M}{\gamma}} (1-\rho_M)^{1-\rho_M} \Bigg)^{-1} \\
\times \Bigg(\frac{\psi^A(\mathbf{S})\rho}{\psi^A(\mathbf{S}) + \psi^B(\mathbf{S}) \left(\frac{\psi^B(\mathbf{S})}{\psi^A(\mathbf{S})} \frac{w^A}{w^B} \right)^{\frac{\gamma}{1-\gamma}} + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S})) \left(\frac{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))}{\psi^A(\mathbf{S})} \frac{w^A}{p^C} \right)^{\frac{\gamma}{1-\gamma}}} \\
+ \frac{\psi^B(\mathbf{S})\rho}{\psi^A(\mathbf{S}) \left(\frac{\psi^A(\mathbf{S})}{\psi^B(\mathbf{S})} \frac{w^B}{w^A} \right)^{\frac{\gamma}{\gamma-1}} + \psi^B(\mathbf{S}) + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S})) \left(\frac{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))}{\psi^B(\mathbf{S})} \frac{w^B}{p^C} \right)^{\frac{\gamma}{1-\gamma}}} \\
+ \frac{((1 - \psi^A - \psi^B(\mathbf{S}))\rho}{\psi^A(\mathbf{S}) \left(\frac{\psi^A(\mathbf{S})}{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))} \frac{p^C}{w^A} \right)^{\frac{\gamma}{\gamma-1}} + \psi^B(\mathbf{S}) \left(\frac{\psi^B(\mathbf{S})}{(1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))} \frac{p^C}{w^B} \right)^{\frac{\gamma}{1-\gamma}} + (1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S}))} + 1 - \rho_M \Bigg)
\end{aligned} \tag{S25}
$$

The Per-Unit Cost of Producing the Domestic Good: Single-Parent Households. Similarly, we can define the per-unit cost of producing the domestic good in single-parent households, which captures the counterfactual cost that spouses living in collectivity would face in they were to be single. Given the parametrization used for the production technology of single-parent households, this per-unit cost is the following for single mothers

$$
\begin{aligned}
P^{S,A}(w^A, p^C; \mathbf{S}) = &\left(\rho_S^{\rho_S}\left[\phi(\mathbf{S})\left(\frac{\phi^A(\mathbf{S})(w^A)^{-1}}{\phi^A(\mathbf{S}) + (1-\phi^A(\mathbf{S}))\left(\frac{1-\phi^A(\mathbf{S})}{\phi^A(\mathbf{S})}\frac{w^A}{p^C}\right)^{\frac{\beta}{1-\beta}}}\right)\right.\right. \\
&\left.\left. + (1-\phi^A(\mathbf{S}))\left(\frac{(1-\phi^A(\mathbf{S}))(p^C)^{-1}}{\phi^A(\mathbf{S})\left(\frac{1-\phi^A(\mathbf{S})}{\phi^A(\mathbf{S})}\frac{w^A}{p^C}\right)^{\frac{\beta}{\beta-1}} + (1-\phi^A(\mathbf{S}))}\right)\right]^{\frac{\rho_S}{\beta}}(1-\rho_S)^{1-\rho_S}\right)^{-1} \\
&\times\left(\frac{\phi^A(\mathbf{S})\rho_S}{\psi^A(\mathbf{S}) + (1-\phi^A(\mathbf{S}))\left(\frac{1-\phi^A(\mathbf{S})}{\phi^A(\mathbf{S})}\frac{w^A}{p^C}\right)^{\frac{\beta}{1-\beta}}} + \frac{(1-\phi^A(\mathbf{S}))\rho_S}{\phi^A(\mathbf{S})\left(\frac{1-\phi^A(\mathbf{S})}{\phi^A(\mathbf{S})}\frac{w^A}{p^C}\right)^{\frac{\beta}{\beta-1}} + (1-\phi^A(\mathbf{S}))} + 1 - \rho_S\right)
\end{aligned}
\tag{S26}
$$

Considering that custody is overwhelmingly granted to mothers and fathers, thus, generally have less discretion on the time allocation of children, the per-unit cost of producing the domestic good in single-father households can be specified in the following way:

$$
P^{S,B}(w^B; \mathbf{S}) = (\phi^B(\mathbf{S}))^{\frac{\rho_S^B}{\beta^B}} \times \left(\frac{\rho_S^{\rho_S}}{w^B}(1-\rho_S)^{1-\rho_S}\right)^{-1} \tag{S27}
$$

The Conditional Sharing Rule. The assumption that household behavior is Pareto efficient allows us to invoke the Second Welfare Theorem to characterize the household's problem as a two-stage process, which gives rise to the concept of the conditional sharing rule. In the first stage, the household solves for ρ^A, ρ^B, and Q. In the second stage, the decision makers then solve for their own l^i and q^i privately taking the solution to the first stage as given. Thus, in the first stage, the household solves

$$
\max_{\rho^A, \rho^B, Q} \lambda(\mathbf{z})V^A(w^A, \rho^A, Q) + (1-\lambda(\mathbf{z}))V^B(w^B, \rho^B, Q)
$$

s.t.

$$
\rho^A + \rho^B + P(w^A, w^B; \mathbf{S})Q = y^A + y^B
$$

where $P(w^A, w^B, p^C; \mathbf{S})Q$ is the cost function coming from the household's production stage which can be written linearly since we have a constant returns to scale production function. Thus, $P(w^A, w^B, p^C; \mathbf{S})$ captures the effective per-unit cost of producing the public good Q. In the second stage, each individual decision maker then solves the following taking Q and ρ^i as given

$$\max_{l^A, q^A} \alpha_1^i(\mathbf{X}^i) \ln(l^A) + \alpha_2^i(\mathbf{X}^i) \ln(q^i) + (1 - \alpha_1^i(\mathbf{X}^i) - \alpha_2^i(\mathbf{X}^i) \ln(Q)$$

s.t.

$$w^i l^i + q^i = w^i T + \rho^i$$

From the solution to the second stage, we then have the following

$$l^{i*} = \frac{\alpha_1^i(\mathbf{X}^i)(w^i T + \rho^i)}{w^i(\alpha_1^i(\mathbf{X}^i) + \alpha_2^i(\mathbf{X}^i))}; \quad q^{i*} = \frac{\alpha_2^i(\mathbf{X}^i)(w^i T + \rho^i)}{\alpha_1^i(\mathbf{X}^i) + \alpha_2^i(\mathbf{X}^i)}$$

And from the solution to the first stage, we have that

$$\rho^A + w^A T = \lambda(\mathbf{z})(\alpha_1^A(\mathbf{X}^A) + \alpha_2^A(\mathbf{X}^A))\bar{Y} \tag{S28}$$

$$\rho^B + w^B T = (1 - \lambda(\mathbf{z}))(\alpha_1^B(\mathbf{X}^B) + \alpha_2^B(\mathbf{X}^B))\bar{Y} \tag{S29}$$

$$Q^* = \frac{(\lambda(\mathbf{z})(1 - \alpha_1^A(\mathbf{X}^A) - \alpha_2^A(\mathbf{X}^A)) + (1 - \lambda(\mathbf{z}))(1 - \alpha_1^B(\mathbf{X}^B) - \alpha_2^B(\mathbf{X}^B)))\bar{Y}}{P(w^A, w^B, p^C; \mathbf{S})} \tag{S30}$$

where $\bar{Y} = (w^A + w^B)T + y^A + y^B$.

