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

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Abstract

This paper exploits the exogenous variation of Mexico's *Oportunidades* conditional cash transfer program on urban households' time and consumption allocations to identify and structurally estimate a collective labor supply model with home production. I use my structural estimates to show that participation in *Oportunidades* increased maternal intrahousehold bargaining power by 24%, which is associated with an increase of almost 25% in the production of a child-related public good. Counterfactual exercises show that *Oportunidades* is as effective as alternative cash transfer programs and more effective than wage subsidies at increasing mothers' bargaining power, control over household monetary resources, and domestic output.
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1 Introduction

Placing monetary resources in the hands of a specific household member significantly affects the way in which those resources will be ultimately spent. Substantial empirical evidence shows that targeting monetary resources to women tend to generate household allocations that are more favorable to children (Duflo (2003), Duflo and Udry (2004), Doss (2013), Armand et al. (2020)). Considering that an increasing number of policies tend to place monetary benefits in the hands of women, disentangling the extent to which observed household responses to these gender-targeted policies are driven by changes in intrahousehold decision-making and are not only the byproduct of income and substitution effects generated by their eligibility criteria and benefits scheme can yield valuable insights regarding the optimal design of social welfare programs and taxation policies.

The aforementioned evidence has constituted a systematic rejection of the standard unitary model of the household.[1] Alternatively, non-unitary models posit that household decisions reflect its decision-makers' individual preferences and relative decision-making power. Specifically, the collective model (Chiappori (1988), Apps and Rees (1988), Chiappori (1992)) formalizes the decision-making structure of the household through the concept of the Pareto weight. The model assumes that households behave as if they maximized a weighted sum of its decision-makers' individual utilities, with the Pareto weight being the relative weight attached to an individual's set of preferences.[2] Therefore, this framework is suitable for studying how gender-targeted benefits affect household time and consumption allocations by changing the intrahousehold distribution of decision-making power and income.

This paper combines the structural estimation of a collective labor supply model that accounts for home production with a causal reduced-form analysis to quantify the impact of Mexico's *Oportunidades* conditional cash transfer program on mothers' Pareto weight, intrahousehold income inequality, and investments in children in urban two-

[1] The unitary model characterizes household behavior as stemming from the maximization of a common utility function, implying that a common set of preferences supersedes household members' individual preferences. A main implication of this framework is that the identity of the recipient of a monetary benefit is irrelevant for decision-making purposes since resources are pooled at the household level.

[2] The model's core assumption is that household outcomes are Pareto efficient. While this can be an unreasonable assumption in the context of developing countries (Udry (1996)), Bobonis (2009) and Attanasio and Lechene (2014) fail to reject the Pareto efficiency assumption for *Progresa* beneficiary households in Mexico, thus providing evidence in favor of collective rationality in this paper's relevant context.

parent households. My focus on the relatively understudied urban implementation of the program is motivated by the availability of information on individual time spent in both market and home production activities which is ultimately crucial in the identification and estimation strategy implemented in the structural approach I propose. Using my structural estimates, I also conduct counterfactual exercises to assess whether alternative policy designs generate comparable responses to different combinations of benefits and conditionalities. In this way, the paper departs from existing work relating the evaluation of policies like *Oportunidades* by focusing on using the program as a rich source of identifying variation to disentangle the role of intrahousehold decision-making and income inequality in generating the documented effects of the program on household consumption and on children's outcomes.[3] While some of the studies in the literature have used the program for ex-ante policy evaluation (Todd and Wolpin (2006), Attanasio, Meghir and Santiago (2012)), the mechanism I explore allows me to assess the extent to which intrahousehold gender gaps can be used as policy levers to induce responses aligned with key policy objectives.

An important feature of the estimated model is that it follows the framework developed in Blundell, Chiappori and Meghir (2005) by considering both time and consumption allocation decisions where time is allocated not only to market work and leisure but also to home production.[4] Within my context, home production plays a crucial role given that domestic output serves as a proxy for the production of child quality by taking both parental time and monetary investments in children as inputs of production. My causal reduced-form analysis showing that mothers' home production and leisure hours respond strongly to *Oportunidades* provide further motivation for the inclusion of home production. Thus, my approach differs from existing collective model applications within the context of developing countries as these rely on a consumption-based characterization of the model that does not consider the time allocation decisions made by individuals (Tommasi (2019), Calvi (2020), Sokullu and Valente (2021)).

Unfortunately, empirical applications of the model featuring both time and consumption allocations in which the Pareto weight is structurally estimated remain relatively

[3] Participation in *Progresa/Oportunidades* has been found to significantly increase the demand for food in rural and urban households (Attanasio and Lechene (2002), Attanasio and Lechene (2010), Angelucci and Attanasio (2013)), decreased adult women's participation in domestic work (Skoufias (2005)). Attanasio and Lechene (2002) showed that participation in *Progresa* improved mothers' reported bargaining position.

[4] Additionally, Apps and Rees (1996) and Chiappori (1992) warn against a simple dichotomization of time between market time and leisure as a model based on such dichotomization could yield biased welfare measures.

scarce. In general, these papers often rely on highly-detailed survey data containing time use and consumption information both reported at the individual level and are predominantly focused on developed countries. Cherchye, De Rock and Vermeulen (2012) provide an empirical application and generalization of this framework using a novel Dutch dataset. Lise and Yamada (2019) extend it to a dynamic setting using unique panel data from Japan. Embedding the model within an equilibrium marriage market framework, Gayle and Shephard (2019) use the variation across marriage markets to identify the Pareto weight. Instead, I use the exogenous variation of *Oportunidades* on household behavior to overcome data limitations when identifying the full structure of the model despite facing limited information on intrahousehold consumption. I, thus, propose an approach for estimating this class of models within the context of developing countries which often face considerable data limitations that tend to thwart applications of this model but feature rich policy variation like the one I leverage here.

The identification results I present allow me to recover the household's production technology, parental preferences, and the Pareto weight when observing the allocation of time at the individual level but only having household-level information on consumption. Besides assuming that preferences are invariant to marital status, my approach relies on two sources of heterogeneity in the impact of *Oportunidades* on parent's time use. The first source exploits the role of the wife's share of non-labor income as a distribution factor, capturing shifts in the decision-making process of beneficiary households generated by the program's gender-based targeting.[5] The second source exploits the role of the number of children in the household attending school as a production shifter, capturing shifts in the household's productivity generated by the program's conditionalities. I find that these two sources of heterogeneous effects on mothers' leisure are crucial in the identification of the Pareto weight. In this way, the complexity of the benefits and requirement schemes of development policies like *Oportunidades* can serve as a valuable source of exogenous variation for identification purposes.

Using my structural estimates for the Pareto weight, I show that participation in *Oportunidades* increased mothers' bargaining power by almost 24% within beneficiary households. To the best of my knowledge, this constitutes novel evidence of the Pareto weight's response to the gender-based targeting strategy of development policies within a framework that accounts for the impact of these policies on both time use and con-

[5] Distribution factors are variables affecting household allocations only through their impact on the Pareto weight while leaving preferences and the budget constraint unchanged.

sumption. While there exists evidence focusing on the impact of the rural implementation of *Progresa/Oportunidades* on women's resource share, commonly used as a measure of bargaining power within a consumption-based collective framework, this is mixed with no consistent evidence of a link between monetary benefits targeted to women and improvements in their decision-making power. For instance, Tommasi (2019) finds that the program increased women's resource shares by almost 12%, with the results of Sokullu and Valente (2021) indicating a more modest increase.[6] On the other hand, Tommasi and Wolf (2016) found that men benefited more from the program than women in this regard. Thus, by capturing changes in the Pareto weight in response to the program, my results contribute to this strand of the literature by providing evidence of a direct link between women's bargaining power and targeted benefits within a framework that rationalizes both time and consumption responses to this type of policies.

A significant advantage of estimating the full structure of the model is that it allows me to explore the extent to which this improvement in mothers' bargaining power ultimately increases their control of household monetary resources. I use an extension of the money metric welfare index (MMWI) originally proposed in Chiappori and Meghir (2015) to provide a money metric of individual welfare, which is in turn informative of a decision-maker's control of monetary household resources while properly accounting for the economies of scale in consumption and production generated by the public consumption of a home-produced good.[7] I find that *Oportunidades* increased mothers' MMWI by almost 20%, which constitutes an annual increase of approximately 3,067 MXN pesos (294 USD) in their individual welfare. Importantly, I find that this improvement in mothers' individual welfare is consistent with an increase of approximately 25% in the production of a domestic good that is publicly consumed within two-parent households and which serves as a proxy for children's well-being by taking both parental time and monetary investments in children as inputs. Thus, the results here presented show that the documented increase in mothers' bargaining power within beneficiary two-parent households effectively translated into improvements in both mothers' individual welfare and higher production levels of the child-related public good. These results are overall consistent with the empirical evidence suggesting a positive relationship

[6] Sokullu and Valente (2021) focus on the same implementation of the program but use a different methodology that exploits the panel feature of the data.

[7] The MMWI I implement differs from the related indifference scales used in Cherchye, De Rock and Vermeulen (2012) in the way it captures the loss incurred by married parents in terms of economies of scale in production and consumption when transitioning from marriage into singlehood.

between mothers' control of resources and investments in children (Lundberg, Pollak and Wales (1997), Duflo (2003), Duflo and Udry (2004), Armand et al. (2020)).

I consider alternative designs of cash transfer programs in terms of their revenue neutrality and conditionalities as well as changes in other sources of income, such as wages.[8] I find that *Oportunidades* is as effective as alternative cash transfer programs at empowering mothers, improving their control of monetary resources and increasing the domestic production of the public good associated with children. Furthermore, I find that cash transfers are significantly more effective than wage subsidies at generating comparable responses. As expected, monetary resources targeted to fathers have a contrasting impact on mothers' bargaining power and on the intrahousehold allocation of monetary resources. Importantly, the results from these exercises indicate that targeting cash transfers to mothers generates an increase in the production of the child-related public good, while targeting these transfers to fathers has the opposite effect on domestic output. These results provide further evidence that targeting benefits to mothers can be more beneficial for children than targeting fathers and complements the empirical evidence highlighting this relationship between the identity of benefit recipients and investments in children when randomizing the identity of recipients as in the context examined in Armand et al. (2020). Furthermore, my results show that conditionalities play a central role in generating strong effects on the domestic production of the child-related public good.

I then conduct an individual poverty analysis on the sub-sample of two-parent non-poor households. I find that upon accounting for the unequal sharing of resources within the household by computing individual poverty rates using the MMWI, I can classify almost 44% of mothers living in two-parent non-poor households as individually poor. I further show that targeting a cash transfer to these mothers improves their bargaining position by more than 10%, translating into an improvement of more than 9% in their MMWI and of more than 7% in the households' level of domestic production. In terms of cost-efficiency, these effects are stronger when considering cash transfers that are revenue neutral. Overall, these results contribute to the growing evidence highlighting the importance of accounting for intrahousehold inequality in poverty calculations as poverty can be unequally shared within households (Cherchye et al. (2018), Tommasi (2019), Calvi (2020)).

[8] Revenue neutrality is ensured at the household level. This is mainly achieved by triggering a redistribution of non-labor income (in the case of cash transfers) or of wage income (in the case of wage subsidies) from the non-targeted spouse to the beneficiary spouse.

The remainder of the paper is organized as follows. Section 2 describes the theoretical framework used to analyze the behavior of two-parent and single-parent households with children. Section 3 describes Mexico's *Oportunidades* program and its evaluation data. Section 4 describes the identification and estimation strategy implemented. Section 5 describes the analysis of intrahousehold bargaining power and individual welfare used to evaluate the program's effect on beneficiary household's decision-making structure and individual welfare and conducts the counterfactual exercises used to explore alternative policy designs. Section 6 concludes.

2 Model Setup

This paper considers the behavior of both single-parent and two-parent households with children. While I focus on decision-making and allocation of resources within two-parent households, the inclusion of single-parent households in the analysis serves a two-fold purpose. First, the behavior of these type of households informs the identification of individual parental preferences. Lastly, I use these households' economic environment to describe the counterfactual environment that married parents would face in the case of dissolution considered by the individual welfare measure proposed in Section 5.

2.1 Single-Parent Households

Consider a household comprised by a single parent and her children. Let i denote the parent who decides how to allocate his/her time between market work and the production of a domestic good Q. Parents have preferences over their own leisure and private market consumption (l^i, q^i) and the domestic good Q. Moreover, each individual decides how to allocate their total time endowment $\bar{T}$ to leisure l^i, time spent in market work h^i_M, and time spent in home production h^i_D. The model allows for the production technology to differ by gender as the domestic good Q is assumed to be produced using parental time h^i_D $(i = A, B)$ and market purchases q^D using the technology described by $Q = F^{s,i}_Q(h^i_D, q^D; \mathbf{S})$, where $\mathbf{S}$ denotes a vector of production shifters, which includes the number of children in the household attending school. Given that I model domestic output as a function of parental investments in children's human capital, Q can be interpreted as a proxy for child quality. Furthermore, total household income is derived from the parent's total labor market earnings $(w^i h^i_M)$ and non-labor income. I introduce the exogenous variation of the *Oportunidades* cash transfer by letting non-labor income be a function of the size of the transfer received from the program, $y^i = y^i_C + dy_{CCT}$, where d is an indicator of program participation, y^i_C denotes non-labor income in the case of non-participation and y_{CCT} denotes the cash transfer amount assigned. Thus, the behavior of single-parent households can be described as the solution to

$$\max_{l^i, h^i_D, q^i, q^D} U^i(l^i, q^i, Q; \mathbf{X}^i) \tag{1}$$

$$\text{s.t.} \;\; q^i + q^D = y^i + w^i h^i_M; \;\; y^i = y^i_C + dy_{CCT}; \quad Q = F^{s,i}_Q(h^i_D, q^D; \mathbf{S}); \;\; l^i + h^i_M + h^i_D = \bar{T}$$

In this case, the optimality conditions governing household behavior are

$$\frac{\partial U^i/\partial l^i}{\partial U^i/\partial q^i} = w^i; \;\; \frac{\partial F^{s,i}_Q}{\partial h^i_D}\frac{\partial U^i}{\partial Q} = \frac{\partial U^i}{\partial l^i}; \;\; \frac{\partial F^{s,i}_Q}{\partial q^D}\frac{\partial U^i}{\partial Q} = \frac{\partial U^i}{\partial q^i}; \;\; \frac{\partial F^{s,i}_Q/\partial h^i_D}{\partial F^{s,i}_Q/\partial q^D} = w^i \tag{2}$$

2.2 Two-Parent Households

Consider a household comprised by the wife and husband, denoted by A and B, respectively, and their children. As in Blundell, Chiappori and Meghir (2005), I assume that children have no bargaining power of their own, but are rather accounted for in the production of the public good Q. Spouses have preferences described by the utility function in 1. While preferences are stable across household structure, the production technology differs across both types of household, thereby capturing economic gains from marriage in the form of economies of scale in production. Within two-parent households, Q is domestically produced using the production technology F^M_Q, taking as inputs both parental time h^i_D, for $i = (A, B)$, and market purchases, q^D. Thus, the full allocation of each spouse's total time endowment $\bar{T}$ is described by the amount of hours they spend in leisure activities (l^i), in home production activities (h^i_D) and in market work (h^i_M). Thus, the household's total income is derived from the parents' total labor market earnings $w^A h^A_M + w^B h^B_M$ and their total non-labor income $y^A + y^B$. I introduce the exogenous variation of the *Oportunidades* cash transfer into the model by assigning the cash transfer amount, y_{CCT}, to the wife's non-labor income if the household is participating in the program. Under the assumption of Pareto efficient household outcomes, household behavior can be described as the solution to

$$\max_{l^A, l^B, h^A_D, h^B_D, q^A, q^B, q^D} \lambda(w^A, w^B, y, \mathbf{z}) U^A(l^A, q^A, Q; \mathbf{X}^A) + (1 - \lambda(w^A, w^B, y, \mathbf{z})) U^B(l^B, q^B, Q; \mathbf{X}^B) \tag{3}$$

$$\begin{aligned} \text{s.t.} \qquad q^A + q^B + q^D &= y^A + y^B + w^A h^A_M + w^B h^B_M; \;\; Q = F^M_Q(h^A_D, h^B_D, q^D; \mathbf{S}) \\ \bar{T} &= l^i + h^i_M + h^i_D; \;\; y^A = y^A_C + dy_{CCT}; \;\; y^A = z^A y \end{aligned}$$

Following Browning and Chiappori (1998), I assume that parental utility functions are strictly concave, twice continuously differentiable and strictly increasing in (l^i, q^i, Q). I introduce observed preference heterogeneity through the inclusion of a set of taste shifters, $\mathbf{X}^i$, that includes sociodemographic characteristics specific to each spouse and household-level characteristics. As will be discussed throughout the estimation of the model in Section 4, similar to Cherchye, De Rock and Vermeulen (2012) and Lise and Yamada (2019), these variables include parents' age, completed years of education and the number of children in the household.

The Pareto weight is a differentiable and zero-homogeneous function on $(w^A, w^B, y, \mathbf{z})$. Importantly, the collective framework recognizes that the Pareto weight can respond to two sets of variables. The first set includes variables that shift the Pareto frontier such as wages and income while the second set, $\mathbf{z}$, includes variables that trace movements along the Pareto frontier. The role of the former is to define the household's social welfare function described in 3 in terms of wages and income, while the latter allows for exogenous factors to affect household behavior only through their effect on the decision-making process.[9] The results in Browning and Chiappori (1998) and Chiappori and Ekeland (2009) highlight the role of the vector of distribution factors, $\mathbf{z}$, in identifying the model. Intuitively, these exogenous variables serve as exclusion restrictions needed to separately identify individual preferences from the Pareto weight by generating shifts in intrahousehold behavior only through changes in the Pareto weight while leaving preferences unaltered.

Specifically, I allow for the *Oportunidades* program to serve as an exogenous source of variation on z^A, which ultimately plays a crucial role in the identification of the model by observing changes in intrahousehold allocations in response to variation in z^A. I discuss in further detail this identification result in Section 4. The link between the *Oportunidades* cash transfer and z^A is derived from the program's gender-based targeting strategy under which the transfer is placed in the hands of female household heads. Formally, the wife's share of non-labor income can be defined as

$$z_d^A = \frac{y_0^A + dy_{CCT}}{y_0^A + y^B}$$

where $d \in \{0, 1\}$ and y_0^A denotes the wife's non-labor income in the absence of treatment.