Moreover, from the solution to the second stage, the following private demand functions can be derived by substituting ρ^i accordingly

$$\begin{bmatrix} l^{A*} \\ l^{B*} \end{bmatrix} = \begin{bmatrix} \frac{\lambda(\mathbf{z})\alpha_1^A(\mathbf{X}^A)\bar{Y}}{w^A} \\ \frac{(1-\lambda(\mathbf{z}))\alpha_1^B(\mathbf{X}^B)\bar{Y}}{w^B} \end{bmatrix}; \begin{bmatrix} q^{A*} \\ q^{B*} \end{bmatrix} = \begin{bmatrix} \lambda(\mathbf{z})\alpha_2^A(\mathbf{X}^A)\bar{Y} \\ (1 - \lambda(\mathbf{z}))\alpha_2^B(\mathbf{X}^B)\bar{Y} \end{bmatrix} \tag{S31}$$

We know that we can compute the marginal willingness to pay for the public good from both spouses in the following way:

$$MWP^i = \frac{\partial V^i(w^i, \rho^i, Q)/\partial Q}{\partial V^i(w^i, \rho^i, Q)/\partial \rho^i} \quad \text{for} \quad i = (A, B)$$

Note that these marginal willingness to pay for the public good can also be interpreted as the Lindahl prices, which intuitively, serve as a way for each individual spouse to internalize the market price of the public good Q (in the absence of home production or in the case of the domestic production of a marketable good) or the per unit cost of producing the domestic good Q (which in this case is denoted by $P(w^A, w^B, p^C; \mathbf{S})$). Letting the Lindahl prices for the husband and wife be denoted as θ_Q^A and θ_Q^B, respectively, we then have that

$$\theta_Q^A = MWP^A = \frac{\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))\cdot P(w^A, w^B, p^C, \mathbf{S})}{\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))} \tag{S32}$$

$$\theta_Q^B = MWP^B = \frac{(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))\cdot P(w^A, w^B, p^C, \mathbf{S})}{\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))} \tag{S33}$$

Given that these are individual prices, we have that an important condition that these must satisfy is the Bowen-Lindahl-Samuelson condition for the optimal demand of the public good – which in this case, has been adjusted to account for the domestic production of the public good:

$$\theta_Q^A + \theta_Q^B = P(w^A, w^B, p^C; \mathbf{S})$$

The Money Metric Welfare Index. The intuition of the MMWI is discussed at length in the main text. Under the chosen parametrization of the model, the MMWI for mothers can be defined as the solution to the following minimization problem:

$$MMWI^A = \min_{h_D^A, l^A, q^A, h_D^C, q^D} [w^A l^A + q^A + w^A h_D^A + q^D + p^C h_D^C] \tag{S34}$$

where

$$\alpha_1^A(\mathbf{X})\ln(l^A) + \alpha_2^A(\mathbf{X})\ln(q^A) + (1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))\ln(Q) \geq$$
$$\alpha_1^A(\mathbf{X})\ln(l^{A*}) + \alpha_2^A(\mathbf{X})\ln(q^{A*}) + (1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))\ln(Q^*)$$
$$Q^* = [\psi^A(\mathbf{S})(h_D^{A*})^\gamma + \psi^B(\mathbf{S})(h_D^{B*})^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^{C*})^\gamma]^{\frac{\rho_M}{\gamma}}(q^{D*})^{1-\rho_M}$$
$$Q = [\phi^A(\mathbf{S})(h_D^A)^{\beta^A} + (1-\phi^A(\mathbf{S}))(h_D^C)^{\beta^A}]^{\frac{\rho_S^A}{\beta^A}}(q^D)^{1-\rho_S^A}$$

For fathers, on the other hand, their MMWI can be defined as the solution to the following minimization problem:

$$MMWI^B = \min_{h_D^B, l^B, q^B, q^D}[w^B l^B + q^B + w^B h_D^B + q^D] \tag{S35}$$

where

$$\alpha_1^B(\mathbf{X})\ln(l^B) + \alpha_2^A(\mathbf{X})\ln(q^B) + (1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))\ln(Q) \geq$$
$$\alpha_1^B(\mathbf{X})\ln(l^{B*}) + \alpha_2^B(\mathbf{X})\ln(q^{B*}) + (1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))\ln(Q^*)$$
$$Q^* = [\psi^A(\mathbf{S})(h_D^{A*})^\gamma + \psi^B(\mathbf{S})(h_D^{B*})^\gamma + (1-\psi^A(\mathbf{S})-\psi^B(\mathbf{S}))(h_D^{C*})^\gamma]^{\frac{\rho_M}{\gamma}}(q^{D*})^{1-\rho_M}$$
$$Q = (\phi^B(\mathbf{S}))^{\frac{\rho_S^B}{\beta^B}}(h_D^B)^{\rho_S^B}(q^D)^{1-\rho_S^B}$$

The solution to mothers' minimization problem yields the following characterization of the MMWI for mothers:

$$MMWI^A = (\rho^A + w^i T)\left(\frac{1}{\theta_Q^A P^{S,A}(w^A, p^C; \mathbf{S})}\right)^{(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))} \tag{S36}$$
$$\times\left(\alpha_1^A(\mathbf{X}) + \alpha_2^A(\mathbf{X}) + (1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))\left(\frac{\phi^A(\mathbf{S})}{\phi^A(\mathbf{S})(C_s^A)^{\frac{\beta}{\beta-1}} + (1-\phi^A(\mathbf{S}))} + \frac{1-\phi^A(\mathbf{S})}{\phi^A(\mathbf{S}) + (1-\phi^A(\mathbf{S}))(C_s^A)^{\frac{\beta}{1-\beta}}} + 1 - \rho_S^A\right)\right) \tag{S37}$$

where

$$C_s^A = \frac{w^A}{p^C} \frac{1 - \phi^A(\mathbf{S})}{\phi^A(\mathbf{S})}$$

The solution to fathers' minimization problem yields the following characterization of the MMWI for fathers:

$$MMWI^B = (\rho^B + w^B T) \left(\frac{1}{\theta_Q^B P^{S,B}(w^B; \mathbf{S})} \right)^{(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))} \tag{S38}$$

B.3 Optimal Weight Matrix for GMM Estimator

I estimate $\mathbf{W}_N$ for the first stage of the GMM estimator presented in Section 4.4 by evaluating the differences between the empirical and theoretical moments used in this stage by first implementing the estimator using the identity matrix $\mathbf{I}_N$ as a weighting matrix, so that

$$W_N = g(\mathbf{S}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\Delta}) g(\mathbf{S}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\Delta})'$$