[9]As discussed in Browning, Chiappori and Weiss (2014), this yields implications derived within the collective framework that are compatible with rejections of income pooling which cannot be rationalized within a unitary setting.

Then, the difference in z^A between participant and non-participant households can then be defined as

$$z_1^A - z_0^A = \frac{y_{CCT}(Y_0 - y_0^A)}{Y_C(Y_0 + y_{CCT})} \geq 0$$

where $Y_0 = y_0^A + y^B$. Thus, by placing the cash transfer entirely in the hands of mothers, *Oportunidades* can be expected to affect the intrahousehold allocation of resources through its impact on z^A and, subsequently, on $\lambda(w^A, w^B, y, \mathbf{z})$.

Furthermore, the production function F_Q^M is assumed to be twice continuously differentiable, strictly increasing and concave in (h_D^A, h_D^B, q^D). The model also allows for the inclusion of production shifters in the vector **S**. Given the research question at hand, the production shifter used in this paper involves the number of children in the household attending school. In this way, through minimum school attendance requirements attached to the receipt of the cash transfer, I allow for the conditionalities of a program like *Oportunidades* to have an effect on the productivity of the household.

Thus, at an interior solution to 3, I derive three sets of optimality conditions that govern the intrahousehold allocation of time and consumption. The first set relates to the spouses' private consumption of leisure and a market good,

$$\frac{\partial U^A/\partial l^A}{\partial U^A/\partial q^A} = w^A; \quad \frac{\partial U^B/\partial l^B}{\partial U^B/\partial q^B} = w^B; \quad \frac{\partial U^A/\partial l^A}{\partial U^B/\partial l^B} = \frac{w^A}{w^B}\frac{1-\lambda}{\lambda}; \quad \frac{\partial U^A/\partial q^A}{\partial U^B/\partial q^B} = \frac{1-\lambda}{\lambda} \tag{4}$$

The second set relates to the spouses' public consumption.

$$\frac{\partial F_Q^M}{\partial h_D^A}\left[\lambda\frac{\partial U^A}{\partial Q} + (1-\lambda)\frac{\partial U^B}{\partial Q}\right] = \lambda\frac{\partial U^A}{\partial l^A} \tag{5}$$

$$\frac{\partial F_Q^M}{\partial h_D^B}\left[\lambda\frac{\partial U^A}{\partial Q} + (1-\lambda)\frac{\partial U^B}{\partial Q}\right] = (1-\lambda)\frac{\partial U^B}{\partial l^B} \tag{6}$$

$$\frac{\partial F_Q^M}{\partial q^D}\left[\lambda\frac{\partial U^A}{\partial Q} + (1-\lambda)\frac{\partial U^B}{\partial Q}\right] = \lambda\frac{\partial U^A}{\partial q^A} = (1-\lambda)\frac{\partial U^B}{\partial q^B} \tag{7}$$

Lastly, the third set relates to productive efficiency

$$\frac{\partial F_Q^M/\partial h_D^A}{\partial F_Q^M/\partial h_D^B} = \frac{w^A}{w^B}; \quad \frac{\partial F_Q^M/\partial h_D^A}{\partial F_Q^M/\partial q^D} = w^A; \quad \frac{\partial F_Q^M/\partial h_D^B}{\partial F_Q^M/\partial q^D} = w^B \tag{8}$$

The partitioning of these optimality conditions into three groups feeds directly into the identification strategy adopted in Section 4. Since the optimality conditions related to productive efficiency do not involve individual preferences or the Pareto weight, identification of the production function is focused on these conditions alone. On the other hand, most of the identification of the Pareto weight and individual preferences relies on the optimality conditions related to public consumption, namely, the household's marginal rates of substitution for private and public consumption.

3 *Oportunidades*: Data and Evaluation

3.1 Program Overview

Mexico's *Oportunidades* conditional cash transfer program is one of the most well-known CCT programs in the region, originally implemented in rural areas under the name *Progresa* in 1997. The program was later expanded to semi-urban and urban areas under the new administration in 2002, then renamed as *Oportunidades* (Levy (2007)). The program intervenes simultaneously in the three focal areas of education, nutrition and health. The evaluation design implemented by the program administration has been conducive to the assessment of the program's impact on key development outcomes such as children's school enrollment and health outcomes, most of which has been deemed as positive (Skoufias and Di Maro (2006), Parker and Todd (2017)). While most of the attention in the literature has been focused on the rural implementation of the program, this paper focuses on its 2002 expansion to urban areas. The two implementations differ mainly in their evaluation design and its beneficiary selection procedure.

Both implementations featured a two-stage beneficiary selection procedure. The first stage involved the geographic targeting of intervention areas. In rural areas, 506 villages in 7 of the 32 states were randomly assigned to control or treatment groups. However, perfect randomization was infeasible in urban areas due to financial considerations. Therefore, using the 2000 census and the INEGI's 2000 National Survey of Household Income and Expenditure, the program was initially offered in city blocks having the highest incidence of poverty based on which the program administration computed a city block-level propensity score predicting the city block's likelihood to be part of the intervention, thus matching a comparable sample of city blocks based on their similarities in terms of propensity scores. The second stage consisted of the selection of beneficiary households through a discriminant analysis which consisted on comparing each household's marginality index against a local cutoff defined using the minimum well-being line defined by the National Council for the Evaluation of Social Development Policy (CONEVAL).[10]

The benefits and conditionalities scheme of the program provides two main channels through which the program can affect consumption patterns and the allocation of time within two-parent households as described in Section 2. The first involves the program's gender-based targeting strategy under which once households are deemed eligible, the program administration assigns female household heads as transfer holders. Thus, participation in the program alters women's contribution to total household non-labor income, described in Section 2 as the distribution factor of interest in this paper. The second one involves the pressure exerted by participation in the program on the households' resource constraints through the conditionalities attached to it involving minimum school attendance by school-aged children in the household and regular medical checkups which could potentially affect the amount of time and money households devote to children's human capital accumulation.

3.2 *Oportunidades*' Urban Evaluation Survey

This paper uses a novel mix of survey and administrative data collected from the urban implementation of *Oportunidades*. The survey data is obtained from the 2002-2004 waves of the program's sociodemographic module of the Urban Evaluation Survey (ENCELURB), yielding a short panel of *Oportunidades*' beneficiary and non-beneficiary households. The survey contains rich information on household structure, income and consumption patterns in addition to individual information on labor supply, education, and time use. The availability of individual time use information motivates this paper's focus in the program's urban implementation. 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 and third waves contain the first and second follow-ups gathered during the fall of 2003 and 2004, respectively. I combine information on households' eligibility with administrative records on the bi-monthly transfers made to households that have been incorporated into the

[10]This minimum well-being line is known as *Linea de Bienestar Minimo*), defined as "the lack of monetary capacity to afford the essential goods for an adequate nutrition even after using all their income to buy food" (CONEVAL, 2000) This multidimensional definition of well-being is used to capture not only extreme poverty but also what is defined as the poverty of means by the National Council for the Evaluation of Social Development Policy (CONEVAL).

program to construct the program participation indicator. I also use this administrative transfer data to construct the wife's share of non-labor income, thereby introducing the exogenous variation of the program into the structural approach developed in the paper. The construction of the variables used in the estimation described in subsection 4.3 is further discussed in the Online Appendix.

3.3 Evaluation Methodology

The imperfect randomization of the program's geographic targeting and household selection process plays an important role on the choice of estimator used to evaluate the program's effect on observed household behavior. I conduct a causal analysis that addresses the potential selection into treatment by explicitly modeling the participation decision using a matching difference-in-differences strategy, thereby implementing the following longitudinal estimator presented in Blundell, Chiappori and Meghir (2005)

$$\hat{\alpha}^{MDID} = \frac{1}{N_1} \sum_{i \in T} \left\{ [y_{it_1} - y_{it_0}] - \sum_{j \in C} \tilde{\omega}_{ij} [y_{jt_1} - y_{jt_0}] \right\} \tag{9}$$

where N_1 denotes the number of treated households in the common support region. The MDID explicitly models the program participation decision by non-parametrically constructing a control group for each treated household such that the comparison group becomes more observably similar to its treated counterpart by matching these households using their propensity to participate in the program, captured by the constructed weight, $\tilde{\omega}_{ij}$.

I implement the estimator in two stages. The first stage involves the computation of the propensity score, $P(X)$, at the household level using a probit model. The marginal effects at the mean for the estimation results of this model for two-parent and single-parent households are presented in Tables 10 and 11 in Appendix C.[11] The distributions of the propensity scores for both types of households are presented Appendix C (Figure

[11] 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. Flores (2021) provides a more detailed explanation on the significant differences in these characteristics between participant and non-participant households at baseline.

6). I use a kernel-based algorithm to generate the weights $\tilde{\omega}_{ij}$ which serve to construct the counterfactual for each participant household using information obtained from non-participant households.[12] The second stage consists on estimating a DID regression model over a matched sample of participant and non-participant households:

$$y_{i,t} = \beta_0 + \beta_1 d_i + \beta_2 Post_t + \beta_3 (d_i \times Post_t) + \epsilon_{i,t}$$

where β_3 denotes the MDID estimate of *Oportunidades*' impact on intrahousehold time allocation and consumption patterns that I document in the next subsection.

3.4 Estimation Sample and Program Evaluation

Estimation Sample. This paper focuses on the subsample of single-parent households and nuclear families in the ENCELURB in which the decision-makers are working in the market. While this is a relatively restrictive criteria given the degree of female non-participation that there is in the sample, it serves as a sample for estimation that has all the components of the model described in Section 2.[13] As mentioned in Cherchye, De Rock and Vermeulen (2012) and Lise and Yamada (2019), the estimation of a collective household model of labor supply and home production as the one here presented and described in Section 2 poses significant data requirements as valid information is needed on time use, consumption and income. This explains the reduced number of observations in the final estimation sample used in subsection 4.3. Table 1 presents relevant descriptive statistics for the sample of households used in the estimation of the model.[14]

The median of all consumption types is higher in two-parent households than in their single counterparts which goes in hand with the higher median income of all sources being higher for two-parent households. Regarding time allocation, mothers in two-parent households tend to spend less time working in the market and more time in

[12]The kernel-based matching strategy I use constructs $\tilde{\omega}_{ij}$ using $\tilde{\omega}_{ij} = \frac{K\left(\frac{P_j - P_i}{h}\right)}{\sum_{k\in C} K\left(\frac{P_k - P_i}{h}\right)}$ where the kernel of choice for the analysis implemented in this paper is the Epanechnikov kernel using Silverman's rule of thumb for bandwidth selection, $h = 2.345\sigma N^{-0.2}$.

[13]This criteria is similar to the one adopted in Cherchye, De Rock and Vermeulen (2012) given that the model does not account for the extensive margin of labor supply. This would require extending it to a framework involving both discrete and continuous choices.

[14]For time allocation, the table distinguishes between time spent in home production and time spent in child care. In the estimation described in subsection 4.3, I consolidate these two time use categories into a single measure of home production, thereby capturing these two dimensions of housework.

Table 1: Descriptive Statistics, Eligible Households Included in Estimation Sample

	Two Parent			Single Mother			Single Father		
	Obs	**Mean**	**Median**	**Obs**	**Mean**	**Median**	**Obs**	**Mean**	**Median**
Household Characteristics:									
Household Size	661	5.13	5.00	848	3.89	4.00	130	2.98	2.00
Number of children	661	3.04	3.00	848	2.71	3.00	130	1.93	1.00
Mean Age of Children in Household	657	8.57	8.50	791	10.06	10.17	56	11.61	11.67
Household Consumption:									
Public Expenditures, Yearly	661	7,140.72	6,226.87	848	5,389.30	4,757.04	130	3,314.59	2,567.27
Private Consumption	661	22,046.49	20,867.19	848	16,246.73	14,718.75	130	16,949.58	14,990.40
Food Expenditures	661	17,795.96	16,484.00	848	13,478.18	12,246.00	130	10,412.40	8,840.00
Income									
Total Household Nonlabor Income	661	7,840.21	4,860.73	848	7,198.88	3,713.89	130	4,778.60	1,578.24
Wife's Share	661	0.29	0.05	0	-	-	0	-	-
Total Household Earnings	661	38,809.77	35,429.08	848	16,457.04	14,511.20	130	23,208.37	23,642.79
Parental Characteristics:									
Age, Mother	661	32.75	32.00	848	37.92	36.00	0	-	-
Age, Father	661	36.36	35.00	0	-	-	130	46.79	46.00
Years of Education, Mother	661	6.20	6.00	848	5.66	6.00	0	-	-
Years of Education, Father	661	6.82	6.00	0	-	-	130	5.18	6.00
Market Work Hours, Mother	661	1,081.64	780.00	848	1,490.95	1,456.00	0	-	-
Market Work Hours, Father	661	2,251.26	2,496.00	0	-	-	130	2,146.45	2,366.00
Child Care Hours, Mother	661	575.38	416.00	848	380.31	208.00	0	-	-
Child Care Hours, Father	661	137.12	0.00	0	-	-	130	98.20	0.00
Home Production Hours, Mother	661	1,683.75	1,664.00	848	1,427.33	1,352.00	0	-	-
Home Production Hours, Father	661	211.42	130.00	0	-	-	130	692.80	598.00
Real Wage, Mother	661	17.36	9.62	848	15.39	9.57	0	-	-
Real Wage, Father	661	14.92	11.42	0	-	-	130	14.64	11.14

[1] Monetary values reported in 2002 MXN pesos. 1USD = 10.43MXN pesos. [2] All measures are annualized.

home production and child care than their single counterparts. I find evidence of a high degree of gender specialization in home production and child care within two-parent households with mothers spending more hours in these activities and less time working in the market than their spouses. Specifically, I find that mothers, on average, take on more than 80% of total parental time spent on child care and home production.

***Oportunidades'* Impact on Time Use and Consumption.** I proceed to investigate the extent to which the *Oportunidades* program affected the allocation of time within two-parent households and of single mothers.[15] Table 2 presents the overall impact of the program on the intrahousehold time allocation and public expenditures of two-parent households. The results suggest that participation in the program increased mothers' yearly leisure hours stemming from a significant decrease in their home production

[15] I do not implement this causal analysis among single-father households since less than 5% of them report participating in the program, inline with the program's targeting strategy prioritizing mothers.

hours that is not offset by the increase in the time they spend working in the market. On the other hand, the impact of the program on fathers' time allocation is rendered statistically insignificant. In terms of consumption, the results suggest that the program significantly increased yearly public expenditures in participant two-parent households compared to their non-participant counterparts.[16]

Table 2: Overall Impact of *Oportunidades* on Two-Parent Beneficiary Households

	Leisure		Home Production		Market Work		
	Mother	Father	Mother	Father	Mother	Father	Public Exp.
MDID	239.46*	-248.55	-419.03***	-70.57	179.57**	319.12	1967.24**
	(136.88)	(210.36)	(141.10)	(62.89)	(78.87)	(223.13)	(782.04)
Mean	2,321.40	3,196.48	2,452.89	360.61	1,049.70	2,266.90	6,610.25
N	478	478	478	478	478	478	478

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

Table 3 presents the estimates of the program's impact on the allocation of time and consumption related to children in single-mother households. The results suggest that while program participation reduced yearly home production hours for mothers, the simultaneous significant increase in their yearly market work hours more than offsets such reduction in a way that it yields a statistically insignificant decrease in leisure hours. In contrast with two-parent households, the results show that participation in the program significantly decreases single-mother households' child-related expenditures.

Table 3: Overall Impact of *Oportunidades* on Single-Mother Beneficiary Households

	Leisure	Home Prod.	Market Work	Public Exp.
MDID	-153.893	-303.262**	454.045***	-1837.540***
	(174.652)	(136.465)	(122.948)	(710.979)
Mean, Dep. Var.	2,446.977	1,946.624	1,430.397	4,599.455
N	632	632	632	632

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

The heterogeneous impact of the program on mothers' time allocation by household structure can be rationalized within the framework presented in Section 2. While a pure income effect of the cash transfer would imply an increase in mothers' leisure hours, differences in the intrahousehold allocation of leisure – or private consumption, broadly

[16] I provide evidence of a similar impact of the program within two-parent households in which mothers are not working in the market. The results are included in the Online Appendix.

speaking – across household types implies that potential substitution effects triggered by the program could reflect the extent to which mothers in two-parent households benefit from economies of scale in the production and consumption of the public good.

Altogether, the program evaluation results I have presented throughout this section yield motivating evidence for further investigating the extent to which it is possible to disentangle the program's effect on the balance of power within two-parent households from the program's effect on input productivity in the provision of the child-related public good. Thus, I formalize the link between a shift in mothers' bargaining power and the observed increase in their leisure hours and public expenditures within two-parent households through the structural estimation procedure described in Subsection 4.3 based on the model presented in Section 2. Upon the recovery of the bargaining structure of two-parent households, I quantify the program's impact on the model's primitives in Subsection 5.2.

4 Estimation and Identification

This section describes the identification and structural estimation procedure of the model presented in Section 2. While the model is parametrically estimated, I explore the non-parametric identification of parental preferences, the production technology of two-parent and single-parent households and the Pareto weight, which fully characterizes the decision-making structure of two-parent households. This non-parametric identification analysis informs the parametric identification of the model detailed in Appendix B which ultimately leads to the two-step estimation procedure here described.

4.1 Identification

Proposition 1 (Identification of Two-Parent Households' Production Technology).
Let (h^A_D, h^B_D, q^D) be observed functions of $(w^A, w^B, y, \boldsymbol{S}, \boldsymbol{z})$ for two-parent households. The production function for two-parent households, $F^M_Q(h^A_D, h^B_D, q^D, \boldsymbol{s})$ is identified up to a strictly monotone (thus, invertible) transformation G_M so that $F^M_Q(h^A_D, h^B_D, q^D, \boldsymbol{s}) = G^{-1}_M[\bar{F}^M_Q(h^A_D, h^B_D, q^D; \boldsymbol{s})]$.

Proof: See A.1 in Appendix A.

This follows from the identification result considered in the application of the model to household production in Blundell, Chiappori and Meghir (2005). Intuitively, the optimality conditions derived from productive efficiency in 8 provide a direct relationship between the marginal rates of technical substitution of the three inputs of production,

h_D^A, h_D^B and q^D and the spouses' wages w^A and w^B. By exploiting the observability of these inputs of production and their reduced-form relationship with wages and the continuous differentiability of the production function, F_Q^M, additional conditions can be derived to separately identify the marginal productivity of each input, which can then be integrated to recover F_Q^M up to an increasing transformation.

Proposition 2 (Identification of Single-Parent Households' Production Technology). *Let (h_D^i, q^D) be observed functions of $(w^i, y^i, \boldsymbol{S})$ for single parents $i = (A, B)$ with sufficient variation induced by at least one production shifter, $s_j \in \boldsymbol{S}$, in their marginal productivity. Then, the production function for single-parent households, $F_Q^{S,i}(h_D^i, q^D, \boldsymbol{s})$ is identified up to a strictly monotone (thus, invertible) transformation G_S so that $F_Q^{S,i}(h_D^i, q^D, \boldsymbol{s}) = G_S^{-1}[\bar{F}_Q^{S,i}(h_D^i, q^D; \boldsymbol{s})]$.*

Proof: See A.1 in Appendix A.

This follows a similar intuition to the one followed in the proof of Proposition 1. The identification result stems from the optimality condition in 2 relating the marginal rate of substitution between parental time and monetary investments, h_D^i and q^D and wages w^i for both single mothers and fathers ($i = A, B$). I further use the response of these marginal rates of technical substitution to shifts in the production shifter s_j to derive an additional condition that allows us to identify each individual marginal productivity which can then be integrated to recover $F_Q^{s,i}$ up to an increasing transformation.

Proposition 3 (Identification of Individual Preferences and the Pareto Weight). *Let l^i be an observed function of $(w^i, y^i, \boldsymbol{S})$ for $i = (A, B)$ for single-parent households and let (l^A, l^B) be observed functions of $(w^A, w^B, y, \boldsymbol{S}, \boldsymbol{z})$ for two-parent households. With the marginal productivities of mothers and fathers identified within both types of households, if (1) there exists an exogenous variation inducing changes in at least one production shifter $s_j \in \boldsymbol{S}$ and at least one distribution $z \in \boldsymbol{z}$ such that it affects married mothers' time allocation in a way that increases their consumption of leisure, (2) the Pareto weight is non-decreasing in z^A, (3) married mothers are more productive at home than their single counterparts, and (4) the responses of single and married mothers' marginal productivities to changes in the production shifter are contrasting, the Pareto weight and parental preferences are identified.*

Proof: See A.2 in Appendix A.

Once the production technology of single-parent and two-parent households have been identified, I first focus on the relationship between the known individual marginal productivities of mothers and fathers and the marginal rate of substitution of leisure for public consumption within the two types of households presented in the optimality conditions 2, 5, and 6. I use these to derive a set of two conditions relating parents' marginal utility for leisure, the Pareto weight and both parents' marginal productivity both within a collective and a single-parent household by exploiting the responsiveness of the Pareto weight to shifts in the distribution factor z and of the observed leisure and home time hours to the production shifter s_j. A third condition relating mothers' and fathers' marginal utility for leisure, the Pareto weight and their wage rate is obtained from the third condition in 4 to complete a system of 3 equations for which a solution exists if: (1) I find an empirical positive relationship between mothers' leisure hours and the distribution factor z and the production shifter s_j, (2) the Pareto weight is non-decreasing on the distribution factor z^A, (3) mothers are more productive when living in collectivity than when living in singlehood, and (4) the response of mothers' marginal productivity at home to shifts in the production shifter s_j differs across the two types of households here considered. Once parents' marginal utility for leisure is recovered, I combine these with information on their wages to recover their marginal utility for private market consumption using the first two conditions in 4. Moreover, I use the information on the Pareto weight, parents' marginal productivity at home and their marginal utility for leisure to recover their individual marginal utilities for public consumption using 5 and 6.

The reliance of this identification result on establishing an empirical relationship between the leisure hours of at least one parent (here being case, the mother) and changes in at least one distribution factor and one production shifter is attuned with the important role that both exclusive goods (here being leisure) and distribution factors play in facilitating the identification of the model's primitives as argued by Chiappori and Ekeland (2009). More importantly, as shown by Cherchye, De Rock and Vermeulen (2012), in the presence of home production, the existence of a production shifter combined with a distribution factor allows us to separately identify differences in home productivity from differences in the households' decision-making structure when observing changes in household behavior.

A caveat accompanying the third proposition involves its generalizability beyond the application I consider in this paper as it relies on the documented gender-asymmetric impact of *Oportunidades* on the allocation of time within two-parent households. It would be of interest to investigate how the required conditions would change within the context of an application in which a different empirical pattern is observed with respect to the way in which leisure is spent within the household. It would also be interesting to understand the extent to which I can use similar exogenous variation on other aspects of observed household behavior, such as public expenditures. This is of particular relevance given the existing empirical evidence focused on the impact of development policies on observed household behavior.

4.2 Parametrization

I now describe the parametrization of preferences, the households' production technology and two-parent households' decision making structure. Based on this parametrization, I explore the parametric identification of the model in Appendix B.

Preferences. As mentioned in the non-parametric identification analysis, I assume that preferences are strongly separable on leisure, private consumption and the public domestic good such that this allows for an additively separable representation. Suppose that each sub-utility is described by a logarithmic function to form the following Cobb-Douglas utility function.

$$U^i(l^i, q^i, Q; \mathbf{X}^i) = \alpha_1^i(\mathbf{X}^i)\ln(l^i) + \alpha_2^i(\mathbf{X}^i)\ln(q^i) + (1 - \alpha_1^i(\mathbf{X}^i) - \alpha_2^i(\mathbf{X}^i))\ln(Q) \quad (i = A, B)$$

$$\text{where} \quad \alpha_1^i(\mathbf{X}^i) = \frac{\exp(\alpha_1^{i'}\mathbf{X}^i)}{1 + \exp(\alpha_1^{i'}\mathbf{X}^i) + \exp(\alpha_2^{i'}\mathbf{X}^i)}; \;\; \alpha_2^i(\mathbf{X}^i) = \frac{\exp(\alpha_2^{i'}\mathbf{X}^i)}{1 + \exp(\alpha_1^{i'}\mathbf{X}^i) + \exp(\alpha_2^{i'}\mathbf{X}^i)}$$

$\mathbf{X}^i$ denotes a vector of sociodemographic characteristics containing a constant other characteristics of spouse i such as his/her age and education as well as the number of children in the household. Since I have assumed that preferences are invariant to marital status, the preferences of single mothers and fathers are the same as the preferences of their married counterparts, thereby implying the same parametrization for the preferences of both types of parents.

Home Production Technology. For two-parent households, I use the following constant returns to scale specification to describe the household's production technology

$$Q = F_Q(h_D^A, h_D^B) = [\psi(\mathbf{S})(h_D^A)^\gamma + (1 - \psi(\mathbf{S}))(h_D^B)^\gamma]^{\frac{\rho}{\gamma}}(q^D)^{1-\rho} \;\; \text{where} \;\; \psi(\mathbf{S}) = \frac{\exp(\psi'\mathbf{S})}{1 + \exp(\psi'\mathbf{S})}$$

I let $\mathbf{S}$ denote a vector of production shifters including a constant and the number of children in the household attending school. Furthermore, as in Lise and Yamada (2019), I let $\rho \in [0, 1]$ and $\gamma \leq 1$.

For households headed by a single parent, I assume that the production function can be characterized by the following CES specification

$$Q = [\phi^i(\mathbf{S})(h_D^i)^{\beta^i} + (1-\phi^i(\mathbf{S}))(q^D)^{\beta^i}]^{\frac{1}{\beta^i}} \quad \text{where} \quad \phi^i(\mathbf{S}) = \frac{\exp(\phi^{i'}\mathbf{S})}{1+\exp(\phi^{i'}\mathbf{S})} \tag{10}$$

where, as in the production function of two-parent households, $\mathbf{S}$ denotes a vector of production shifters. To distinguish between single men and women, I estimate this separately for single mothers and for single fathers to allow ϕ^i and β^i to vary by gender.

Pareto Weight. I parametrize the Pareto weight of the collective model for two-parent households in the following way

$$\lambda(w^A, w^B, y, \mathbf{z}) = \frac{\exp(\lambda_0 + \lambda_1(w^A/w^B) + \lambda_2 y + \lambda_3'\mathbf{z})}{1+\exp(\lambda_0 + \lambda_1(w^A/w^B) + \lambda_2 y + \lambda_3'\mathbf{z})}$$

where I will denote $\lambda(w^A, w^B, y, \mathbf{z})$ as $\lambda(\mathbf{z})$ hereafter under the understanding that this primitive is dependent upon w^A, w^B and y but the primary sources of variation for its identification are in $\mathbf{z}$. Throughout the model estimation, I use the wife's share of non-labor income (containing variation induced by program participation through variation in transfer size) and the state-level, age-specific sex ratios as distribution factors.

4.2.1 Optimality Conditions

I begin by deriving the conditions for single-parent households by first focusing on productive efficiency. Given the parametrization of these households' production technology, these conditions show that the ratio of the input prices govern the ratio of the inputs used in the production of Q.

$$\frac{\phi^i(\mathbf{S})}{1-\phi^i(\mathbf{S})}\left(\frac{h_D^i}{q^D}\right)^{\beta^i - 1} = w^i \tag{11}$$

Then deriving the optimality condition related to private consumption

$$\frac{\alpha_1^i(\mathbf{X})}{\alpha_2^i(\mathbf{X})}\frac{q^i}{l^i} = w^i \tag{12}$$

To then focus on the optimality conditions governing public consumption

$$\frac{\alpha_1^i(\mathbf{X})[\phi^i(\mathbf{S})(h_D^i)^{\beta^i} + (1-\phi^i(\mathbf{S}))(q^D)^{\beta^i}]}{(1-\alpha_1^i(\mathbf{X})-\alpha_2^i(\mathbf{X}))\phi^i(\mathbf{S})}\frac{(h_D^i)^{1-\beta^i}}{l^i} = 1 \tag{13}$$

$$\frac{\alpha_2^i(\mathbf{X})[\phi^i(\mathbf{S})(h_D^i)^{\beta^i} + (1-\phi^i(\mathbf{S}))(q^D)^{\beta^i}]}{(1-\alpha_1^i(\mathbf{X})-\alpha_2^i(\mathbf{X}))(1-\phi^i(\mathbf{S}))}\frac{(q^D)^{1-\beta^i}}{q^i} = 1 \tag{14}$$

I then proceed to derive the optimality conditions for two-parent households. I begin by focusing on the conditions related to productive efficiency for which, given the production function's parametrization, I find that the ratios with which the inputs of production are used are governed by the ratio of their prices. For parental time, these ratios are re-weighted by their relative productivity in domestic production, captured by $\psi(\mathbf{S})$, by the coefficient of substitution γ and by the production share or parental time ρ.

$$\frac{w^A}{w^B} = \frac{\psi(\mathbf{S})}{1-\psi(\mathbf{S})}\left(\frac{h_D^A}{h_D^B}\right)^{\gamma-1} \tag{15}$$

$$w^A = \psi(\mathbf{S})\frac{\rho}{(1-\rho)}\frac{(h_D^A)^{\gamma-1}q^D}{\psi(\mathbf{S})(h_D^A)^{\gamma} + (1-\psi(\mathbf{S}))(h_D^B)^{\gamma}} \tag{16}$$

$$w^B = (1-\psi(\mathbf{S}))\frac{\rho}{(1-\rho)}\frac{(h_D^B)^{\gamma-1}q^D}{\psi(\mathbf{S})(h_D^A)^{\gamma} + (1-\psi(\mathbf{S}))(h_D^B)^{\gamma}} \tag{17}$$

I then focus on the conditions related to private consumption, q^i and l^i. Given the parametrization imposed on preferences, these conditions show that the ratio of the spouses' leisure hours $\frac{l^A}{l^B}$ is governed not only by the ratio of their wages but also by their relative bargaining power within the household $\lambda(\mathbf{z})$.

$$\frac{\alpha_1^A(\mathbf{X})}{\alpha_2^A(\mathbf{X})}\frac{q^A}{l^A} = w^A;\;\; \frac{\alpha_B^1(\mathbf{X})}{\alpha_2^B(\mathbf{X})}\frac{q^B}{l^B} = w^B;\;\; \left(\frac{\lambda(\mathbf{z})}{1-\lambda(\mathbf{z})}\right)\frac{\alpha_1^A(\mathbf{X})}{\alpha_1^B(\mathbf{X})}\frac{l^B}{l^A} = \frac{w^A}{w^B};\;\; \left(\frac{\lambda(\mathbf{z})}{1-\lambda(\mathbf{z})}\right)\frac{\alpha_2^A(\mathbf{X})}{\alpha_2^B(\mathbf{X})}\frac{q^B}{q^A} = 1 \tag{18}$$

Lastly, I derive the conditions related to public consumption, connecting the household's marginal utility for public consumption, the spouses' marginal productivity at home and their marginal utility for leisure.

$$\lambda(\mathbf{z})\frac{\alpha_1^A(\mathbf{X})}{l^A} = \frac{\psi(\mathbf{S})\rho(h_D^A)^{\gamma-1}[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{[\psi(\mathbf{S})(h_D^A)^\gamma+(1-\psi(\mathbf{S}))(h_D^B)^\gamma]} \tag{19}$$

$$(1-\lambda(\mathbf{z}))\frac{\alpha_1^B(\mathbf{X})}{l^B} = \frac{(1-\psi(\mathbf{S}))\rho(h_D^B)^{\gamma-1}[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{[\psi(\mathbf{S})(h_D^A)^\gamma+(1-\psi(\mathbf{S}))(h_D^B)^\gamma]} \tag{20}$$

$$\lambda(\mathbf{z})\frac{\alpha_2^A(\mathbf{X})}{q^A} = \frac{(1-\rho)[\lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))]}{q^D} \tag{21}$$

I then exploit the inclusion of a production shifter, s_j, and the role of the wife's share of non-labor income, z^A, as a distribution factor to derive the experimental moments by taking the derivatives of some of these conditions with respect to z^A and s_j. I begin by taking the derivative of the conditions relating productive efficiency for single-parent and two-parent households in 11 and 15, respectively. For the former, I focus on the spouses' home time ratios. For the latter, I focus on the parental-time-to-monetary-investments ratio and take the derivative of these conditions with respect to s_j.

Focusing on two-parent households, I take the derivative of the third condition related to private consumption in 18 and the conditions related to public consumption in 19 and 20 with respect to z^A. The first condition (in Equation 40) captures the extent to which shifts in the distribution factor z^A can affect the intrahousehold allocation of leisure hours between spouses. Similarly, the second and third conditions (in Equations 41 and 42) capture the extent to which shifts in the distribution factor can affect the spouses' leisure-to-home time ratios. A motivation for using these conditions in the estimation procedure is based on the results presented in Section 3 showing that participation in *Oportunidades* had an impact on this ratio for mothers by inducing an increase in their leisure hours stemming from the significant decrease observed in their home production hours.

Exploiting the fact that the conditions in 19 and 20 are also a function of the production shifter, s_j, I also take the derivative of these two conditions with respect to s_j to obtain two additional exogenous moments. As in the conditions in 41 and 42, the conditions in 43 and 44 capture changes in the spouses' leisure-to-home time ratios with the only difference is that these relate to changes in the production shifter s_j.

4.3 Estimation

Step 1. The first step of the estimation procedure involves quantifying the experimental estimates captured in the left-hand side of the conditions presented in 38-44 using the experimental variation of the *Oportunidades* program. While the empirical evidence presented in Section 3 motivates this estimation step, I compute the empirical counterpart of the derivatives captured by these conditions exploiting the administrative data on bi-monthly cash disbursements made to participant households. This resembles the approach adopted in Attanasio, Meghir and Santiago (2012) in using the actual size of the program's grants within a structural estimation strategy. As before, the choice of estimator for the evaluation of the program is based on the MDID estimator described in Section 3.3 with an adjustment made to allow for interacting the MDID interaction term with the continuous variable capturing the size of the transfer, say z_{it}. Formally, this involves estimating the following regression

$$y_{it} = \beta_0 + \beta_1 d_i + \beta_2 Post_t + \beta_3(d_i \times Post_t) + \beta_4(d_i \times Post_t \times z_{it}) + \epsilon_{it} \tag{22}$$

over a sample that has been matched using the propensity score that captures the households' likelihood to participate in *Oportunidades*. In terms of notation, I let y_{it} denote $\frac{l_{it}^A}{l_{it}^B}$, $\frac{l_{it}^A}{l_{it}^B}$, $\frac{l_{it}^A}{h_{D,it}^A}$, $\frac{l_{it}^B}{h_{D,it}^B}$, $\frac{h_{D,it}^A}{h_{D,it}^B}$ and $\frac{h_{D,it}^A}{q_{it}^D}$. I make a distinction of what I use as z_{it} for the two types of households described in Section 2. For two-parent households, I use z_{it}^A as the variable capturing information on the size of the transfer given that the transfer is placed in the hands of mothers in their role as transfer holders. For single-parent households, I directly use information on the transfer size as z_{it}. Thus, β_4 serves to capture the heterogeneous impact of the program on y_{it} based on the transfer size received by the household. Thus, I can interpret β_4 as the empirical counterpart of $\Delta_{z^A}^{l}(d)$, $\Delta_{z^A}^{l,h_D}(d, A)$, $\Delta_{z^A}^{l,h_D}(d, B)$, $\Delta_{z^A}^{h_D}(d)$ and $\Delta_{z^A}^{h_D,q^D}(d)$ by letting y_{it} denote the corresponding time and consumption ratios of interest highlighted in 4.2.