I then obtain the optimal weight matrix, $\mathbf{W}_N$, for the second stage of the GMM estimator by implementing a correction to the standard weight matrix used in a simple GMM to account for the fact that the estimator being used is a two-step one. This correction is based on the results of Newey and McFadden (1994) for the asymptotic variance of two-step GMM estimators to correct for the efficiency loss incurred by the two-step nature of the estimator:

$$W_N = \{h(\mathbf{X}, \mathbf{z}, \hat{\boldsymbol{\theta}}_1, \hat{\boldsymbol{\theta}}_2, \boldsymbol{\Delta}) + G_{\theta_1}\xi(\mathbf{S})\}\{h(\mathbf{X}, \mathbf{z}, \hat{\boldsymbol{\theta}}_1, \hat{\boldsymbol{\theta}}_2, \boldsymbol{\Delta}) + G_{\theta_1}\xi(\mathbf{S})\}'$$

where $G_{\theta_1} = \nabla_{\theta_1} h(\mathbf{X}, \mathbf{z}, \hat{\boldsymbol{\theta}}_1, \hat{\boldsymbol{\theta}}_2, \boldsymbol{\Delta})$, $\xi(\mathbf{S}) = -(\nabla_{\theta_1} g(\mathbf{S}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\Delta}))^{-1} g(\mathbf{S}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\Delta})$, and $h(\cdot)$ denotes the objective function (set of moment conditions) from Step 2B while $g(\cdot)$ denotes the objective function used in Step 2A.

C Non-Parametric Identification Proof

The non-parametric identification of the model is carried out in three main steps. The first step involves the identification of two-parent households' production function. The second step involves the identification of single-parent household. Lastly, the third step involves the identification of individual parental preferences and the Pareto weight exploiting the effect of *Oportunidades* on this distribution factor and production shifter and the fact that I observe the behavior of single-parent households. Even though this approach involves solving for the household's allocation by directly solving the social planner's problem, this approach follows a similar intuition to the identification approach used when working within the two-stage, decentralized characterization of the household's problem as in Chiappori and Ekeland (2009) and Cherchye, De Rock and Vermeulen (2012) as it relies on the use of an exclusive good (namely, leisure).

C.1 Identifying the Household's Production Technology

Single-Parent Households. Productive efficiency allows me to define the following marginal rate of technical substitution of both the parent's and children's time inputs for monetary investments in the production of the public good

$$\Phi_S^i = \frac{\partial F_Q^{S,i}(h_D^i, h_D^C, q^D; \mathbf{S})/\partial h_D^i}{\partial F_Q^{S,i}(h_D^i, h_D^C, q^d; \mathbf{S})/\partial q^D} = w^i; \quad \Phi_S^C = \frac{\partial F_Q^{S,i}(h_D^i, h_D^C, q^D; \mathbf{S})/\partial h_D^C}{\partial F_Q^{S,i}(h_D^i, h_D^C, q^d; \mathbf{S})/\partial q^D} = p^C \tag{S39}$$

From Blundell, Chiappori and Meghir (2005), these conditions are sufficient to identify Φ_S^i for $i = (A, B)$ given the existence of a mapping between (w^i, p^C, y) and (h_D^i, h_D^C, q^D) generated by the reduced-form equations relating the observed inputs of production as functions of w^i, p^C and y (which are also observed in the data). However, this only recovers the Φ_S^i's, but not the production function. Given this, Blundell, Chiappori and Meghir (2005) and Cherchye, De Rock and Vermeulen (2012) mention that at least one overidentifying condition is needed to recover $F_Q^{S,i}$. In both papers, the recommendation is to impose an additional condition reflecting that these marginal rates of technical substitution stem from the same function. Such condition yields the following restriction that need to be satisfied by the marginal productivity of parental time and monetary investments in Q:

$$\frac{\partial\Phi_S^i(h_D^i, h_D^C, q^D; \mathbf{S})}{\partial h_D^C} + \Phi_S^i(h_D^i, h_D^C, q^D; \mathbf{S})\frac{\partial\Phi_S^C(h_D^i, h_D^C, q^D; \mathbf{S})}{\partial q^D} = \\ \frac{\partial\Phi_S^C(h_D^i, h_D^C, q^D; \mathbf{S})}{\partial h_D^i} + \Phi_S^C(h_D^i, h_D^C, q^D; \mathbf{S})\frac{\partial\Phi_S^i(h_D^i, h_D^C, q^D; \mathbf{S})}{\partial q^D} \tag{S40}$$

The third condition presented in (S40) stems from the assumption that $F_Q^{S,i}$ is $\mathcal{C}^2$ and exploiting the symmetry of its Hessian invoking Young's Theorem. To see this, consider the derivative of Φ_S^i and Φ_S^C with respect to each input of production. Furthermore, for the sake of keeping notation clean, let $F_Q^{S,i}$ denote $F_Q^{S,i}(h_D^i, h_D^C, q^D; \mathbf{S})$ and Φ_S^i denote $\Phi_S^i(h_D^i, h_D^C, q^D, \mathbf{S})$ for $i = (A, B)$.

Differentiating Φ_S^i with respect to h_D^C and q^D yields

$$\frac{\partial\Phi_S^i}{\partial h_D^B} = \frac{\frac{\partial}{\partial h_D^C}\left[\frac{\partial F_Q^{S,i}}{\partial h_D^i}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} - \Phi_S^i\frac{\frac{\partial}{\partial h_D^C}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} \tag{S41}$$

$$\frac{\partial\Phi_S^i}{\partial q^D} = \frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial h_D^g}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} - \Phi_S^i\frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} \tag{S42}$$

Similarly, differentiating Φ_S^C with respect to h_D^i and q^D yields

$$\frac{\partial\Phi_S^C}{\partial h_D^i} = \frac{\frac{\partial}{\partial h_D^g}\left[\frac{\partial F_Q^{S,g}}{\partial h_D^C}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} - \Phi_S^C\frac{\frac{\partial}{\partial h_D^i}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} \tag{S43}$$

$$\frac{\partial\Phi_S^C}{\partial q^D} = \frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial h_D^C}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} - \Phi_S^C\frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} \tag{S44}$$

Given the symmetry of the Hessian of $F_Q^{S,i}$, I know that $\frac{\frac{\partial}{\partial h_D^C}\left[\frac{\partial F_Q^{S,i}}{\partial h_D^i}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} = \frac{\frac{\partial}{\partial h_D^i}\left[\frac{\partial F_Q^{S,i}}{\partial h_D^C}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}}$, which can be rewritten using (S41) and (S43) as

$$\frac{\partial \Phi_S^i}{\partial h_D^C} + \Phi_M^i \frac{\frac{\partial}{\partial h_D^C}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} = \frac{\partial \Phi_S^C}{\partial h_D^i} + \Phi_M^C \frac{\frac{\partial}{\partial h_D^i}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} \tag{S45}$$

Furthermore, exploiting the fact that $\frac{\frac{\partial}{\partial h_D^i}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}} = \frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial h_D^g}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}}$ for $i = (A, B)$, rearranging (S42) and (S44) and substituting the second term in both sides of (S45) yields

$$\frac{\partial \Phi_S^i}{\partial h_D^C} + \Phi_S^i \frac{\partial \Phi_S^C}{\partial q^D} + \Phi_S^i \Phi_S^C \frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^C}{\partial q^D}} = \frac{\partial \Phi_S^C}{\partial h_D^i} + \Phi_S^B \frac{\partial \Phi_S^i}{\partial q^D} + \Phi_S^C \Phi_S^i \frac{\frac{\partial}{\partial q^D}\left[\frac{\partial F_Q^{S,i}}{\partial q^D}\right]}{\frac{\partial F_Q^{S,i}}{\partial q^D}}$$

Since the third term of each side is identical, the additional restriction that needs to be satisfied by the marginal rates of technical substitution of parental time for monetary investments is precisely the one presented in (S40).