To explicitly define the derivatives with respect to s_j as a function of the *Oportunidades* transfer size, I first estimate the effect of the transfer size on the relevant ratio by using 22. Then, I estimate the effect of z^A on s_j using a similar specification:

$$s_{j,it} = \beta_{s0} + \beta_{s1} d_i + \beta_{s2} Post_t + \beta_{s3}(d_i \times Post_t) + \beta_{s4}(d_i \times Post_t \times z_{it}) + \xi_{it} \tag{23}$$

This yields an estimate of $\Delta_{s_j}^{y}$ by using $\frac{\beta_4}{\beta_{s4}}$. The intuition follows from applying the chain rule to $\frac{\partial y}{\partial z^A}$ so that $\frac{\partial y}{\partial z^A} = \frac{\partial y}{\partial s_j}\frac{\partial s_j}{\partial z^A}$ implies that $\frac{\partial y}{\partial s_j} = \frac{\partial y}{\partial z^A} / \frac{\partial s_j}{\partial z^A}$. I can then capture the effect of the production shifters on the relevant ratios exploiting the variation induced by *Oportunidades*. This completes the set of experimental moments captured in conditions 38-44. This stage then yields the estimates for $\hat{\Delta}^{l}_{z^A}(d)$, $\hat{\Delta}^{l,h_D}_{s_j}(d, A)$, $\hat{\Delta}^{l,h_D}_{s_j}(d, B)$, $\hat{\Delta}^{l,h_D}_{z^A}(d, A)$, $\hat{\Delta}^{l,h_D}_{z^A}(d, B)$, and $\hat{\Delta}s_j{}^{h_D}(d)$ for two-parent households and $\Delta^{h_d,q^D}_{s_j}(d)$ for single-parent households which I then take to the second step of the estimation strategy.

Step 2. This step consists of implementing a two-step estimator, described by Newey and McFadden (1994) as a sequential GMM estimator, which closely follows the parametric identification analysis presented in Appendix B. I partition the parameter vector into one set containing only the home production parameters, denoted by θ_1 and another set containing the preference and Pareto weight parameters, denoted by θ_2. In the first stage, which I call Step 2A, I implement the following GMM estimator for the production function of the two types of households considered

$$\hat{\boldsymbol{\theta}}_1^{GMM} = \arg\min_{\boldsymbol{\theta}} Q_N^{(1)}(\boldsymbol{\theta}_1), \quad \text{where} \quad Q_N^{(1)}(\boldsymbol{\theta}_1) \quad = \left[\frac{1}{N}\sum_{n=1}^{N}\mathbf{g}(\mathbf{S}_n, \boldsymbol{\Delta}, \boldsymbol{\theta}_1)\right]' \boldsymbol{W}_N \left[\frac{1}{N}\sum_{n=1}^{N}\mathbf{g}(\mathbf{S}_n, \boldsymbol{\Delta}, \boldsymbol{\theta}_1)\right]$$

where $\boldsymbol{\theta}_1 = \boldsymbol{\theta}_1^M = (\rho, \gamma, \boldsymbol{\psi})$ for two-parent households and $\boldsymbol{\theta}_1 = \boldsymbol{\theta}_1^S = (\beta, \boldsymbol{\phi})$ for single-parent households. Furthermore, $\mathbf{g}(\cdot)$ contains the orthogonality conditions described in 12 and 15-17 for single-parent and two-parent households, respectively. $\mathbf{W}_N$ is a symmetric positive definite optimal weighting matrix, obtained 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

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

In the second stage (Step 2B), I implement the following GMM estimator for parental preferences and the Pareto weight using the results for the production function parameters obtained in Step 2A

$$\hat{\boldsymbol{\theta}}_2^{GMM} = \arg\min_{\boldsymbol{\theta}} Q_N^{(2)}(\hat{\boldsymbol{\theta}}_1, \boldsymbol{\theta}_2)$$
$$\text{where} \quad Q_N^{(2)}(\hat{\boldsymbol{\theta}}_1, \boldsymbol{\theta}_2) = \left[\frac{1}{N}\sum_{n=1}^{N}\mathbf{h}(\mathbf{X}_n, \mathbf{z}_n, \boldsymbol{\Delta}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\theta}_2)\right]' W_N \left[\frac{1}{N}\sum_{n=1}^{N}\mathbf{h}(\mathbf{X}_n, \mathbf{z}_n, \boldsymbol{\Delta}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\theta}_2)\right]$$

where $\boldsymbol{\theta}_2 = (\boldsymbol{\lambda}, \boldsymbol{\alpha}^{\boldsymbol{A}}, \boldsymbol{\alpha}^{\boldsymbol{B}})$. and $\hat{\boldsymbol{\theta}}_1 = [\boldsymbol{\theta}_1^M; \boldsymbol{\theta}_1^S] = (\hat{\rho}, \hat{\gamma}, \hat{\boldsymbol{\psi}}, \hat{\beta}, \hat{\boldsymbol{\phi}})$ are the estimates obtained in Step 2A. Furthermore, $\mathbf{h}(\cdot)$ contains the orthogonality conditions derived from the optimality conditions and $\mathbf{W}_N$ is a symmetric positive definite weighting matrix for which I use an optimal weight matrix. I estimate $\mathbf{W}_N$ 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. Thus, I use the following as the optimal weight matrix throughout the estimation process:

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

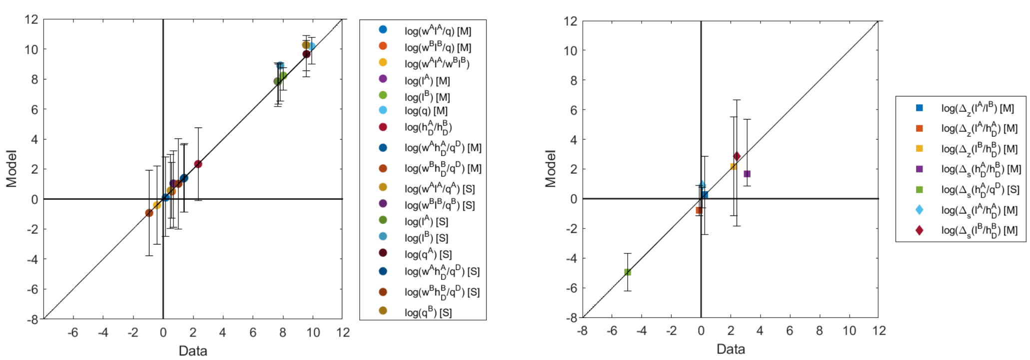
where $G_{\theta_1} = \nabla_{\theta_1} h(\mathbf{X}, \mathbf{z}, \hat{\boldsymbol{\theta}}_1, \hat{\boldsymbol{\theta}}_2, \boldsymbol{\Delta})$, $\xi(\mathbf{S}) = -(\nabla_{\theta_1} g(\mathbf{S}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\Delta}))^{-1} g(\mathbf{S}, \hat{\boldsymbol{\theta}}_1, \boldsymbol{\Delta})$, and $h(\cdot)$ denotes the objective function (set of moment conditions) used in the GMM implemented in the second step of the estimator while $g(\cdot)$ denotes the objective function used in the GMM implemented in the first step of the estimator. Furthermore, $\boldsymbol{\theta_1} = (\rho, \gamma, \boldsymbol{\psi}, \beta^A, \boldsymbol{\phi}^A, \beta^B, \boldsymbol{\phi}^B)$ and $\boldsymbol{\theta}_2 = (\boldsymbol{\lambda}, \boldsymbol{\alpha}_1^A, \boldsymbol{\alpha}_2^A, \boldsymbol{\alpha}_1^B, \boldsymbol{\alpha}_2^B)$. Thus, the individual components of the correction take into consideration both the sensitivity of the moments used in the second-step GMM to the set of pre-estimated parameters and how well the parameter estimates obtained in the first-step GMM fit the moments used in that step.

Throughout the estimation procedure, I leverage the two-step nature of the estimator to define four different specifications characterized by the exclusion/inclusion of the experimental moments described in 38-44 either in Step 2A or Step 2B. These specifications are then distinguished by the orthogonality conditions included in $\mathbf{g}$ and $\mathbf{h}$, respectively. The first specification excludes all the experimental conditions and, therefore, relies solely on the orthogonality conditions derived from the optimality conditions from the two types of households. The second specification includes 38 and 39 in the orthogonality conditions of Step 2A estimated over the two-parent and single-parent households sub-samples, respectively but does not use any experimental condition in Step 2B. The third specification does not use any experimental moment in Step 2A but includes the experimental moments described in 40-42 in the orthogonality conditions of Step 2B. Lastly, the fourth specification, which is chosen as the preferred specification, includes 38 and 39 in Step 2A and 40-42 in Step 2B. To test the external validity of the model, 43 and 44 are left untargeted in Step 2B in all specifications considered. Furthermore, as in Lise and Yamada (2019), the orthogonality conditions used to form the respective GMM objective functions are derived by taking logs of the targeted optimality conditions and of the derived experimental moments.

4.3.1 Model Fit

Upon the estimation of the model, I proceed to check how well the model fits the moments targeted in all four specifications considered. For the purpose of assessing the external validity of the model, I also check how well the model fits moments that were left untargeted in the estimation procedure. When implementing these model fit checks, I make a distinction between the *theoretical moments* derived from the optimality conditions that are targeted in all of the specifications considered and the experimental moments that are obtained from the impact of *Oportunidades* on parents' home production and leisure hours. 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 presents the model fit checks made for the preferred (fourth) specification.[17]

Figure 1: Theoretical and Experimental Moments, Specification 4



Theoretical Moments

Experimental Moments

All specifications fit the theoretical moments relatively well.[18] The model hits the experimental moments related to the effect of *Oportunidades* on the leisure-to-home time ratios of mothers and fathers through the effect on the production shifter (number of

[17]Checks for specifications 1-3 can be found in Figure 8 in Appendix C.

[18]The model seems to over-predict single fathers' leisure hours and private market consumption. This might be expected given that these households represent a small share (8%) of the estimation sample, so that most of the estimation of fathers' preferences could be driven by the sample of married fathers.

children attending school) despite these remaining untargeted in all of the specifications. However, in order to fit the 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, it is necessary to target these remaining experimental moments as both specifications 3 and 4 yield a better overall model fit by targeting these moments[19]. As will be further discussed, a significant difference in the results obtained from specifications that leave these moments untargeted and these that target them is that I obtain a coefficient for z^A in the Pareto weight that is higher in the ones in which these moments are targeted.

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, specifications that target the experimental moment for single-parent households fit this moment better. However, for two-parent households, specifications that do not target this moment seem to fit it slightly better. For specifications 2 and 4 that target this moment, the model seems to slightly under-predict the magnitude of this effect within two-parent households.

Overall, I find that the specifications that target the experimental moments related to the impact of *Oportunidades* on spouses' leisure and leisure-to-home time 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. To leverage the exogenous variation of the program in both steps of the GMM estimator, I use the fourth specification to carry out the program evaluation analysis on intrahousehold inequality.

4.4 Results

Step 1. Table 4 presents the intermediate step implemented to compute the experimental moments described in Section 4.2 that are targeted in the GMM estimation implemented in the second stage. I find that effectively, participation in *Oportunidades* significantly increased the amount of mothers' leisure hours to fathers' through its impact on the wife's share of non-labor income. Similarly, I find that participation in *Oportunidades* interacted with mothers' share of non-labor income significantly increased mothers' leisure-to- home time ratio and the number of children attending school. The latter effect is

[19] Even though these specifications slightly under-predict the effect of the program on mothers' leisure-to-home time ratio through its effect on z^A, these still yield a better fit than the one yielded by specifications 1 and 2

observed within both two-parent and single-mother households, though for the latter, the effect is mediated through the size of the transfer. Furthermore, I find a negative, though statistically insignificant, relationship between mothers' share of non-labor income upon participation in the program and fathers' leisure to home time ratios. I find a similar statistically insignificant negative relationship with parents' relative time spent in home production.[20]

Table 4: Overall Impact of the *Oportunidades* Transfer on Beneficiary Households

	Two-Parent					*Single-Mother*		
	l^A/h_D^A	l^A/l^B	l^B/h_D^B	h_D^A/h_D^B	s_j	l^A/h_D^A	q^D/h_D^A	s_j
$d_i \times Post_t \times z_{it}$	0.411*	1.227**	-1.710	-9.207	0.934**	7.658e-05	0.022***	1.797e-04***
	(0.211)	(0.586)	(16.678)	(8.619)	(0.416)	(5.886e-05)	(0.005)	(2.180e-05)
N	474	474	474	474	474	640	640	640

Step 2. Table 5 presents the results obtained from the two-step GMM estimator implemented in the estimation.

Home Production: For two-parent households, I find that women are, on average, equally or more productive at home than fathers. Furthermore, when comparing single and married mothers, I find that married mothers are, on average, more productive than their single counterparts. This ties back to one of the conditions facilitating the result outlined in Proposition 3 of Section 4.1. Among single parents, however, I find that when using the estimates obtained from the specifications including the experimental variation of *Oportunidades* in Step 2A mothers are, on average, more productive at home than their male counterparts. The opposite holds when I exclude the experimental variation of the program in Step 2A for single parents.

Focusing on the preferred specification presented in the fourth column, I find that the production shifter affects mothers' productivity at home differently depending on their marital status. For married mothers, I find that the number of children attending school slightly increases their productivity at home. On the other hand, I find that children's school attendance decreases single mothers' productivity at home. A similar

[20]It is worth noting that I can use the negative coefficients associated with the interaction of the MDID and z_{it}^A for l^B/h_D^B and h_D^A/h_D^B as orthogonality conditions in the GMM requiring transforming these into logarithmic terms since the theoretical counterparts of these moments derived through the model are negatively signed given the parametric specification adopted. Thus, when taking logs to generate these orthogonality conditions, the negative terms are offset and the conditions properly defined.

result holds for single fathers. This is consistent with the conditions outlined in Proposition 3 of the non-parametric identification analysis discussed in Section 4.1. Moreover, this is also going to have significant implications for the assessment of the impact of *Oportunidades* on individual welfare presented in Section 5 since the MMWI captures the extent to which mothers' productivity is affected by the program's effect on children's school attendance when moving from collectivity to singlehood.

Preferences: With respect to parental preferences, I find that mothers, on average, have a lower utility weight on leisure than fathers and that the utility weight attached to private market consumption is slightly higher for mothers than for fathers. I now focus on assessing the premise that mothers tend to have a higher preference for public consumption than fathers. Within the parametric specification adopted in the analysis, I define the utility weight attached to the public domestic good is as $1 - \alpha_1^i(\mathbf{X}) - \alpha_2^i(\mathbf{X})$ for $(i = A, B)$. Based on the estimates obtained from all four specifications, I find that mothers do assign a higher utility weight to the consumption of the public good Q. Evaluated at the sample mean, I find that this utility weight among mothers is 0.398, 0.395, 0.389, and 0.389. On the other hand, evaluated at the sample mean for fathers, this weight is 0.071, 0.072, 0.066, and 0.064.

There is noticeable preference heterogeneity on observable characteristics. Focusing on the chosen specification, I find that the number of children in the household increases both parents' preference for the domestic public good through a reduction on the utility weights attached to both leisure and private consumption. Parental education also increases the utility weight attached to the public good. Furthermore, while fathers' age increases their preference for the public good, I find that the opposite holds for mothers.

Pareto Weight: Using the estimates obtained from the four specifications considered and evaluated at the sample mean, I find that the Pareto weight attached to mothers' preferences is 0.525, 0.527, 0.522, and 0.524. In particular, I find that both relative market returns (w^A/w^B) and women's contribution to total household income (z^A) significantly increase mothers' bargaining power. While the coefficient attached to the spouses' relative wages is robust across all four specifications (around 0.05), the coefficient attached to the wife's share of non-labor income, the distribution factor I focus on, increases substantially from 0.10 to 0.8 upon the inclusion of the experimental moments related to the effect of *Oportunidades* on the intrahousehold allocation of leisure and home production

Table 5: 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:								
γ	0.8545	4.194E-06	0.9854	1.185E-05	0.8545	4.194E-06	0.9854	1.185E-05
ρ	0.8193	1.279E-06	0.8213	6.459E-07	0.8193	1.279E-06	0.8213	6.459E-07
ψ_2 [n_s]	0.1530	5.333E-07	2.480E-09	1.718E-09	0.1530	5.333E-07	2.480E-09	1.718E-09
Sample mean $\psi(\mathbf{S})$ =	0.5750		0.5000		0.5750		0.5000	
Home Production Parameters, Single-Mother HHs:								
β	-1.4809	0.0104	-1.5047	0.0203	-1.4809	0.0104	-1.5047	0.0203
ϕ_2^A [n_s]	-0.0300	0.0074	-0.0435	0.0162	-0.0300	0.0074	-0.0435	0.0162
Sample mean $\phi(\mathbf{S})$ =	0.4870		0.4812		0.4870		0.4812	
Home Production Parameters, Single-Father HHs:								
β	-0.7525	0.0532	-0.7912	0.2633	-0.7525	0.0532	-0.7912	0.2633
ϕ_2^B [n_s]	-0.0449	0.0138	-0.1299	0.0963	-0.0449	0.0138	-0.1299	0.0963
Sample mean $\phi(\mathbf{S})$ =	0.4929		0.4794		0.4929		0.4797	
Wife's Preference for Leisure Parameters:								
$\alpha_{1,1}^A$ [Constant]	-0.0713	0.0459	-0.0756	0.0001	0.0477	0.0108	0.0455	0.0049
$\alpha_{1,2}^A$ [Age]	0.0105	1.6714	0.0103	0.0018	0.0086	0.4121	0.0085	0.1799
$\alpha_{1,3}^A$ [Education]	-0.0032	0.2679	-0.0031	0.0004	-0.0165	0.0607	-0.0161	0.0287
$\alpha_{1,4}^A$ [Number of Children]	-0.0684	0.1306	-0.0670	0.0002	-0.0572	0.0292	-0.0576	0.0138
Sample mean $\alpha_1^A(\mathbf{X})$ =	0.4143		0.4094		0.4081		0.4067	
Wife's Preference for Private Consumption Parameters:								
$\alpha_{2,1}^A$ [Constant]	-3.1591	0.0515	-3.1433	0.0001	-1.7563	0.0115	-1.7548	0.0057
$\alpha_{2,2}^A$ [Age]	0.0651	1.8566	0.0660	0.0027	0.0377	0.4204	0.0378	0.2134
$\alpha_{2,3}^A$ [Education]	0.0304	0.3022	0.0299	0.0004	-0.0033	0.0665	-0.0029	0.0321
$\alpha_{2,4}^A$ [Number of Children]	0.0138	0.1487	0.0142	0.0002	-0.0397	0.0325	-0.0393	0.0154
Sample mean $\alpha_2^A(\mathbf{X})$ =	0.1882		0.1954		0.2031		0.2047	
Husband's Preference for Leisure Parameters:								
$\alpha_{1,1}^B$ [Constant]	3.2582	0.0262	3.2399	0.0002	3.5966	0.0036	3.6594	0.0010
$\alpha_{1,2}^B$ [Age]	-0.0030	0.9946	-0.0030	0.0061	-0.0012	0.1350	-0.0012	0.0382
$\alpha_{1,3}^B$ [Education]	-0.0693	0.1723	-0.0691	0.0011	-0.0350	0.0248	-0.0365	0.0060
$\alpha_{1,4}^B$ [Number of Children]	-0.1008	0.0658	-0.1028	0.0004	-0.2575	0.0099	-0.2609	0.0021
Sample mean $\alpha_1^B(\mathbf{X})$ =	0.7478		0.7419		0.7890		0.7950	
Husband's Preference for Private Consumption Parameters:								
$\alpha_{2,1}^B$ [Constant]	1.1039	0.0044	1.1125	0.0000	1.3503	0.0004	1.3441	0.0001
$\alpha_{2,2}^B$ [Age]	0.0014	0.1633	0.0012	0.0018	-0.0019	0.0166	-0.0019	0.0053
$\alpha_{2,3}^B$ [Education]	0.0191	0.0420	0.0203	0.0005	0.0186	0.0034	0.0186	0.0010
$\alpha_{2,4}^B$ [Number of Children]	-0.1155	0.0164	-0.1128	0.0002	-0.1907	0.0021	-0.1861	0.0007
Sample mean $\alpha_2^B(\mathbf{X})$ =	0.1812		0.1863		0.1451		0.1413	
Pareto Weight Parameters:								
λ_0 [Constant]	0.6626	0.0026	0.6656	0.0003	0.9002	0.0032	0.9024	0.0020
λ_1 [w^A/w^B]	0.0484	0.0021	0.0463	0.0004	0.0457	0.0049	0.0468	0.0030
λ_2 [y]	-0.0076	0.0201	-0.0076	0.0022	0.0049	0.0301	0.0050	0.0175
λ_3 [z^A]	0.1064	0.0006	0.1208	0.0001	0.8062	0.0049	0.8098	0.0022
λ_4 [Sex ratio]	-0.6381	0.0023	-0.6336	0.0003	-1.2089	0.0029	-1.2063	0.0018
Sample mean $\lambda(\mathbf{z})$ =	0.5247		0.5266		0.5224		0.5243	
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 hours through the change in z^A. That is, the distribution factor is being informative about the responses of the decision-making process to a policy that targets mothers' contribution to non-labor income. Importantly, I find that the estimates for the Pareto weight yielded by these specifications that are consistent with the external validity and non-parametric identification of the model are more robust compared to those of specifications more reliant on functional form. Moreover, I find that the sex ratio I use in the estimation (defined as the number of women per men for different age groups) decreases women's bargaining power. In this way, I find that as women become relatively more scarce, their bargaining power increases. This is consistent with empirical evidence in the literature documenting a significant relationship between women's empowerment and sex ratios, such as in Chiappori, Fortin and Lacroix (2002).

5 Intrahousehold Inequality and Gendered Policies

Throughout this section, I quantify bargaining power and individual welfare within two-parent households as described in Section 2 using the estimates obtained in Section 4.4. The measure of individual welfare I focus on involves an extension of the money metric welfare index (MMWI) proposed by Chiappori and Meghir (2015).[21] The MMWI describes the minimum amount of expenditures an individual would need to incur in order to reach the same level of intrahousehold utility reached in collectivity in the case in which he or she were to become single, thereby taking into consideration how the change in living arrangement will ultimately affect not only their private consumption but also their consumption of the public good.

5.1 Individual Welfare within a Collective Household Framework

Chiappori and Meghir (2015) propose the concept of the money metric welfare index (MMWI) to compute individual welfare within a collective household setting. The in-

[21] Another welfare measure commonly used within this framework is the conditional sharing rule (CSR) which captures the amount monetary resources available to each decision maker for their own private consumption as a result of a bargaining process in which total household resources are allocated among spouses. Intuitively, the higher the bargaining power of a decision maker, the higher the amount of resources he or she should be able to secure for his or her own consumption. While the CSR constitutes a form of money metric utility, it disregards the utility parents derive from public consumption by focusing on private consumption. This shortcoming of the CSR stems from the decentralization used to derive this measure as it deals with the externalities of public consumption at the household level and fails to provide a way for household members to internalize such externalities. The derivation of the sharing rule for the specification used in this paper can be found in the second section of the Online Appendix.

tuition behind the MMWI is to obtain a measure of the expenses a married individual would need to incur in a counterfactual single household in order to be able to reach the same level of utility s/he would achieve when living in collectivity. Defining the single-parent household's problem and being able to identify its primitives is then essential since it provides the counterfactual environment needed for the computation of the MMWI. In the presence of home production, I then define the MMWI as

$$MMWI^i = \min_{h_D^i, l^i, q^i, q^D} [w^i l^i + q^i + w^i h_D^i + q^D | u^i(l^i, q^i, Q; \mathbf{X}^i) \geq u^i(l^{i*}, q^{i*}, Q^*; \mathbf{X}^i); Q = F_Q^s(h_D^i, q^D; \mathbf{S})] \quad (24)$$

where $(l^{i*}, q^{i*}, Q^* = F_Q(h_D^{A*}, h_D^{B*}, q^{D*}))$ denotes the optimal choices made within a two-parent household. In order to define the counterfactual environment of singlehood that the spouses would face, I use the production function estimates from the model for single mothers and fathers to potential losses in economies of scale in production incurred when moving from a collective household to a single-parent one.

Modifying the definition of the MMWI in Cherchye et al. (2018) and given the estimates for preferences and the households' production technology obtained at this point, I define the MMWI as

$$MMWI^i = \min_{h_D^i, l^i, q^i, q^D} w^i l^i + q^i + w^i h_D^i + q^D \quad (25)$$

s.t.

$$\hat{\alpha}_1^i(\mathbf{X}^i)\ln(l^i) + \hat{\alpha}_2^i(\mathbf{X}^i)\ln(q^i) + (1 - \hat{\alpha}_1^i(\mathbf{X}^i) - \hat{\alpha}_2^i(\mathbf{X}^i))\ln(Q) \geq$$
$$\hat{\alpha}_1^i(\mathbf{X}^i)\ln(l^{i*}) + \hat{\alpha}_2^i(\mathbf{X}^i)\ln(q^{i*}) + (1 - \hat{\alpha}_1^i(\mathbf{X}^i) - \hat{\alpha}_2^i(\mathbf{X}^i))\ln(Q^*)$$
$$Q^* = [\hat{\psi}(\mathbf{S})(h_D^{A*})^{\hat{\gamma}} + (1 - \hat{\psi}(\mathbf{S}))(h_D^{B*})^{\hat{\gamma}}]^{\frac{\hat{\rho}}{\hat{\gamma}}}(q^{D*})^{1-\hat{\rho}}; \;\; Q = [\phi(\mathbf{S})(h_D^i)^{\beta} + (1 - \phi(\mathbf{S}))(q^D)^{\beta}]^{\frac{1}{\beta}}$$
$$l^i + h_D^i + h_M^i = T \text{ for } i = (A, B)$$

Intuitively, the MMWI constitutes a compensating variation in which each spouse faces a different price for the domestic public good Q as their living arrangement is changed from living collectively with their spouse to becoming a single parent. From paying the Lindahl price θ_Q^i, each spouse then faces the full per unit cost $P^{S,i}(w^i, \mathbf{S})$. In the case of home production, even the price of the public good changes as the living arrangement changes since the production possibilities of each spouse also changes.

A significant feature of the MMWI is that it constitutes an adjustment to the sharing rule through a reweighing that can be characterized as a function of (i) the two-parent household's marginal utility for public consumption, (ii) the individual's own preferences for the public good, (iii) the opportunity cost incurred by each spouse for spending time in home production and (iv) the per unit cost incurred by the household in the production of the public good as internalized by each spouse.[22]

5.2 *Oportunidades* and Intrahousehold Inequality

Using the estimates obtained from the fourth specification (column 4) presented in Table 5, I compute the Pareto weight and MMWI of each two-parent household included in the estimation sample and then implement a MDID estimator to quantify the impact of *Oportunidades* on beneficiary households' decision-making structure and individual welfare within two-parent households. For the purpose of documenting differences in the allocation of welfare within households, I report welfare measures as a fraction of household income. Figure 7 in Appendix C presents a before and after comparison among participant and non-participant households of the predicted measures of bargaining power and individual welfare obtained for the estimation sample. Given the program's objective, I also quantify the effect of the program on other unobservable primitives of interest, such as household's domestic production of Q. For the sake of comparison, I also report the impact of *Oportunidades* on the domestic production of Q in single-mother households.

Table 6 presents the level effects while Table 7 presents the percentage changes obtained from the causal analysis implemented on these measures. The results suggest that the participation in the program is associated with a strongly significant increase of almost 24% (of almost 13 percentage points) in mothers' bargaining power which translates into a significant 20% increase in their individual welfare characterized by the MMWI. This constitutes an increase of approximately 3,067 MXN pesos (294 USD) in mothers' individual welfare. Such impact on individual welfare is asymmetric as fathers' individual welfare decreases by almost 25% as characterized by their MMWI, constituting a decrease of approximately 2,645 MXN pesos (254 USD). This gender-asymmetric effect documented on individual welfare suggests a mitigation in the degree of gender welfare inequality observed at baseline as, overall, the ratio of mothers' money metric welfare in-

[22]This is similar to the characterization of the MMWI in the presence of public consumption without home production presented in Chiappori and Meghir (2015). In that case, the sharing rule is reweighed by i's own willingness to pay and preferences for the domestic good. Once home production is introduced, this is further reweighed by the cost faced by the household in the production of the domestic good, by i's relative productivity in the household and the intensity with which parental time and monetary investments are used in the production of the domestic good.

dex to that of fathers' is approximately 0.785 (being 0.787 among beneficiary households and 0.784 among non-participants) prior to the start of the program.[23]

Table 6: Overall Impact of *Oportunidades* on Beneficiary Households

	Two-Parent				*Single-Parent*
		Money Metric Welfare			
	Pareto Weight	Mother	Father	Domestic Output	Domestic Output
MDID	0.130***	0.101***	-0.115***	711.007***	-338.417*
	(0.005)	(0.020)	(0.016)	(201.704)	(163.203)
N	478	478	478	478	632

Notes: [1] Bootstrapped standard errors (100 repetitions).

Table 7: Overall Impact of *Oportunidades* on Beneficiary Households, Percentage Change

	Two-Parent				*Single-Parent*
		Money Metric Welfare			
	Pareto Weight	Mother	Father	Domestic Output	Domestic Output
MDID	23.807***	19.559***	-25.081***	24.611***	-12.470*
	(0.963)	(4.133)	(3.644)	(6.843)	(7.388)
N	478	478	478	478	632

Notes: [1] Bootstrapped standard errors (100 repetitions).

Given the significant empowerment effect documented in favor of mothers, I now investigate whether such empowerment effect is consistent with a higher production of the public good Q. Notably, I find that participation in *Oportunidades* can also be associated with a significant increase of almost 25% in the production of the public good Q. Given that the public good Q in the model serves as a way to capture investments in children's human capital, this result is in line with the overall positive impact of the urban implementation of *Oportunidades* on children's educational outcomes in two-parent beneficiary households documented in Behrman et al. (2012) and Flores (2021). Going back to the empirical evidence presented in Section 3, such increase in domestic output

[23] While the drop in fathers' individual welfare captured by the MMWI is significantly larger than the increase in mothers' individual welfare, participation in the program does not (statistically) increase nor decrease the total welfare within the household (defined as the sum of the parents' MMWI, weighted by their Pareto weight) since participation in the program increases total household welfare by a statistically insignificant 0.11%. This is consistent with the result observed that participation in the program increases the weight attached to mothers' preferences.

suggests that the observed increase in the monetary investments made by the household in the production of the public good Q offsets the documented decrease in parental time investments. Based on the estimation results and the observed empowerment effect, this suggests that by empowering mothers, who tend to have a higher preference for the public good Q, the program effectively increases domestic production within two-parent households by allowing them to substitute parental time investments with monetary investments in children. Thus, as mothers' bargaining position improves, they enjoy more leisure hours and the level of domestic production within the household increases.

5.3 Counterfactual Policies and Intrahousehold Inequality

I now quantify the impact of counterfactual gender-targeted policies on women's bargaining power, individual welfare, and domestic production. The collective household model allows exploring different types of policies involving gender-targeted benefits to assess the extent to which these exacerbate or mitigate existing patterns of gender inequality within the household. In particular, I consider targeted benefits in the form of cash transfers and wage subsidies. I take the documented *Oportunidades* effects as the benchmark against which I compare these counterfactual policies' effects.

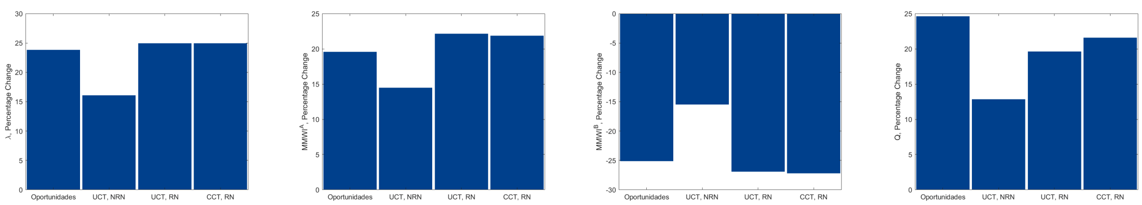
Throughout each of these exercises, I take the households observed at baseline (i.e. in the year 2002) and then, change either the spouses' non-labor income or wage rate depending on the counterfactual scenario of interest (keeping everything else fixed at 2002 values) for each of these households. The choice of baseline stems from the 2002 sample of the ENCELURB constituting the baseline used in the evaluation of the *Oportunidades* CCT program.

Cash Transfer Targeted to Mothers. I first consider alternative designs of a cash transfer targeted to mothers. Let y_{CT} be the average size of the transfer observed in the data.[24] I then assign this to the mother's non-labor income, so that $y^A = y^A_{old} + y_{CT}$, without imposing the conditionality that the number of children attending school is equal to the total number of children in the household. There are two options throughout the implementation of this exercise: (1) let this cash transfer not be revenue neutral or (2) make this transfer revenue neutral by triggering a re-distribution of non-labor income within spouses so that $y^B = y^B_{old} - y_{CT}$. This has important implications in terms of

[24] This is an annual 4,427 MXN pesos in the estimation sample. That is, an average bimonthly disbursement of 737.8 MXN pesos.

the expected effect on bargaining power and intrahousehold behavior since the revenue-neutral cash transfer would affect only mothers' share of non-labor income, z^A, while the cash transfer that is not revenue-neutral would lead to an increase in total household non-labor income (thereby, triggering income effects). Figure 2 compares the results of the impact of a cash transfer targeted to mothers on the households' bargaining structure and individual welfare. UCT denotes an unconditional cash transfer, CCT denotes a conditional cash transfer, NR denotes a revenue neutral cash transfer, and NRN denotes a non-revenue neutral cash transfer.

Figure 2: Overall Impact of Cash Transfer Targeted to Mothers



Pareto Weight | MMWI, Wife | MMWI, Husband | Domestic Output, Q

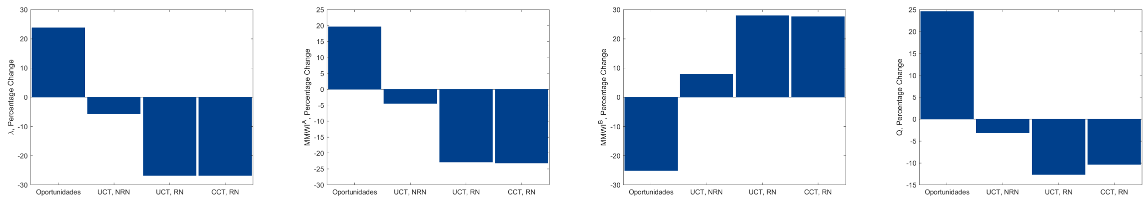
The results indicate that unconditional transfers are effective at inducing an empowerment effect comparable to that observed from participation in *Oportunidades* if revenue neutrality is guaranteed at the household level. This is expected given that revenue neutrality in this scenario increases z^A while keeping total household non-labor income constant, thereby not triggering an income effect. The results also show that a conditional cash transfer that is revenue neutral triggers a slightly larger increase in mothers' bargaining power and individual welfare captured by both the MMWI.

Cash Transfer Targeted to Fathers. Similar to the first counterfactual exercise, y_{CT} will be assigned to one of the parents. In this instance, I target this cash transfer to fathers in two-parent households. For this matter, let $y^B = y^B_{old} + y_{CT}$. Again, I let this transfer targeted to the father be revenue neutral or not. As before, in the case of a revenue neutral transfer, I set $y^A = y^A_{old} - y_{CT}$. Note that since I am targeting the cash transfer to the father, this would constitute a decrease in z^A.

Another exercise involves simultaneously imposing the conditionality that the number of children in the household currently attending school matches the number of children in the household.[25] Figure 3 compares the results of the impact of a cash transfer

[25] In the case of a cash transfer that is not revenue neutral, I cannot really tell beforehand what the effect

Figure 3: Overall Impact of Cash Transfer Targeted to Fathers



Pareto Weight | MMWI, Wife | MMWI, Husband | Domestic Output, Q

targeted to fathers on the households' bargaining structure and individual welfare.