Two-Parent Households. Identification of the production technology follows as a straightforward extension of the result obtained for the production technology of single-parent households. As aforementioned, the result follows from the conditions we derive from productive efficiency which provide a mapping from the marginal rate of technical substitution of both parents' time inputs for monetary investments to their corresponding wages and from marginal rate of technical substitution of children's time inputs for monetary investments within this type of household to the price of keeping them at home:

$$\begin{aligned}
\Phi_M^A &= \frac{\partial F_Q^M(h_D^A, h_D^B, h_D^C, q^D; \mathbf{S})/\partial h_D^A}{\partial F_Q^M(h_D^A, h_D^B, h_D^C, q^D; \mathbf{S})/\partial q^D} = w^A \\
\Phi_M^B &= \frac{\partial F_Q^M(h_D^A, h_D^B, h_D^C, q^D; \mathbf{S})/\partial h_D^B}{\partial F_Q^M(h_D^A, h_D^B, h_D^C, q^D; \mathbf{S})/\partial q^D} = w^B \\
\Phi_M^C &= \frac{\partial F_Q^M(h_D^i, h_D^B, h_D^C, q^D; \mathbf{S})/\partial h_D^C}{\partial F_Q^M(h_D^A, h_D^B, h_D^C, q^D; \mathbf{S})/\partial q^D} = p^C
\end{aligned} \tag{S46}$$

C.2 Identifying Parental Preferences and the Pareto Weight

I first present a set of assumptions that facilitate the non-parametric identification of the individual preferences of parents and the decision-making structure of two-parent households.

(A1) Preferences are strongly separable on leisure, private consumption and the public domestic good so that these allow for an additively separable representation:

$$U^i(l^i, q^i, Q; \mathbf{X}^i) = u^{l,i}(l^i; \mathbf{X}^i) + u^{q,i}(q^i; \mathbf{X}^i) + u^{Q,i}(Q; \mathbf{X}^i)$$

This allows me to characterize each individual marginal utility as $\frac{\partial U^i(l^i,q^i,Q;\mathbf{X}^i)}{\partial l^i} = \frac{\partial u^{l,i}(l^i;\mathbf{X}^i)}{\partial l^i}$, $\frac{\partial U^i(l^i,q^i,Q;\mathbf{X}^i)}{\partial q^i} = \frac{\partial u^{q,i}(q^i;\mathbf{X}^i)}{\partial q^i}$ and $\frac{\partial U^i(l^i,q^i,Q;\mathbf{X}^i)}{\partial Q} = \frac{\partial u^{Q,i}(Q;\mathbf{X}^i)}{\partial Q}$.

(A2) The Pareto weight is non-decreasing in one distribution factor, $\hat{z}$. That is, $\frac{\partial \lambda(w^A,w^B,y,\hat{z}^A)}{\partial z^A} \geq 0$.

(A3) There exist some known $\hat{l}^A, \hat{l}^B$ and $\hat{z}^A$ such that $\frac{\partial U^A(\hat{l}^A,q^A,Q;\mathbf{X})}{\partial l^A} = \frac{\partial u^{l,A}(\hat{l}^A;\mathbf{X}^A)}{\partial l^A} = c_A$, $\frac{\partial U^B(\hat{l}^B,q^B,Q;\mathbf{X})}{\partial l^B} = \frac{\partial u^{l,B}(\hat{l}^B;\mathbf{X}^B)}{\partial l^B} = c_B$ and $\lambda(w^A, w^B, y, \hat{z}^A) = c$, where c_A, c_B and c are some known constants. Specifically, I assume that these normalizations are imposed at the lower boundaries of the domains of $\frac{\partial u^{l,A}(\hat{l}^A;\mathbf{X}^A)}{\partial l^A}$,$\frac{\partial u^{l,B}(\hat{l}^B;\mathbf{X}^B)}{\partial l^B}$ and $\lambda(w^A, w^B, y, \hat{z}^A)$.

We then proceed to identify parental preferences and the intrahousehold bargaining structure in three main steps.

Step 1 Recover $\left[\frac{\partial U^A}{\partial l^A}, \frac{\partial U^B}{\partial l^B}, \lambda(\mathbf{z})\right]$ using three conditions derived from: (i) the household's marginal rate of substitution of spouses' leisure time; (ii) the response of (i) to the receipt of the *Oportunidades* cash transfer; (iii) the household's marginal rate of substitution of private and public consumption

Step 2 Once we recover $\left[\frac{\partial U^A}{\partial l^A}, \frac{\partial U^B}{\partial l^B}, \lambda(\mathbf{z})\right]$, we can then proceed to recover $\left[\frac{\partial U^A}{\partial q^A}, \frac{\partial U^B}{\partial q^B}\right]$ using:

$$\frac{\partial U^A/\partial l^A}{\partial U^A/\partial q^A} = w^A;$$
$$\frac{\partial U^B/\partial l^B}{\partial U^B/\partial q^B} = w^B$$

Step 3 Recover $\left[\frac{\partial U^A}{\partial Q}, \frac{\partial U^B}{\partial Q}\right]$ using:

$$\frac{\partial U^A}{\partial Q} = \frac{1}{\lambda(\mathbf{z})}\left(\lambda(\mathbf{z})\frac{\partial U^A/l^A}{\partial F_Q^M/\partial h_D^A} - (1-\lambda(\mathbf{z}))\frac{\partial U^B/l^B}{\partial F_Q^S/\partial h_D^B}\right);$$
$$\frac{\partial U^B}{\partial Q} = \frac{1}{(1-\lambda(\mathbf{z}))}\left((1-\lambda(\mathbf{z}))\frac{\partial U^B/l^B}{\partial F_Q^M/\partial h_D^B} - \lambda(\mathbf{z})\frac{\partial U^A/l^A}{\partial F_Q^S/\partial h_D^A}\right)$$

For **Step 1**, the system of equations to solve is going to be comprised of the following three conditions:

$$F1: \frac{\lambda(\mathbf{z})}{1-\lambda(\mathbf{z})}\frac{\Gamma_l^A}{\Gamma_l^B} - \frac{w^A}{w^B} = 0$$
$$F2: \frac{f_\lambda}{(1-\lambda)^2}\frac{\Gamma_l^A}{\Gamma_l^B} + \frac{\lambda}{(1-\lambda)}\left(f_\Gamma^A \Delta_{z^A}^l(d,A)\Gamma_l^B - \Gamma_l^A \Delta_{z^A}^l(d,B) f_\Gamma^B\right)\frac{1}{(\Gamma_l^B)^2} = 0$$
$$F3: \Delta_{p^C}^{\phi_M}(d,C)\left(\lambda\frac{\Gamma_l^A}{\phi_S^A} - (1-\lambda)\frac{\Gamma_l^B}{\phi_S^B}\right) + \phi_M^C\Bigg(\lambda\bigg(\frac{f_\Gamma^A\Delta_{p^C}^l(d,A) - \Gamma_l^A\Delta_{p^C}^{\phi_S}(d,A)}{(\phi_S^A)^2}\bigg)$$
$$+ (1-\lambda)\bigg(\frac{f_\Gamma^B\Delta_{p^C}^l(d,B) - \Gamma_l^B\Delta_{p^C}^{\phi_S}(d,B)}{(\phi_S^B)^2}\bigg)\Bigg) - \frac{\lambda}{w^A} f_\Gamma^A \Delta_{p^C}^l(d,A) = 0$$

where

$$\Delta_{p^C}^{\phi_M}(d,C) = \frac{\partial \phi_M^N}{\partial p^C} = \underbrace{\frac{\partial \phi_M^N}{\partial h_D^A}}_{\text{Known}}\underbrace{\Delta_{p^C}^{h^D}(d,A)}_{\text{MDID}} + \underbrace{\frac{\partial \phi_M^N}{\partial h_D^B}}_{\text{Known}}\underbrace{\Delta_{p^C}^{h^D}(d,B)}_{\text{MDID}} + \underbrace{\frac{\partial \phi_M^C}{\partial h_D^C}}_{\text{Known}}\underbrace{\Delta_{p^C}^{N_{ns}}(d)}_{\text{MDID}} + \underbrace{\frac{\partial \phi_M^N}{\partial q^D}}_{\text{Known}}\underbrace{\Delta_{p^C}^{q^D}(d)}_{\text{MDID}}$$
$$\Delta_{p^C}^{\phi_S}(d,i) = \frac{\partial \phi_S^N}{\partial p^C} = \underbrace{\frac{\partial \phi_S^N}{\partial h_D^A}}_{\text{Known}}\underbrace{\Delta_{p^C}^{h^D}(d,i)}_{\text{MDID}} + \underbrace{\frac{\partial \phi_S^C}{\partial h_D^C}}_{\text{Known}}\underbrace{\Delta_{p^C}^{h_D^C}(d)}_{\text{MDID}} + \underbrace{\frac{\partial \phi_S^N}{\partial q^D}}_{\text{Known}}\underbrace{\Delta_{p^C}^{q^D}(d)}_{\text{MDID}} \quad \text{for} \quad (i = A, B)$$

where the items labeled as known are known at this point since at this stage we have been able to recover the domestic production technology of both two-parent and single-parent households.

The set of normalizations in assumption **(A3)** allows us to characterize F1-F3 as as a non-linear system of equations of the form $\mathbf{F}(\Gamma_l^A, \Gamma_l^B, \lambda) = \mathbf{0}$. Formally, these normalizations are

$$\frac{\partial \Gamma_l^A}{\partial l^A} \approx f_\Gamma^A = \frac{\Gamma_l^A - c_A}{l^A - \hat{l}^A}$$
$$\frac{\partial \Gamma_l^B}{\partial l^B} \approx f_\Gamma^B = \frac{\Gamma_l^B - c_B}{l^B - \hat{l}^B}$$
$$\frac{\partial \lambda(\mathbf{z})}{\partial z^A} \approx f_\lambda = \frac{\lambda - c}{z^A - \hat{z}^A}$$

It is relatively more straightforward to see how the parental preferences for leisure and the Pareto Weight can be non-parametrically identified with a straightforward normalization. Suppose there exists a $\tilde{z}$ for which $\lambda(\tilde{z}) = 1/2$. Focusing on this sub-sample:

1. Using F1, it follows that $\frac{\Gamma_l^A}{\Gamma_l^B} = \frac{w^A}{w^B}$ – allowing us to write Γ_l^B in terms of Γ_l^A
2. Substituting for Γ_l^B into F3 we can recover Γ_l^A as a function of the quasi-experimental moments and marginal productivities in both single and two-parent households.
3. With Γ_l^A known, we proceed to back out Γ_l^B using F1 for this sub-sample.

Given Γ_l^A and Γ_l^B, $\lambda(\mathbf{z})$ can be recovered using F2 on the full sample. To see this, from F2 and knowing from F1 that $\frac{\Gamma_l^A}{\Gamma_l^B} = \frac{1-\lambda}{\lambda}\frac{w^A}{w^B}$, we can show that

$$\frac{c\Gamma_l^A}{z - \hat{z}} + \frac{w^A}{w^B}\left(\frac{\Gamma_l^B - c_B}{l^B - \hat{l}^B}\right)\Delta_z^l(d, B) = \lambda^2\left[-\left(\frac{w^A}{w^B}\left(\frac{\Gamma_l^B - c_B}{l^B - \hat{l}^B}\right)\Delta_z^l(d, B) + \left(\frac{\Gamma_l^A - c_A}{l^A - \hat{l}^A}\right)\Delta_z^l(d, A)\right)\right]$$
$$+ \lambda\left[\frac{\Gamma_l^A}{z - \hat{z}} + 2\frac{w^A}{w^B}\left(\frac{\Gamma_l^B - c_B}{l^B - \hat{l}^B}\right)\Delta_z^l(d, B) + \left(\frac{\Gamma_l^A - c_A}{l^A - \hat{l}^A}\right)\Delta_z^l(d, A)\right]$$

which simplifies to a relatively simple quadratic equation in terms of the Pareto weight so that an implementation of the quadratic formula yields its solution.

D Parametric Identification

This section describes the parametric identification of the model from which the estimation strategy described in Section 4.4 is derived.

D.1 Main Identification Results

Proposition B1 (Identification of Single-Parent Households' Production Technology).
Let (h^i_D, h^C_D, q^D) *be observed functions of* $(w^i, p^C, y^i, \boldsymbol{S})$ *for* $i = (A, B)$ *. If for at least one production shifter* $s_j \in \boldsymbol{S}$*,* $\exists s^*_j$ *such that* $\phi^i(\boldsymbol{S}^*) = 1/2$*, the substitution parameter* β *is identified. Once* β^i *is identified, the relative productivity of parental time,* $\phi^i(\boldsymbol{S})$*, can be recovered from the observed* h^i_D/h^C_D *ratios over the sub-sample such that* $s_j \neq s^*_j$*. Then the output share of time inputs* ρ^i_S *can be recovered from the home time to monetary investment ratios observed in the data,* $\frac{h^i_D}{q^D}$*.*

Proof: Identification of single-parent households' production technology is derived from the optimality condition related to productive efficiency and described in (S7)-(S9). However, even though there are three equations containing three unknowns, the three equations alone do not allow me to explicitly solve for each parameter in terms of observables unless I impose a normalization. Since the production shifter of interest involves the number of children younger than 5, I can then impose a normalization such that for parents with no child younger than 5 ($s_j = 0$), $\phi^i(\mathbf{S}) = 1/2$. Thus, from these households, I can recover β. Taking β^i as known, I can recover $\phi^i(\mathbf{S})$ using S7 on the sub-sample of households with at least one child attending school. Once I have β^i and $\phi^i(\mathbf{S})$, I can use either (S8) or (S9) to recover ρ^i_S. Thus, I find that either of these two conditions can also serve as an overidentifying restriction in this case.