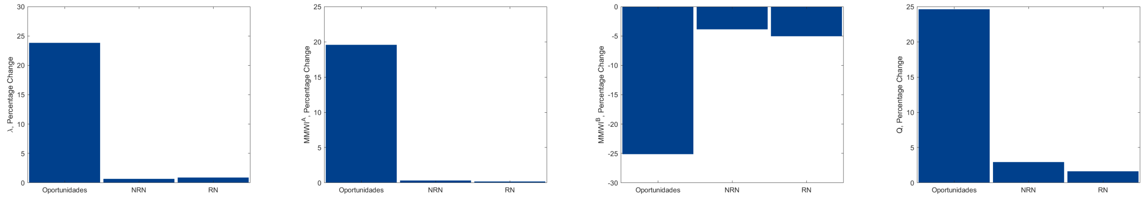
As expected, the results show that an increase in fathers' contribution to non-labor income reduces mothers' bargaining power and individual welfare. As observed in the first counterfactual exercise, the strength of the effect of unconditional cash transfers is larger when this is revenue neutral. Thus, when focusing at revenue neutral cash transfers, both conditional and unconditional cash transfers yield a similar effect. Moreover, while the direction of the effects on bargaining power and individual welfare are different, the magnitudes of those associated with revenue neutral cash transfers are similar to those documented for the *Oportunidades* program.

Wage Subsidy Targeted to Mothers. I now focus on the effectiveness of wage subsidies at empowering mothers. Let τ be a wage subsidy intended to be targeted to mothers. I define a new wage rate for mothers: $w^A = (1+\tau)w^A_{old}$. To ensure revenue neutrality, I adjust the husband's wage rate to keep full household income constant, so that $w^B = \frac{\bar{Y}_{old} - y^A - y^B}{T} - (w^A_{old} + \tau)$, where $\bar{Y}_{old} = y^A + y^B + (w^A_{old} + w^B_{old})T$. By forcing a redistribution of labor market returns, I generate a change in $\frac{w^A}{w^B}$ which, based on the estimation results from all specifications, is expected to increase the wife's Pareto weight.

I conduct this counterfactual by setting τ at 25%, thus increasing mothers' wage rate reported in 2002 (increasing average w^A/w^B just above unity in the scenario in which the subsidy is not revenue neutral, even higher when ensuring revenue neutrality at the household level). Figure 4 compares the results of the impact of a wage subsidy targeted

of the transfer on the Pareto weight will be since the decrease in z^A would coincide with an increase in household income for which the coefficient in the Pareto weight is positive. Furthermore, the conditionality would not affect the Pareto weight but can potentially affect household behavior and the money metric measures of welfare through its impact on the per unit cost of producing the domestic good *and* the per unit cost of producing the domestic good in the counterfactual environment of singlehood (this would be relevant only in the computation of the welfare measures).

Figure 4: Overall Impact of Wage Subsidy for Mothers



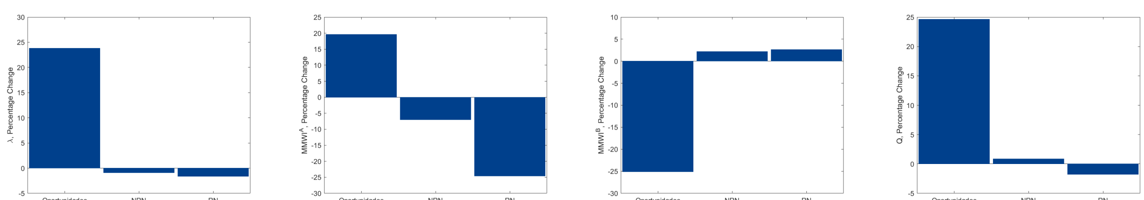
Pareto Weight | MMWI, Wife | MMWI, Husband | Domestic Output, Q

to mothers on the households' bargaining structure and individual welfare. NR (NRN) denotes a revenue neutral (non-revenue neutral) wage subsidy.

The results show that wage subsidies have a virtually negligible impact on mothers' bargaining position. This is consistent with the magnitude of the estimate obtained for the coefficient associated with the spouses' relative labor market returns in the Pareto weight. Besides the impact on the Pareto weight, we expect this change in the spouses' wage ratio to affect the individual welfare measures by generating changes in the per unit cost of producing the domestic good both in collectivity and in singlehood.

Wage Subsidy Targeted to Fathers. Now, I let τ be a wage subsidy targeted to fathers. The new wage rate for fathers is then defined as: $w^B = (1+\tau)w^B_{old}$.I adjust the wife's wage rate to ensure revenue-neutrality, so $w^A = \frac{\bar{Y}_{old}-y^A-y^B}{T} - ((1+\tau)w^A_{old})$. Mirroring the subsidy granted to mothers, the subsidy used to conduct this counterfactual amounts to a 25% increase in the husband's wage rate reported in 2002. Figure 5 compares the results of the impact of a wage subsidy targeted to fathers on the households' bargaining structure and individual welfare.

Figure 5: Overall Impact of Wage Subsidy for Fathers



Pareto Weight | MMWI, Wife | MMWI, Husband | Domestic Output, Q

The results indicate that the Pareto weight does not respond significantly to changes in the spouses' wage ratio. Nonetheless, in this case, the MMWI of the wife seems to be very responsive to this ratio, which is aligned with the relationship between these relative wages and the per unit cost of producing the domestic good. Compared to the results on the response of fathers' MMWI to changes in relative wages, it seems that the MMWI of the spouse that is relatively more productive at home tends to be more sensitive to changes in relative wages. We can infer this from the strong decrease observed for mothers' MMWI when considering a revenue-neutral cash transfer.

Overall, the intrahousehold gender inequality analysis implemented throughout this section suggests that cash transfers like *Oportunidades* are as effective at empowering mothers as alternative designs of cash transfers targeted to mothers. Furthermore, as expected, I find that both cash transfers and wage subsidies targeted to fathers tend to have a negative impact on mothers' bargaining position and lead to smaller effects on the public good production. Importantly, I find that wage subsidies targeted to mothers are virtually ineffective at empowering them. In terms of policy implications, this suggests that the income source targeted by development programs like *Oportunidades* matter as changes in non-labor income seem to be more effective than wage income at generating shifts in the decision making structure of two-parent households.

5.4 Targeting Intrahousehold Poverty

I use the MMWI to revisit the original targeting strategy of *Oportunidades*. The motivating question involves assessing whether by determining the selection of beneficiaries on household-level poverty rates and disregarding the unequal sharing of resources – thereby, poverty – within households, the second stage of the program's targeting strategy discussed in Section 3 excludes mothers living in non-poor households who could have benefited from participating in the program. I first investigate whether the MMWI can help identify these individually poor mothers. I then assess whether a cash transfer can effectively translate into improvements in these mothers' bargaining position and a higher production of the domestic public good Q.

I start by including non-poor households in the estimation sample in the GMM estimator described in Section 4.3 including households considered as non-poor by the program administration.[26] I then use the estimates obtained from the fourth specification to compute the MMWI. I compare the MMWI estimates with what would be an individual poverty line below which a particular parent would be deemed as poor. I

[26]The estimation and program evaluation results obtained when including non-poor households in the estimation sample can be found in the Online Appendix.

Table 8: MMWI-Based Individual Poverty Rates among Non-Poor Households

	All Households	HHs with 1 Child	HHs with 2 Children	HHs with 3+ Children
MMWI				
All	22.49%	10.68%	20.45%	32.57%
Mothers	43.77%	18.45%	39.61%	65.13%
Only Mothers	42.54%	15.53%	38.31%	65.13%
Both	1.22%	2.91%	1.30%	0.00%
Fathers	1.22%	2.91%	1.30%	0.00%
Only Fathers	0.00%	0.00%	0.00%	0.00%
Both	1.22%	2.91%	1.30%	0.00%
Intrahousehold Pov. Ineq.	100.00%	100.00%	100.00%	100.00%
	N = 409	N = 103	N = 154	N = 152

Intrahousehold Pov. Inequality captures the percentage of households in which the only poor parent is the mother among households in which only one parent is deemed poor

primarily focus on mothers since they (1) are originally targeted by the program and have, on average, a relatively higher preference for the public good.

While this individual poverty analysis is similar to the one in Cherchye et al. (2018), my approach departs from theirs in two main aspects. First, instead of defining the poverty line for an individual as half of 60% of the median full household income observed in the sample, I use the country's official poverty line for the years covered by the ENCELURB (allowing for the presence of a parent and at least one child) reported by the CONEVAL.[27] Lastly, I use a version of the MMWI that accounts for home production, which is not accounted for in the MMWI used in the authors' individual poverty analysis. I define the poverty line to determine a parent's poverty classification considering the case in which mothers are granted full custody of children. In this case, the poverty line for mothers is determined by obtaining the poverty line for a household comprised by the mother and all her children.[28] For fathers, I define their poverty line as the poverty line obtained from the CONEVAL for a 1-person household.

Table 8 presents the individual poverty rates obtained under this poverty line definition. I find that 44% of mothers in two-parent non-poor households can be classified as individually poor when measuring poverty based on their MMWI respectively.[29] The re-

[27]This is defined at approximately 17,496 yearly MXN pesos per person, where 1USD = 10.43 MXN pesos. The poverty lines defined by the CONEVAL can be found in `https://www.coneval.org.mx/Medicion/MP/Paginas/Lineas-de-bienestar-y-canasta-basica.aspx` This agency's poverty line for 2000 was used to determine the eligibility for *Oportunidades* was originally defined.

[28]That is, multiplying the per person poverty line from the CONEVAL data by the household size equal to 1 plus the number of children in the household

[29]Such relatively high individual poverty rates can be explained, to some extent, by the fact that more than 50% of these non-poor households have incomes barely falling just above the poverty line used by the administration of the program and were, therefore, originally categorized as almost poor.

sults highlight a sharp pattern of intrahousehold gender inequality that pervades among non-poor households. This relates to my finding that in all households in which I can categorize only one of the parents as individually poor, such parent is the mother.

Table 9: Overall Impact of Cash Transfers to Poor Mothers in Non-Poor Households

	CCT, NRN	UCT, NRN	CCT, RN	UCT, RN
Pareto Weight	10.2601	10.2601	14.5260	14.5260
MMWI, Wife	10.8987	9.7452	12.2175	11.0615
MMWI, Husband	-7.2012	-6.7051	-12.1165	-11.6173
Domestic Output	14.1207	7.6971	13.8982	7.4922

Notes: [1] CCT denotes conditional cash transfers, UCT denotes unconditional cash transfers
[2] RN denotes revenue neutrality, NRN denotes non-revenue neutrality.

Table 9 presents the percentage changes in the main outcomes of interest associated with targeting a cash transfer constituting 30% of these households' non-labor income to mothers living in two-parent non-poor households deemed as poor within the individual poverty analysis here presented.[30] I again consider four different alternative designs of this cash transfer based on conditionalities and revenue neutrality.[31]

Pareto Weight. The results show that non-revenue neutral cash transfers yield the lowest response in terms of the Pareto weight irrespective of whether a conditionality is imposed (a 10% increase in mothers' bargaining power compared to the 14% increase generated by revenue neutral transfers). On the other hand, the higher impact of the revenue neutral cash transfer is primarily driven by the fact that the revenue neutral cash transfer increases z^A significantly more than the non-revenue neutral cash transfer by forcing a redistribution of non-labor income from the father to the mother.

Individual Welfare Metrics and Domestic Output. Consistent with the sharper increase in the Pareto weight generated by revenue neutral cash transfers than their non revenue neutral counterparts, I find that the shifts generated by revenue neutral cash transfers on the MMWI are larger than those generated by non revenue neutral transfers. Nonetheless, I find that conditional transfers generate sharper shifts in parents' MMWI than their unconditional transfers. This is mainly because the MMWI accounts for changes

[30] I assign this transfer size since I find that in the estimation sample, on average, the transfer amount accounts for 30% of households' non-labor income.

[31] The conditionality in this case is imposed by setting the number of children in the household attending school equal to the number of school-aged children in the household.

induced by the production shifter on parents' relative marginal productivity at home. Thus, when imposing the conditionality, the MMWI adjusts to reflect changes in the number of children in the household attending school. Furthermore, I find that conditional cash transfers tend to have a relatively larger impact on the household's level of domestic output relative to unconditional cash transfers. The results also indicate that non revenue neutral cash transfers tend to generate larger shifts in domestic output than revenue neutral cash transfers. This can be explained by the income effect generated by non revenue neutral cash transfers which allow for more resources to be allocated for domestic production.

While *Oportunidades* has been as effective as alternative cash transfer designs and considerably more effective than wage subsidies in improving mothers' bargaining position within the household, there is scope for improving the implementation of the program in terms of its targeting strategy. Specifically, I show that by determining the eligibility of mothers on the basis of household-level poverty rates, thereby disregarding existing patterns of intrahousehold inequality, the targeting strategy of the program misses mothers living in non-poor two-parent households who would benefit from participating in the program. Thus, these results show that this shortcoming could be addressed by adjusting the selection of program beneficiaries on the basis of individual poverty rates.

6 Conclusion

I provide novel evidence on the impact of gender-targeted policies on women's bargaining power by documenting the response of mothers' Pareto weight to participation in Mexico's *Oportunidades*. To do so, I present identification results that allow us to identify the household's production technology, parental preferences and the Pareto weight of two-parent households even when the intrahousehold allocation of time and consumption is partially observed. Importantly, this approach exploits the exogenous variation induced by the program on parents' time use by placing the cash transfer in the hands of mothers and by requiring school-aged children to attend school. Such alternative identification approach addresses a common data shortcoming that tends to thwart the extent to which I can use empirical applications of the collective labor supply model with home production presented in Blundell, Chiappori and Meghir (2005) to assess the impact of targeted benefits on intrahousehold inequality.

My results indicate that the receipt of the program's cash transfer is associated with a significant increase in mothers' Pareto weight which effectively translated into an increase in their individual welfare, characterized by the generalization of the money metric welfare index of Chiappori and Meghir (2015) I propose in this paper. Importantly, I also find that such empowerment effect associated with participation in *Oportunidades* coincides with an increase in domestic production within two-parent households. Given that the production of the public good is used in the model to account for the presence of children, I provide convincing evidence in favor of the argument that empowering mothers is beneficial for children. Specifically, I find that by empowering mothers, who tend to have a higher preference for the public good as shown by the estimation results in Section 4.4, the program effectively increases domestic production within two-parent households by allowing them to substitute parental time investments with monetary investments in children. My counterfactual exercises show that *Oportunidades* is as effective as alternative cash transfer designs and considerably more effective than wage subsidies in serving as a policy lever for mothers' empowerment.

As is common in the applications of the model I consider, my analysis is limited by the focus on the sub-sample of working parents, thereby losing potentially useful information from households in which there are patterns of full specialization under which mothers devote most of their time to home production but none to market work. Thus, the analysis here developed would benefit from incorporating non-participation into the model. This would involve extending my proposed approach in a way that permits modeling the continuous choices related to parents' time allocation and consumption as well as their discrete choice relating their decision to participate or not in either market work or home production within a generalization of the framework developed in Blundell et al. (2007). Besides involving novel identification results, such extension could help yield more generalizable results of the impact of gender-targeted policies on women's bargaining power, individual welfare and household investments in children.

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A Non-Parametric Identification

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) and the variation generated by a distribution factor and a production shifter. I first present a set of assumptions that facilitate the non-parametric identification of the model.

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 z^A. 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 $\lambda(w^A, w^B, y, \hat{z}^A)$.

A4 Married mothers are more productive at home than their single counterparts: $\frac{\partial F_Q^M(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial h_D^A} > \frac{\partial F_Q^S(h_D^A,q^D;\mathbf{S})}{\partial h_D^A}$.

A5 The empirical relationship between z^A and l^A is positive. Similarly, the empirical relationship between s_j and l^A is positive. That is, I find empirical evidence suggesting that $\frac{\partial l^A}{\partial z^A} > 0$ and $\frac{\partial l^A}{\partial s_j} > 0$ in the data while fathers' time use is virtually unaffected by z^A and s_j.

A6 Shifts in the production shifter affect married and single mothers' productivity at home differently. That is, either $\frac{\partial}{\partial s_j}\left[\frac{\partial F_Q^M(h_D^A, h_D^B, q^D; \mathbf{S})}{\partial h_D^A}\right] \geq 0$ and $\frac{\partial}{\partial s_j}\left[\frac{\partial F_Q^S(h_D^A, q^D; \mathbf{S})}{\partial h_D^A}\right] \leq 0$ or vice versa.

A.1 Identifying the Household's Production Technology

Two-Parent Households. Data availability on the amount of time each individual parent spends on home production and on the household's child-related expenditures allow for the identification of the household's production function despite Q being unobserved. This is a result outlined in Blundell, Chiappori and Meghir (2005) and Chiappori and Ekeland (2009).[32] I provide further details of the derivation of the system of equations used to show this identification result in the Mathematical Appendix of the Online Appendix.

Single-Parent Households. Letting the gender of a single parent be denoted by g, similar to the case of two-parent households, productive efficiency allows me to define the following rate of technical substitution of time for monetary investments in the production of the public good

$$\varphi_S^g = \frac{\partial F_Q^{S,g}(h_D^g, q^D; \mathbf{S})/\partial h_D^g}{\partial F_Q^{S,g}(h_D^g, q^d; \mathbf{S})/\partial q^D} = w^g$$

which, given that I have data on both single parents' monetary and time investments on Q can be identified by applying a similar result to the one for used two-parent households, relying on the invertibility of the following Jacobian of reduced-form equations

$$D_{(w^A, Y)}(h_D^g, q^D) = \begin{pmatrix} \frac{\partial h_D^g}{\partial w^g} & \frac{\partial h_D^g}{\partial y} \\ \frac{\partial q^D}{\partial w^g} & \frac{\partial q^D}{\partial y} \end{pmatrix} \tag{26}$$

[32] Chiappori and Ekeland (2009) also emphasize that additional inputs can be introduced into the production function at no cost in terms of identification as long as these are observable. Thus, adding home production into the model does not constitute a significant challenge for identification as long as I have data on all inputs of production.