Proposition B2 (Identification of Two-Parent Households' Production Technology).
Let $(h^A_D, h^B_D, h^C_D, q^D)$ *be observed functions of* $(w^A, w^B, p^C, y, \boldsymbol{S}, \boldsymbol{z})$ *for two-parent households. If for at least one production shifter* s*,* $\exists s^*_j$ *such that* $\psi^A(\boldsymbol{S}^*) = 1/3$*, the substitution parameter* γ *is*

identified. Once γ is identified, the output share of the time inputs ρ_M can be identified using the sub-sample such that $s = s_j^*$ upon observing at least one of the home time to monetary investment ratios $\frac{h_D^i}{q^D}$, for $i = (A, B, C)$. With γ and ρ_M known, it is possible to recover each parents' relative productivity in the household over the sample with $s \neq s_j^*$ using the corresponding time to monetary input ratios.

Proof: Identification of the home production parameters stems from the optimality conditions related to productive efficiency described in (S1)-(S6). Since the sample of households in the application here considered has any positive number of children, I let s_j be the number of children younger than 5. Since, for now, the only observable included in the estimation of $\psi^i(\mathbf{S})$ is this, a useful normalization to consider involves focusing on the sub-sample with no child younger than 5. Using (S1) on this sub-sample, I can let $\psi^A(\mathbf{S}) = 1/3$ to recover γ. Taking γ as known, I can recover ρ_M using (S4) on the sub-sample of households no child younger than 5. Once I have γ and ρ, I use (S1) and (S3) to write down $\psi^B(\mathbf{S})$ and $(1 - \psi^A(\mathbf{S}) - \psi^B(\mathbf{S}))$ in terms of $\psi^A(\mathbf{S})$, which can then be substituted into (S4) using the households with at least one child younger than 5 to recover $\psi^A(\mathbf{S})$. Upon recovering $\psi^A(\mathbf{S})$, we can then use (S1) in the same sub-sample to recover $\psi^B(\mathbf{S})$. Then, (S2)-(S3) and (S5)-(S6) serve as overidentifying restrictions.

Proposition B3 (Identification of Individual Preferences).
Let (l^i, q^i) be observed functions of $(w^i, y^i, \boldsymbol{S})$ for $i = (A, B)$. With $\phi^A(\boldsymbol{S})$ and β^A identified, mothers' marginal rate of substitution of leisure for private consumption is identified by observing mothers' wages and leisure to private consumption ratios following (S19). *Upon the identification of the marginal rate of substitution, preference for leisure, $\alpha_1^A(\boldsymbol{X})$, and for private consumption, $\alpha_2^A(\boldsymbol{X})$, are separately identified by observing single mothers' leisure to home production hours ratio following* (S20) *and their private consumption to monetary investments in the production of the public good following* (S22). *A symmetric result holds for the identification of single fathers' preferences for leisure and private market consumption. Assuming that preferences are invariant*

to marital status, the identification of individual preferences within two-parent households follows.

Proof: Once the production function for the sample of single-parent households has been identified, I can then take β^i and $\phi^i(\mathbf{S})$ as known in (S20) and (S22). These two conditions yield two expressions for $\alpha_1^i(\mathbf{X})$ and for $\alpha_2^i(\mathbf{X})$ for both men and women. This follows from using S19 to write down either $\alpha_1^i(\mathbf{X})$ in terms of $\alpha_2^i(\mathbf{X})$, or vice versa, and using this in S20 or S22 to solve the system of equations, yielding

$$\alpha_1^i(\mathbf{X}) = \left(1 - \frac{1}{w^i l^i}\left[(\phi^i(\mathbf{S})(h_D^A)^{\beta^i} + (1-\phi^i(\mathbf{S}))(q^D)^{\beta^i})(q^D)^{1-\beta^i} + q^i\right]\right)^{-1}$$
$$\alpha_2^i(\mathbf{X}) = \left(1 - \frac{w^i}{q^i}\left[(\phi^i(\mathbf{S})(h_D^A)^{\beta^i} + (1-\phi^i(\mathbf{S}))(q^D)^{\beta^i})(h_D^A)^{1-\beta^i} + l^i\right]\right)^{-1}$$

Proposition B4 (Identification of the Pareto Weight).

Let (l^A, l^B, q) be observed functions of $(w^A, w^B, y, \mathbf{S}, \boldsymbol{z})$ for two-parent households. With individual preferences identified, identification of the Pareto weight, $\lambda(\boldsymbol{z})$ follows from the relationship between the spouses' relative bargaining power, observed leisure and wage ratios and distribution factors as described in the third optimality condition presented in (S10).

Proof: Once the parents' individual preferences for leisure have been identified, I can take these as known in the first order conditions of two-parent households, from which I can recover $\lambda(\mathbf{z})$ without needing a normalization since it can come directly from the third condition presented in (S10) upon substitution of α_1^i $(i = A, B)$. This yields the following relationship between the Pareto weight and what is known at this stage

$$\lambda(\mathbf{z}) = \frac{w^A l^A \alpha_1^B(\mathbf{X})}{w^A l^A \alpha_1^B(\mathbf{X}) + w^B l^B \alpha_1^A(\mathbf{X})}$$

Corollary B4 (Overidentification of the Pareto Weight).

With individual preferences and two-parent households' production technology identified, there exist two sets of overidentifying conditions for the Pareto weight. The first set relates the household's public consumption optimality conditions and the second set relates the restrictions derived using *the experimental variation of Oportunidades on household behavior.*

Proof: While the identification of the Pareto weight is guaranteed by the relationship described in (S10), the conditions related to the household's marginal utility for public consumption and for leisure and the spouses' marginal productivity at home described in (S13) and (S14) yield two additional conditions to identify the Pareto weight since both parental preferences and two-parent households' production technology is known at this stage. Furthermore, the condition related to the experimental variation of *Oportunidades* on household behavior described in (S23) yields another overidentifying restrictions relating the Pareto weight, individual preferences and the production technology parameters.

E Robustness Checks

E.1 Estimation Sample Including Households Classified as Non-Poor

To implement the individual poverty analysis presented in Section 5, I extend the original estimation sample to include households that were classified as non-poor by the *Oportunidades* program administration.

E.2 Estimation Sample Including Households with Non-Working Mothers

One of the main criticisms made on implementing empirical applications of the model used in this paper involves the sampling restrictions involving the focus on households in which both parents are working in the labor market. To assess the extent to which the results presented in Section 4 are robust to the inclusion of information from these households, I follow the approach in Chiappori, Meghir and Okuyama (2024) to include these households in the estimation procedure. Within this approach, the labor force participation decision is not modeled structurally within the collective household model developed in the paper, but is estimated outside of the model by imputing the

Appendix Table A.1: Structural Estimation Results Including Households Classified as Non-Poor

	Estimate	SE
Home Production Function, Two-Parent Households:		
ψ_0^A	-0.693	0.0009
ψ_1^A	1.184	0.0015
ψ_0^B	-0.693	0.0009
ψ_1^B	-0.634	0.0009
γ	0.746	0.0015
ρ	0.893	0.0007
Sample mean $\psi^A(S)$	0.484	-
Sample mean $\psi^B(S)$	0.269	-
Sample mean $(1-\psi^A(S)-\psi^B(S))$	0.247	-
Home Production Function, Single-Mother Households:		
ϕ_0^A	0.002	0.0000
ϕ_1^A	1.299	0.0331
β^A	0.164	0.0573
ρ_S^A	0.859	0.0583
Sample mean $\phi^A(S)$	0.606	-
Sample mean $(1-\phi^A(S))$	0.394	-
Home Production Function, Single-Father Households:		
ϕ_0^B	2815.374	0.0019
ϕ_1^B	0.286	0.0003
β^B	0.169	0.0011
ρ_S^B	0.743	0.0020
Sample mean $\phi^B(S)$	0.506	-
Sample mean $(1-\phi^B(S))$	0.494	-
Pareto Weight, Two-Parent Households:		
λ_0 [Constant]	2.129	0.0125
λ_1 [w^A/w^B]	0.831	0.0108
λ_2 [z_0^A]	0.693	0.0006
λ_3 [z_1^A]	0.444	0.0099
λ_4 [Sex ratio]	-3.319	0.0121
Sample mean $\lambda(\mathbf{z})$	0.556	0.0000

	Estimate	SE
Wife's Preferences for Leisure:		
$\alpha_{1,1}^A$ [Constant]	0.941	0.0431
$\alpha_{1,2}^A$ [Age]	0.000	0.2653
$\alpha_{1,3}^A$ [Education]	-0.052	0.1052
$\alpha_{1,4}^A$ [Number of Children]	-0.454	0.0728
Sample mean $\alpha_1^A(\mathbf{X})$ (Married)	0.261	-
Sample mean $\alpha_1^A(\mathbf{X})$ (Single)	0.224	-
Wife's Preferences for Private Market Consumption:		
$\alpha_{2,1}^A$ [Constant]	-15.759	0.0348
$\alpha_{2,2}^A$ [Age]	0.446	0.2026
$\alpha_{2,3}^A$ [Education]	-0.226	0.0905
$\alpha_{2,4}^A$ [Number of Children]	0.312	0.0566
Sample mean $\alpha_2^A(\mathbf{X})$ (Married)	0.204	-
Sample mean $\alpha_2^A(\mathbf{X})$ (Single)	0.299	-
Husband's Preferences for Leisure:		
$\alpha_{1,1}^B$ [Constant]	-3.304	0.0240
$\alpha_{1,2}^B$ [Age]	0.109	0.1605
$\alpha_{1,3}^B$ [Education]	4.470	0.0354
$\alpha_{1,4}^B$ [Number of Children]	-6.582	0.0432
Sample mean $\alpha_1^B(\mathbf{X})$ (Married)	0.464	-
Sample mean $\alpha_1^B(\mathbf{X})$ (Single)	0.414	-
Husband's Preferences for Private Market Consumption:		
$\alpha_{2,1}^B$ [Constant]	-1.808	0.0298
$\alpha_{2,2}^B$ [Age]	0.001	0.2037
$\alpha_{2,3}^B$ [Education]	-0.052	0.0762
$\alpha_{2,4}^B$ [Number of Children]	0.863	0.0424
Sample mean $\alpha_2^B(\mathbf{X})$ (Married)	0.293	-
Sample mean $\alpha_2^B(\mathbf{X})$ (Single)	0.296	-

Notes: The tables present the parameter estimates obtained in the two-step GMM procedure implemented. The first table relates to the home production parameters estimated separately for each type of household. The second table relates to the parameters of the Pareto weight and parental preferences for leisure and private market consumption.

wages for non-working mothers using the Heckman two-step estimator.

Appendix Table A.2: Structural Estimation Results Including Two-Parent Households with Non-Working Mothers in the Estimation Sample

	Estimate	SE
Home Production Function, Two-Parent HHs:		
ψ_0^A	-0.693	0.0025
ψ_1^A	0.959	0.0030
ψ_0^B	-0.693	0.0022
ψ_1^B	-1.039	0.0013
γ	0.528	0.0012
ρ	0.901	0.0011
Sample mean $\psi^A(S)$	0.517	-
Sample mean $\psi^B(S)$	0.206	-
Sample mean $(1-\psi^A(S)-\psi^B(S))$	0.277	-
Pareto Weight:		
λ_0 [Constant]	0.042	0.0154
λ_1 [w^A/w^B]	0.619	0.0106
λ_2 [z_0^A]	0.693	0.0033
λ_3 [z_1^A]	0.656	0.0054
λ_4 [Sex ratio]	-0.842	0.0144
Sample mean $\lambda(\mathbf{z})$	0.524	-
Wife's Preferences for Leisure:		
$\alpha_{1,1}^A$ [Constant]	-0.778	0.0231
$\alpha_{1,2}^A$ [Age]	-0.000	0.1412
$\alpha_{1,3}^A$ [Education]	-0.101	0.0560
$\alpha_{1,4}^A$ [Number of Children]	-0.896	0.0402
Sample mean $\alpha_1^A(\mathbf{X})$ (Married)	0.258	-
Sample mean $\alpha_1^A(\mathbf{X})$ (Single)	0.303	-

	Estimate	SE
Wife's Preferences for Private Market Consumption:		
$\alpha_{2,1}^A$ [Constant]	-16.213	0.0316
$\alpha_{2,2}^A$ [Age]	0.300	0.1885
$\alpha_{2,3}^A$ [Education]	0.094	0.0770
$\alpha_{2,4}^A$ [Number of Children]	1.216	0.0536
Sample mean $\alpha_2^A(\mathbf{X})$ (Married)	0.109	-
Sample mean $\alpha_2^A(\mathbf{X})$ (Single)	0.237	-
Husband's Preferences for Leisure:		
$\alpha_{1,1}^B$ [Constant]	3.547	0.0307
$\alpha_{1,2}^B$ [Age]	0.008	0.2085
$\alpha_{1,3}^B$ [Education]	3.127	0.0392
$\alpha_{1,4}^B$ [Number of Children]	-4.248	0.0555
Sample mean $\alpha_1^B(\mathbf{X})$ (Married)	0.471	-
Sample mean $\alpha_1^B(\mathbf{X})$ (Single)	0.442	-
Husband's Preferences for Private Market Consumption:		
$\alpha_{2,1}^B$ [Constant]	-2.040	0.0703
$\alpha_{2,2}^B$ [Age]	-0.004	0.4587
$\alpha_{2,3}^B$ [Education]	-0.193	0.1906
$\alpha_{2,4}^B$ [Number of Children]	2.208	0.0860
Sample mean $\alpha_2^B(\mathbf{X})$ (Married)	0.364	-
Sample mean $\alpha_2^B(\mathbf{X})$ (Single)	0.357	-

Notes: The tables present the parameter estimates obtained in the two-step GMM procedure implemented. The first table relates to the home production parameters estimated separately for each type of household. The second table relates to the parameters of the Pareto weight and parental preferences for leisure and private market consumption.