While this recovers φ_S^g, I am still falling short of one condition that could allow me to identify each marginal productivity separately. While in the case of two-parent households, this additional condition could be obtained from exploiting the continuous differentiability of the production function to ensure that the marginal rates of technical substitution of both parents' home time for monetary investments on the domestic good corresponded to the same production function F_Q^M, this is not feasible in the case of a single-parent household since there are only two inputs of production, and therefore only one marginal rate of technical substitution that can be used. I use (1) the role of the number of children in the household attending school, s_j, as a production shifter, (2) the relationship between the conditional factor demands for h_D^A and q^D with s_j, and (3) the variation induced by the *Oportunidades* cash transfer program on children's school attendance to generate an additional condition in terms of both marginal productivities that can help me separately identify each of them. For this, I can differentiate φ_S^g with respect to s_j taking into consideration the reduced-form relationship between h_D^g and s_j and between q^D and s_j:

$$\frac{\partial h_D^g}{\partial s_j}\frac{\partial}{\partial h_D^g}\left[\frac{\partial F_Q^{S,g}}{\partial h_D^g}\right]+\frac{\partial}{\partial s_j}\left[\frac{\partial F_Q^{S,g}}{\partial h_D^g}\right]-w^g\left(\frac{\partial q^D}{\partial s_j}\frac{\partial}{\partial q_D}\left[\frac{\partial F_Q^{S,g}}{\partial q^D}\right]+\frac{\partial}{\partial s_j}\left[\frac{\partial F_Q^{S,g}}{\partial q^D}\right]\right)=0 \quad (27)$$

where $\frac{\partial h_D^g}{\partial s_j}$ and $\frac{\partial q^D}{s_j}$ is observed in the data, and therefore, known to the researcher. Similar to the case of two-parent households, 26 and 27 generate a 2×2 system of equations that allows me to recover the marginal productivity of single parents' time and monetary investments in the production of Q. This allows me to identify the production function $F_Q^{S,g}$ up to a strictly monotone transformation, $G_{s,g}$ such that $F_Q^{S,g}(h_D^g, q^D; \mathbf{S}) = G_{S,g}^{-1}[\bar{F}^{S,g}(h_D^g, q^D; \mathbf{S})]$.

A.2 Identification of Preference Parameters and Pareto Weight

At this point, I can then take $\frac{\partial F_Q^M}{\partial h_D^A}$, $\frac{\partial F_Q^M}{\partial h_D^B}$, $\frac{\partial F_Q^M}{\partial q^D}$, $\frac{\partial F_Q^{S,A}}{\partial h_D^A}$, $\frac{\partial F_Q^{S,B}}{\partial h_D^B}$, $\frac{\partial F_Q^{S,A}}{\partial q^D}$, and $\frac{F_Q^{S,B}}{\partial q^D}$. The following notation is adopted hereafter.

Unknowns

For the household's decision making structure, the only unknown is $\lambda(\mathbf{z})$. For individual preferences, let $\Gamma_l^i(l^i, q^i, Q, \mathbf{X}^i) = \frac{\partial U^i(l^i,q^i,Q;\mathbf{X}^i)}{\partial l^i}$, $\Gamma_Q^i(l^i, q^i, Q, \mathbf{X}^i) = \frac{\partial U^i(l^i,q^i,Q;\mathbf{X}^i)}{\partial Q}$

and $\Gamma_q^i(l^i, q^i, Q, \mathbf{X}^i) = \frac{\partial U^i(l^i,q^i,Q;\mathbf{X}^i)}{\partial q^i}$ for $i = (A, B)$. Furthermore, given that preferences are strongly separable as described in A1, I have that $\Gamma_l^i(l^i, \mathbf{X}^i) = \frac{\partial u^{l,i}(l^i;\mathbf{X}^i)}{\partial l^i}$, $\Gamma_Q^i(Q, \mathbf{X}^i) = \frac{\partial u^{Q,i}(Q;\mathbf{X}^i)}{\partial Q}$ and $\Gamma_q^i(q^i, \mathbf{X}^i) = \frac{\partial u^{q,i}(q^i;\mathbf{X}^i)}{\partial q^i}$ for $i = (A, B)$.

Known (from the data and recovered in Step 1)

Recovered in Step 1: $\phi_M^A = \frac{\partial F_Q^M(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial h_D^A}, \phi_M^B = \frac{\partial F_Q^M(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial h_D^B}, \phi_M^D = \frac{\partial F_Q^M(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial q^D}, \phi_S^A = \frac{\partial F_Q^{S,A}(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial h_D^A}, \phi_S^B = \frac{\partial F_Q^{S,B}(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial h_D^B}, \phi_S^{D,A} = \frac{\partial F_Q^{S,A}(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial q^D}, \phi_S^{D,B} = \frac{\partial F_Q^{S,B}(h_D^A,h_D^B,q^D;\mathbf{S})}{\partial q^D}$

Data only: $\Delta_{z^A}^l(d, A) = \frac{\partial l^A}{\partial z^A}, \Delta_{z^A}^l(d, B) = \frac{\partial l^B}{\partial z^A}, \Delta_{s_j}^l(d, A) = \frac{\partial l^A}{\partial s_j} = \frac{\Delta_{z^A}^l(d,A)}{\Delta_{z^A}^{s_j}(d)}, \Delta_{s_j}^l(d, B) = \frac{\partial l^B}{\partial s_j} = \frac{\Delta_{z^A}^l(d,B)}{\Delta_{z^A}^{s_j}(d)}, \Delta_{z^A}^{h^D}(d, A) = \frac{\partial h_D^A}{\partial z^A}, \Delta_{z^A}^{h^D}(d, B) = \frac{\partial h_D^B}{\partial z^A}, \Delta_{s_j}^{h^D}(d, A) = \frac{\partial h_D^A}{\partial s_j} = \frac{\Delta_{z^A}^{h^D}(d,A)}{\Delta_{z^A}^{s_j}(d)}, \Delta_{s_j}^{h^D}(d, B) = \frac{\partial h_D^B}{\partial s_j} = \frac{\Delta_{z^A}^{h^D}(d,B)}{\Delta_{z^A}^{s_j}(d)}, \Delta_{z^A}^{q^D}(d) = \frac{\partial q^D}{\partial z^A}, \Delta_{s_j}^{q^D}(d) = \frac{\partial q^D}{\partial s_j} = \frac{\Delta_{z^A}^{q^D}(d)}{\Delta_{z^A}^{s_j}(d)}, \Delta_{z^A}^q(d) = \frac{\partial q}{\partial z^A}, \Delta_{s_j}^q(d) = \frac{\partial q}{\partial s_j} = \frac{\Delta_{z^A}^q(d)}{\Delta_{z^A}^{s_j}(d)}$

Combination of data and components recovered in Steps 1 and 2:
$\Delta_{z^A}^\phi(d, i) = \frac{\partial \phi^i}{\partial z^A} = \frac{\partial \phi^i}{\partial h_D^A}\Delta_{z^A}^{h^D}(d, A) + \frac{\partial \phi^i}{\partial h_D^B}\Delta_{z^A}^{h^D}(d, B) + \frac{\partial \phi^i}{\partial q^D}\Delta_{z^A}^{q^D}(d)$ for $i = (A, B), \Delta_{s_j}^\phi(d, i) = \frac{\partial \phi^i}{\partial s_j} = \frac{\partial \phi^i}{\partial h_D^A}\Delta_{s_j}^{h^D}(d, A) + \frac{\partial \phi^i}{\partial h_D^B}\Delta_{s_j}^{h^D}(d, B) + \frac{\partial \phi^i}{\partial q^D}\Delta_{s_j}^{q^D}(d)$ for $i = (A, B), \Delta_{z^A}^{\phi^D}(d) = \frac{\partial \phi^B}{\partial z^A} = \frac{\partial \phi^D}{\partial h_D^A}\Delta_{z^A}^{h^D}(d, A) + \frac{\partial \phi^D}{\partial h_D^B}\Delta_{z^A}^{h^D}(d, B) + \frac{\partial \phi^D}{\partial q^D}\Delta_{z^A}^{q^D}(d), \Delta_{s_j}^{\phi^D}(d) = \frac{\partial \phi^D}{\partial s_j} = \frac{\partial \phi^B}{\partial h_D^A}\Delta_{s_j}^{h^D}(d, A) + \frac{\partial \phi^D}{\partial h_D^B}\Delta_{s_j}^{h^D}(d, B) + \frac{\partial \phi^D}{\partial q^D}\Delta_{s_j}^{q^D}(d), \Delta_{z^A}^Q(d) = \frac{\partial Q}{\partial z^A} = \phi^A\Delta_{z^A}^{h^D}(d, A) + \phi^B\Delta_{z^A}^{h^D}(d, B) + \phi^D\Delta_{z^A}^{q^D}(d)$
$\Delta_{s_j}^Q(d) = \frac{\partial Q}{\partial s_j} = \phi^A\Delta_{s_j}^{h^D}(d, A) + \phi^B\Delta_{s_j}^{h^D}(d, B) + \phi^D\Delta_{s_j}^{q^D}(d)$

I start by focusing on the first order conditions relating parents' marginal utility for public consumption and their marginal utility for leisure. For single mothers and fathers, respectively, I have that

$$\frac{\partial F_Q^{S,A}}{\partial h_D^A}\frac{\partial U^A}{\partial Q} = \frac{\partial U^A}{\partial l^A}; \quad \frac{\partial F_Q^{S,B}}{\partial h_D^B}\frac{\partial U^B}{\partial Q} = \frac{\partial U^B}{\partial l^B}$$

Substituting $\frac{\partial U^A}{\partial Q}$ into the two-parent households' marginal utility for public consumption, yielding

$$\frac{\partial F_Q^M}{\partial h_D^A}\left[\lambda(\mathbf{z})\frac{\partial U^A/\partial l^A}{\partial F_Q^{S,A}/\partial h_D^A} + (1-\lambda(\mathbf{z}))\frac{\partial U^B/\partial l^B}{\partial F_Q^{S,B}/\partial h_D^B}\right] = \lambda(\mathbf{z})\frac{\partial U^A}{\partial l^A} \tag{28}$$

Differentiating this with respect to s_j and z^A could yield 2 additional restrictions to the two-parent households first order condition relating both parents' marginal utilities for leisure

$$\frac{\lambda(\mathbf{z})}{1-\lambda(\mathbf{z})}\frac{\partial U^A/\partial l^A}{\partial U^B/\partial l^B}=\frac{w^A}{w^B}$$

Thus, I have the following 3×3 system of equations that can be used to recover parents' marginal utility for leisure and the Pareto weight

$$\frac{\lambda(\mathbf{z})}{1-\lambda(\mathbf{z})}\frac{\Gamma_l^A}{\Gamma_l^B}-\frac{w^A}{w^B}=0 \tag{29}$$

$$(1-\lambda(\mathbf{z}))\left(\frac{\phi_S^B\Delta_{s_j}^l(d,B)\frac{\partial\Gamma_l^B}{\partial l^B}-\Gamma_l^B\Delta_{s_j}^{\phi_S}(d,B)}{(\phi_S^B)^2}\right)$$
$$-\lambda(\mathbf{z})\left(\frac{\phi_M^A\Delta_{s_j}^l(d,A)\frac{\partial\Gamma_l^A}{\partial l^A}-\Gamma_l^A\Delta_{s_j}^{\phi_M}(d,A)}{(\phi_M^A)^2}-\frac{\phi_S^A\Delta_{s_j}^l(d,A)\frac{\partial\Gamma_l^A}{\partial l^A}-\Gamma_l^A\Delta_{s_j}^{\phi_S}(d,A)}{(\phi_S^A)^2}\right)=0 \tag{30}$$

$$-\frac{\partial\lambda(\mathbf{z})}{\partial z}\frac{\Gamma_l^B}{\phi_S^B}+\frac{(1-\lambda(\mathbf{z}))}{\phi_S^B}\Delta_{z^A}^l(d,B)\frac{\partial\Gamma_l^B}{\partial l^B}-\frac{\phi_M^A\left(\frac{\partial\lambda(\mathbf{z})}{\partial z^A}\Gamma_l^A+\lambda(\mathbf{z})\Delta_{z^A}^l(d,A)\frac{\Gamma_l^A}{\partial l^A}\right)-\Gamma_l^A\lambda(\mathbf{z})\Delta_{z^A}^{\phi_M}(d,A)}{(\phi_M^A)^2}$$
$$+\frac{1}{\phi_S^A}\left(\frac{\partial\lambda(\mathbf{z})}{\partial z^A}\Gamma_l^A+\lambda(\mathbf{z})\Delta_{z^A}^l(d,A)\frac{\Gamma_l^A}{\partial l^A}\right)=0 \tag{31}$$

The first equation corresponds to the relationship between the marginal rate of substitution of spouses' leisure within two-parent households. The second equation is obtained by differentiating 28 with respect to s_j. Finally, the third one is obtained by differentiating 28 with respect to z^A. Note that I can exploit the variation of the program on h_D^A through z^A only for mothers in two-parent households since only in this type of household structure I have that the conditional factor demand for h_D^A, h_D^B and q^D are functions of z^A.

The normalizations described in A3 allow me to characterize 29-31 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

$$\frac{\partial\Gamma_l^A}{\partial l^A}\approx f_\Gamma^A=\frac{\Gamma_l^A-c_A}{l^A-\hat{l}^A} \tag{32}$$

$$\frac{\partial\Gamma_l^B}{\partial l^B}\approx f_\Gamma^B=\frac{\Gamma_l^B-c_B}{l^B-\hat{l}^B} \tag{33}$$

$$\frac{\partial\lambda(\mathbf{z})}{\partial z^A}\approx f_\lambda=\frac{\lambda-c}{z^A-\hat{z}^A} \tag{34}$$

Thus, I define $\mathbf{F}(\Gamma_l^A, \Gamma_l^B, \lambda) = \mathbf{0}$ so that

$$F1 = \frac{\lambda(\mathbf{z})}{1-\lambda(\mathbf{z})} \frac{\Gamma_l^A}{\Gamma_l^B} - \frac{w^A}{w^B} = 0 \tag{35}$$

$$F2 = (1-\lambda(\mathbf{z})) \left(\frac{\phi_S^B \Delta_{s_j}^l(d,B) f_\Gamma^B - \Gamma_l^B \Delta_{s_j}^{\phi_S}(d,B)}{(\phi_S^B)^2} \right)$$
$$-\lambda(\mathbf{z}) \left(\frac{\phi_M^A \Delta_{s_j}^l(d,A) f_\Gamma^A - \Gamma_l^A \Delta_{s_j}^{\phi_M}(d,A)}{(\phi_M^A)^2} - \frac{\phi_S^A \Delta_{s_j}^l(d,A) f_\Gamma^A - \Gamma_l^A \Delta_{s_j}^{\phi_S}(d,A)}{(\phi_S^A)^2} \right) = 0 \tag{36}$$

$$F3 = -\frac{\partial \lambda(\mathbf{z})}{\partial z} \frac{\Gamma_l^B}{\phi_S^B} + \frac{(1-\lambda(\mathbf{z}))}{\phi_S^B} \Delta_{z^A}^l(d,B) f_\Gamma^B - \frac{\phi_M^A \left(\frac{\partial \lambda(\mathbf{z})}{\partial z^A} \Gamma_l^A + \lambda(\mathbf{z}) \Delta_{z^A}^l(d,A) f_\Gamma^A \right) - \Gamma_l^A \lambda(\mathbf{z}) \Delta_{z^A}^{\phi_M}(d,A)}{(\phi_M^A)^2}$$
$$+ \frac{1}{\phi_S^A} \left(\frac{\partial \lambda(\mathbf{z})}{\partial z^A} \Gamma_l^A + \lambda(\mathbf{z}) \Delta_{z^A}^l(d,A) f_\Gamma^A \right) = 0 \tag{37}$$

Invoking the Inverse Function Theorem, a solution to $\mathbf{F}(\Gamma_l^A, \Gamma_l^B, \lambda) = \mathbf{0}$ exists if I can show that $\mathbf{DF}(\Gamma_l^A, \Gamma_l^B, \lambda)$ is invertible. That is, I need to show that $det(\mathbf{DF}(\Gamma_l^A, \Gamma_l^B, \lambda)) \neq 0$.

To keep notation clean, let

$$C1 = \frac{1}{\phi_S^A} - \frac{1}{\phi_M^A}; \quad C2 = \frac{\Delta_{s_j}^{\phi_M}(d,A)}{(\phi_M^A)^2} - \frac{\Delta_{s_j}^{\phi_S}(d,A)}{(\phi_S^A)^2}$$

where $C1, C2 > 0$, by assumptions A4 and A6, respectively.

I can sign the following by the assumption that $\lambda \in (0,1)$ and that $U^A(l^A, q^A, Q; \mathbf{X}^A)$ and $U^B(l^B, q^B, Q; \mathbf{X}^A)$ are increasing on (l^i, q^i, Q) for both A and B, implying that $\Gamma_l^A, \Gamma_l^B > 0$:

$$\frac{\partial F_1}{\partial \lambda} = \frac{\Gamma_l^A}{(1-\lambda)^2 \Gamma_l^B} > 0; \quad \frac{\partial F_1}{\partial \Gamma_l^A} = \frac{\lambda}{(1-\lambda)\Gamma_l^B} > 0; \quad \frac{\partial F_1}{\partial \Gamma_l^B} = -\frac{\lambda \Gamma_l^A}{(1-\lambda)(\Gamma_l^B)^2} < 0$$

Moreover, given that in assumption A3, the normalization imposed relative to the lower boundary of l^A and l^B and that U^i is assumed to be concave, I know then that $f_\Gamma^i < 0$ for $i = (A, B)$. Assuming that λ is non-decreasing on z^A, it follows that $f_\lambda >= 0$.