Appendix Table A.3: Overall Impact of *Oportunidades* on Beneficiary Households (Including Non-Working Mothers), Percentage Change

	Two-Parent Households					
		Conditional Sharing Rule		**MMWI**		
	Pareto Weight	Mother	Father	Mother	Father	Domestic Output
MDID	14.778***	26.095***	-14.906*	0.314***	0.286	18.463**
	(2.168)	(4.133)	(7.825)	(0.095)	(0.191)	(8.613)

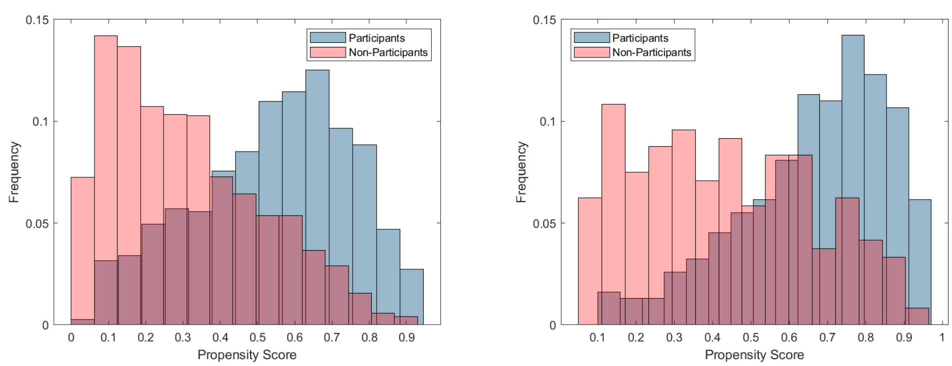
Notes: Tables present the MDID estimates (in percentage changes) of the impact of *Oportunidades* on outcomes derived from the model that quantify the degree of gender inequality within two-parent households, including those with non-working mothers. *Money Metric Welfare Index* computes the money metric welfare index described as the solution to (S37) and (S38) for mothers and fathers, respectively. *Domestic Output* corresponds to the predicted production of the public good Q associated with children.

F Supplemental Tables and Figures

F.1 Propensity Score Estimation and Distribution

The choice of conditioning variables for the estimation of the propensity score builds upon the work of Behrman et al. (2012), and Angelucci and Attanasio (2013). In the estimation of this probit model, I focus on the subset of covariates pertaining to household composition, dwelling characteristics, financial indicators (whether the household has some previous loans, and savings). I also include information on household participation in other social programs, educational attainment of the mother and father, and an index of poverty incidence in the state in which the household resides. The first step of the MDID estimator described in Section 2 involves estimating a probit model of program participation. For two-parent households, I present the marginal effects at the mean in A.4. For single parent households, a comparable set of covariates are used to estimate the model, yielding the marginal effects at the mean presented in Table A.5. The distributions of the predicted propensity scores are presented A.1.

Figure A.1: Propensity Score Distribution by Type of Household



Two-Parent Single-Parent

To implement the MDID estimator, I construct the weight $\tilde{\omega}_{ij}$ using $\tilde{\omega}_{ij} = \frac{K\left(\frac{P_j-P_i}{h}\right)}{\sum_{k\in C} K\left(\frac{P_k-P_i}{h}\right)}$ over the region of common support, where the kernel of choice for the analysis implemented in

Appendix Table A.4: Probit Estimates: Marginal Effects at the Mean

	$\Pr(D=1 \mid X)$	
HH Poverty Index	0.375*	(0.16)
(HH Poverty Index)^2	-0.129***	(0.04)
Household size	0.0617	(0.06)
Number of children, 0-5	0.0453	(0.07)
Number of children, 6-12	-0.106	(0.11)
Number of children, 13-15	-0.0999	(0.10)
Number of children, 16-20	-0.231*	(0.11)
(Number of children in school)^2	-0.0188	(0.01)
Number of children in school, 6-12	0.256*	(0.10)
Number of children in school, 13-15	0.236*	(0.11)
Number of children in school, 16-20	0.369**	(0.14)
Female head	0.243**	(0.09)
Wants children to get more education	0.0194	(0.18)
Number of rooms	-0.0602	(0.04)
Floors made of dirt	0.160**	(0.05)
Walls made of weak material	0.208***	(0.05)
Gas stove ownership	-0.125	(0.11)
Refrigerator ownership	-0.0203	(0.06)
Has had loans	0.105*	(0.05)
Has had savings	0.0765	(0.10)
Local incidence of poverty	0.0311**	(0.01)
(Local incidence of poverty)^2	-0.000216	(0.00)
Tortilla subsidy	0.269***	(0.07)
Milk subsidy	-0.0885	(0.08)
Breakfast subsidy	-0.0590	(0.07)
Employed in 2001, mother	-0.0797	(0.06)
Employed in 2000, mother	0.0410	(0.07)
Employed in 1999, mother	0.0654	(0.06)
Employed in 2001, father	0.0702	(0.18)
Employed in 2000, father	-0.171	(0.18)
Employed in 1999, father	-0.0794	(0.16)
Completed years of education, mother	-0.0150	(0.01)
Completed years of education, father	-0.0309*	(0.01)
Age, mother	-0.00978	(0.01)
Age, father	0.00663	(0.00)
N	629	

Standard errors in parentheses

Appendix Table A.5: Probit Estimates: Marginal Effects at the Mean

	$\Pr(D=1\|X)$	
HH Poverty Index	0.0500	(0.15)
(HH Poverty Index)^2	-0.0376	(0.04)
Household size	-0.0773	(0.05)
Number of children, 0-5	0.205**	(0.06)
Number of children, 6-12	0.0893	(0.08)
Number of children, 13-15	0.0520	(0.09)
Number of children, 16-20	0.0724	(0.08)
(Number of children in school)^2	-0.00265	(0.01)
Number of children in school, 6-12	0.107	(0.07)
Number of children in school, 13-15	0.0974	(0.09)
Number of children in school, 16-20	0.0352	(0.11)
Wants children to get more education	0.0519	(0.12)
Number of rooms	-0.169***	(0.04)
Floors made of dirt	0.153**	(0.06)
Walls made of weak material	0.137*	(0.05)
Refrigerator ownership	-0.00573	(0.07)
Gas stove ownership	-0.208	(0.12)
Has had loans	0.0918	(0.06)
Has had savings	0.0460	(0.12)
Local incidence of poverty	0.0571***	(0.01)
(Local incidence of poverty)^2	-0.000524***	(0.00)
Tortilla subsidy	0.271***	(0.07)
Milk subsidy	0.0595	(0.09)
Breakfast subsidy	-0.00791	(0.08)
Employed in 2001	0.0712	(0.08)
Employed in 2000	0.0181	(0.08)
Employed in 1999	-0.0363	(0.06)
Age	0.00800*	(0.00)
Completed years of education	-0.0202	(0.01)
N	650	

Standard errors in parentheses

this paper is the Epanechnikov kernel using Silverman's rule of thumb for bandwidth selection, $h = 2.345\sigma N^{-0.2}$.

Appendix Table A.6: 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).