To simplify the derivation of $det(\mathbf{DF}(\Gamma_l^A, \Gamma_l^B, \lambda))$ that could allow me to sign it, I consider the particular case I have in the empirical evidence. Recall that in Section 3 I showed that participation in the program leaves fathers' time allocation unaffected. Similarly, I find that mothers' leisure increases with program participation. Thus, suppose that $\Delta_{s_j}^l(d,B) = \Delta_{z^A}^l(d,B) = 0$, $\Delta_{s_j}^l(d,A) \geq 0$ and $\Delta_{z^A}^l(d,A) \geq 0$. That is, fathers' leisure is unresponsive to changes in z^A and s_j while mothers' leisure in two-parent households is positively related with changes in z^A and s_j associated with participation in a program like *Oportunidades*.[33] Then, I describe $det(\mathbf{DF}(\Gamma_l^A, \Gamma_l^B, \lambda))$ and sign it in the following way

$$
\begin{aligned}
det(\mathbf{DF}(\Gamma_l^A, \Gamma_l^B, \lambda)) = & -\frac{\Gamma_l^A}{(1-\lambda)^2\Gamma_l^B}\frac{\lambda f_\lambda C1\Delta^l_{s_j}(d,A)}{\phi_S^B(l^A-\hat{l}^A)} + f_\Gamma^A\frac{\lambda}{(1-\lambda)\Gamma_l^B}\frac{\Delta^l_{s_j}(d,A)C1}{\phi_S^B} \\
& - \frac{\Gamma_l^A}{(1-\lambda)^2}\frac{\lambda f_\lambda C2}{\phi_S^B} - \frac{\lambda}{(1-\lambda)\Gamma_l^B}\frac{\Gamma_l^A C2}{\phi_S^B} \\
& - \frac{\lambda}{1-\lambda}\frac{\Gamma_l^A}{(\Gamma_l^B)^2}\Bigg[\underbrace{\left(-C1\Delta^l_{s_j}(d,A)f_\Gamma^A + \Gamma_l^A C2\right)\left(C1\left(f_\lambda + \frac{\lambda\Delta^l_{z^A}(d,A)}{l^A-\hat{l}^A}\right) + \frac{\lambda\Delta^{\phi_M}_{z^A}(d,A)}{(\phi_M^A)^2}\right)}_{+} \\
& - \Bigg(\underbrace{\frac{1}{z^A-\hat{z}^A}\left(-\frac{\Gamma_l^B}{\phi_S^B} + \Gamma_l^A C1\right) + f_\Gamma^A\Delta^l_{z^A}(d,A)C1}_{-}\Bigg)\Bigg(\underbrace{C1\frac{\lambda\Delta^l_{s_j}(d,A)}{l^A-\hat{l}^A} + \lambda C2}_{+}\Bigg)\Bigg]
\end{aligned}
$$

Given the signs of Γ_l^A, Γ_l^B, f_Γ^A, f_Γ^B, and f_λ, this is **negative**. Thus, a solution to the system of equations generated by 29-31 exists.

Given the solution obtained for $(\Gamma_l^A, \Gamma_l^B, \lambda)$, I proceed to recover $\Gamma_Q^A, \Gamma_Q^B, \Gamma_q^A, \Gamma_q^B$. I start by focusing on parents' marginal rate of substitution of leisure for private consumption implied by the optimality condition relating leisure and private consumption. This allows me to recover Γ_q^i using $\frac{\Gamma_l^i}{\Gamma_q^i} = w^i$ as Γ_l^i is known at this stage and I observe w^i in the data. I then combine the marginal rates of substitution of leisure for public consumption for parents in both types of households to derive the following

$$
\Gamma_Q^A = \frac{1}{\lambda(\mathbf{z})}\left(\lambda(\mathbf{z})\frac{\Gamma_l^A}{\phi_M^A} - (1-\lambda(\mathbf{z}))\frac{\Gamma_l^B}{\phi_S^B}\right); \quad \Gamma_Q^B = \frac{1}{1-\lambda(\mathbf{z})}\left((1-\lambda(\mathbf{z}))\frac{\Gamma_l^B}{\phi_M^B} - \lambda(\mathbf{z})\frac{\Gamma_l^A}{\phi_S^A}\right)
$$

Since Γ_l^i, λ, ϕ_S^i and ϕ_M^i (for $i = A, B$) are known at this stage, the identification of Γ_Q^i follows. Thus, the marginal utilities of both mothers and fathers and the Pareto weight are recoverable.

[33]The positive relationship between program participation and changes in s_j is established by the evidence I find that program participation increases the number of children attending school as shown in Section 4.4. The subsequent impact on parents' time allocation within two-parent households is derived as described in Step 1 in Section 4.3.

B Parametric Identification

This section describes the parametric identification of the model from which the estimation strategy described in Section 4.3 is derived.

B.1 Main Identification Results

Proposition B1 (Identification of Two-Parent Households' Production Technology).
Let (h_D^A, h_D^B, q^D) be observed functions of $(w^A, w^B, y, \mathbf{S}, \mathbf{z})$ for two-parent households. If for at least one production shifter $s_j \in \mathbf{S}$, $\exists s_j^*$ such that $\psi(\mathbf{S}^*) = 1/2$, the substitution parameter γ is identified. Once γ is identified, the relative productivity of the spouses can be recovered from the home time ratios observed in the data, $\frac{h_D^A}{h_D^B}$. With γ and $\psi(\mathbf{S})$ identified, the output share of parental time, ρ, is identified upon observing at least one of the home time to monetary investment ratios, $\frac{h_D^i}{q^D}$, for $i = (A, B)$.

Proof: Identification of the home production parameters stems from the optimality conditions related to productive efficiency described in 15-17. 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 sample of households in the application here considered has any positive number of children, I let s_j be the number of children that attend school. Since, for now, the only observable included in the estimation of $\psi(\mathbf{S})$ is this s_j, a useful normalization to consider involves focusing on the sub-sample with no children for whom, using 15, I can let $\psi(\mathbf{S}) = 1/2$ to recover γ. Taking γ as known, I can recover $\psi(\mathbf{S})$ using 15 on the sub-sample of households with at least one child attending school. Once I have γ and $\psi(\mathbf{S})$, I can use either 16 or 17 to recover ρ. Thus, I find that either of these two conditions can also serve as an overidentifying restriction in this case.

Proposition B2 (Identification of Single-Parent Households' Production Technology).
Let (h_D^i, q^D) be observed functions of $(w^i, y^i, \mathbf{S})$ for $i = (A, B)$. If for at least one production shifter $s_j \in \mathbf{S}$, $\exists s_j^*$ such that $\phi(\mathbf{S}^*) = 1/2$, the substitution parameter β is identified. Once β^i is identified, the relative productivity of parental time, $\phi^i(\mathbf{S})$, can be recovered from single parents' home time to monetary investment ratios observed in the data, $\frac{h_D^i}{q^D}$.

Proof: Identification of single-parent households' production technology is derived from the optimality condition related to productive efficiency and described in 12.

In this case, I face a similar problem in the identification of β and $\phi(\mathbf{S})$ as when focusing on the production technology of two-parent households. This involves the lack of a condition I can use to begin solving for each individual production function parameter. Again, since the production shifter of interest involves the number of children enrolled in school, I can then impose a similar normalization to the one used for two-parent households such that for parents with no children enrolled in school ($s_j = 0$), $\phi(\mathbf{S}) = 1/2$. Thus, from these households, I can recover β. Once I recover β, I can then estimate $\phi(\mathbf{S})$ taking β as given over the sample of households in which there are children attending school ($s_j > 0$).

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 12. 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 13 and their private consumption to monetary investments in the production of the public good following 14. 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 13 and 14. 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 12 to write down either $\alpha_1^i(\mathbf{X})$ in terms of $\alpha_2^i(\mathbf{X})$, or vice versa, and using this in 13 or 14 to solve the system of equations, yielding

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

Proposition B4 (Identification of the Pareto Weight).
Let (l^A, l^B, q) be observed functions of $(w^A, w^B, y, \boldsymbol{S}, \boldsymbol{z})$ 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 18.

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 18 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 the third optimality condition presented in 18, the conditions related to the household's marginal utility for public consumption and for leisure and the spouses' marginal productivity at home described in 19 and 20 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 conditions related to the experimental variation of *Oportunidades* on household behavior described in 40-44 yield another set of overidentifying restrictions relating the Pareto weight, individual preferences and the production technology parameters.

B.2 Additional Identifying Conditions Derived from *Oportunidades*

Letting $\Delta_{s_j}^{h_D}(d) = \frac{\partial}{\partial s_j}\left[\frac{h_D^A}{h_D^B}\right]$ and $\Delta_{s_j}^{h_D,q^D}(d) = \frac{\partial}{\partial s_j}\left[\frac{h_D^A}{q^D}\right]$.

$$\Delta_{s_j}^{h_D}(d) = -\frac{1}{1-\gamma}\left(\frac{w^B}{w^A}\frac{\psi(\mathbf{S})}{(1-\psi(\mathbf{S}))}\right)^{\frac{1}{1-\gamma}}\frac{\partial\psi(\mathbf{S})}{\partial s_j} \tag{38}$$

$$\Delta_{s_j}^{h_D,q^D}(d) = -\frac{1}{1-\beta^i}\left((w^A)^{\frac{1}{\beta^i}}\left(\frac{(1-\phi^i(\mathbf{S}))}{\phi^i(\mathbf{S})}\right)^{\frac{\beta^i}{1-\beta^i}}\frac{\partial\phi^i(\mathbf{S})}{\partial s_j}\right) \tag{39}$$

Intuitively, for two-parent households, 38 captures the response of $\frac{h_D^A}{h_D^B}$ to changes in the production shifter, s_j – capturing the extent to which the production shifter can be used to affect the degree of gender specialization within the household. For single-parent households, 39 captures the response of $\frac{h_D^A}{q^D}$ to changes in the production shifter s_j.

Furthermore, letting $\Delta^l_{z^A}(d) = \frac{\partial}{\partial z^A}\left[\frac{l^A}{l^B}\right]$, $\Delta^{l,h_D}_{z^A}(d,A) = \frac{\partial}{\partial z^A}\left[\frac{l^A}{h_D^A}\right]$ and $\Delta^{l,h_D}_{z^A}(d,B) = \frac{\partial}{\partial z^A}\left[\frac{l^B}{h_D^B}\right]$, I define the following conditions

$$\Delta^l_{z^A}(d) = \frac{\partial\lambda(\mathbf{z})}{\partial z^A}\frac{1}{(1-\lambda(\mathbf{z}))^2}\frac{\alpha_1^A(\mathbf{X})}{\alpha_1^B(\mathbf{X})}\frac{w^B}{w^A} \tag{40}$$

$$\Delta^{l,h_D}_{z^A}(d,A) = \frac{\partial\lambda(\mathbf{z})}{\partial z^A}\frac{\alpha_1^A(\mathbf{X})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))[\psi(\mathbf{S})+(1-\psi(\mathbf{S}))(h_D^B/h_D^A)^\gamma]}{C^2\rho\psi(\mathbf{S})} \tag{41}$$

$$\Delta^{l,h_D}_{z^A}(d,B) = -\frac{\partial\lambda(\mathbf{z})}{\partial z^A}\frac{\alpha_1^B(\mathbf{X})(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))[\psi(\mathbf{S})(h_D^A/h_D^B)^\gamma+(1-\psi(\mathbf{S}))]}{C^2\rho(1-\psi(\mathbf{S}))} \tag{42}$$

Letting $\Delta^{l,h_D}_{s_j}(d,A) = \frac{\partial}{\partial s_j}\left[\frac{l^A}{h_D^A}\right]$ and $\Delta^{l,h_D}_{s_j}(d,B) = \frac{\partial}{\partial s_j}\left[\frac{l^B}{h_D^B}\right]$, I derive the following

$$\Delta^{l,h_D}_{s_j}(d,A) = \frac{\lambda(\mathbf{z})\alpha_1^A(\mathbf{X})}{\rho C}\left(\frac{1-\psi(\mathbf{S})}{\psi(\mathbf{S})}\left[\left(\frac{w^A}{w^B}\right)^{\frac{1}{1-\gamma}}\frac{1}{1-\gamma}\left(\frac{1-\psi(\mathbf{S})}{\psi(\mathbf{S})}\right)^{\frac{\gamma}{1-\gamma}}\frac{\partial\psi(\mathbf{S})}{\partial s_j}\right]\right) \tag{43}$$

$$\Delta^{l,h_D}_{s_j}(d,B) = -\frac{(1-\lambda(\mathbf{z}))\alpha_1^B(\mathbf{X})}{\rho C}\left(\frac{\psi(\mathbf{S})}{1-\psi(\mathbf{S})}\left[\left(\frac{w^A}{w^B}\right)^{\frac{1}{\gamma-1}}\frac{1}{1-\gamma}\left(\frac{1-\psi(\mathbf{S})}{\psi(\mathbf{S})}\right)^{\frac{\gamma}{1-\gamma}}\frac{\partial\psi(\mathbf{S})}{\partial s_j}\right]\right) \tag{44}$$

where $C = \lambda(\mathbf{z})(1-\alpha_1^A(\mathbf{X})-\alpha_2^A(\mathbf{X}))+(1-\lambda(\mathbf{z}))(1-\alpha_1^B(\mathbf{X})-\alpha_2^B(\mathbf{X}))$.

C Supplemental Tables and Figures

C.1 Propensity Score Estimation and Distribution

The first step of the MDID estimator described in Section 3 involves estimating a probit model of program participation. For two-parent households, I present the marginal effects at the mean in 10. 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 11. The distributions of the predicted propensity scores are presented 6.

Table 10: 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	

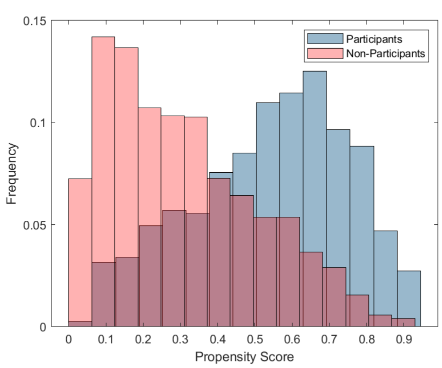
Standard errors in parentheses

Table 11: Probit Estimates: Marginal Effects at the Mean

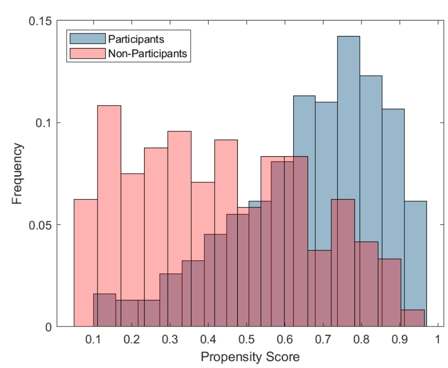
	$\Pr(D=1 \mid X)$	
HH Poverty Index	0.0500	(0.15)
(HH Poverty Index)^2	-0.0376	(0.04)
Household size	-0.0773	(0.05)
Number of children, 0-5	0.205**	(0.06)
Number of children, 6-12	0.0893	(0.08)
Number of children, 13-15	0.0520	(0.09)
Number of children, 16-20	0.0724	(0.08)
(Number of children in school)^2	-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

Figure 6: Propensity Score Distribution by Type of Household



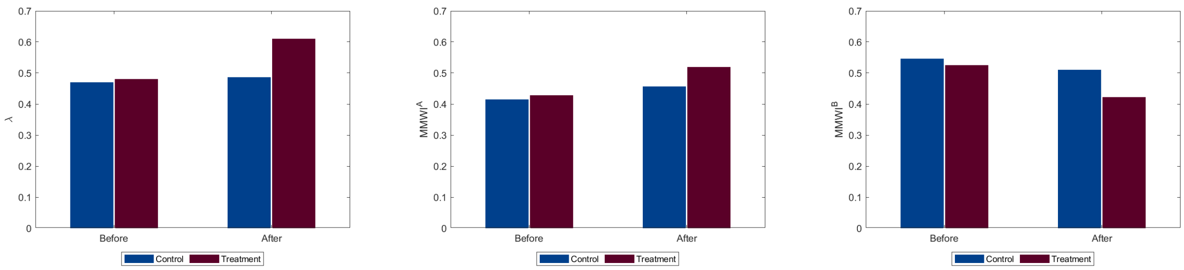
Two-Parent



Single-Parent

C.2 Bargaining Power and Individual Welfare Measures

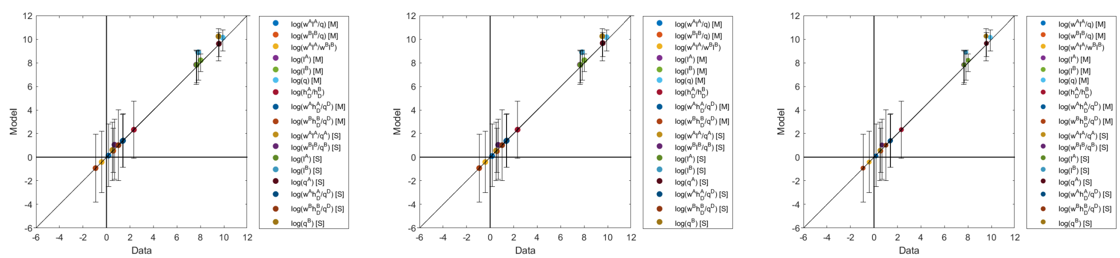
Figure 7: Overall Impact of *Oportunidades* on Intrahousehold Bargaining Power and Individual Welfare



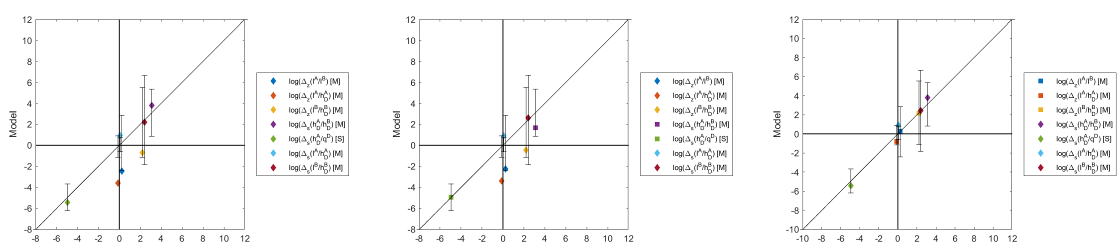
Pareto Weight MMWI, Wife MMWI, Husband

C.3 Model Fit for Specifications 1-3

Figure 8: Theoretical and Experimental Moments



Theoretical (Sp. 1) Theoretical (Sp. 2) Theoretical (Sp. 3)



Experimental (Sp. 1) Experimental (Sp. 2) Experimental (Sp. 3)