Out of Sight, Not Out of Mind: Information, Efficiency and the Extended Family

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Abstract

There is consistent evidence of efficient resource allocation among coresident family members, such as between partners or between parents and children. I investigate the efficiency of resource allocations among non-coresident family members, such as between adult children and aging parents. My paper is the first study to use novel survey data from the Panel Study of Income Dynamics to document the extent of information asymmetries across households of an extended family. I show evidence of inefficient resource allocation between non-coresident families but also show allocative efficiency is heterogeneous with respect to information asymmetries. I find that families with better information sharing allocate resources in a (Pareto) efficient manner while families with asymmetric information make inefficient allocation decisions similar to those among complete strangers. This work improves our understanding of decision-making in the extended family and provides empirical support for well understood theoretical notions that information frictions hinder efficiency. Since the extended family plays a central role in re-distributing economic benefits, my work suggests policy targeting financial benefits to one generation can affect consumption across generations in some families but not others.

Keywords: extended family, resource allocation, collective rationality, Information asymmetry

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1 Introduction

Across the globe, the extended family plays a significant role as a source of caregiving, offering social and financial support to its members. In the United States, its importance has been reinforced by significant, ongoing demographic shifts such as increased life expectancy which enables multiple generations of the family to be alive at the same time (Miniño et al., 2011; Seltzer, 2019). Such changes shape interactions among generations of the family that now extend beyond providing care for older members to older members helping their children and grandchildren with household chores, childcare, and parenting advice (Margolis and Wright, 2017). The US has also experienced a rise in college enrollment rates which in turn has: lengthened the transition to adulthood process and increased the financial reliance of adult children on their parents for a longer period of time (Bianchi et al., 2008; Wightman et al., 2013), and at the same time widened the cultural and educational gap across generations. Despite all this, decision making within the extended family is still a relatively understudied topic. This paper fills the gap in the literature by focusing on i) how efficient is the allocation of resources among non-coresident members of the extended family?, and ii) to what extent does information asymmetry play a role in determining the efficiency of allocative decisions?

The conceptualization presented in my work borrows from a plethora of work examining resource allocations and decision making within the household, which insofar has the majority of its applications limited to the level in which data are collected: individuals sharing the same roof or cooking pot. I overcome this limitation by employing data from the Panel Study of Income Dynamics (PSID) and exploiting the survey's genealogical sample design to construct a sample of extended families covering detailed measures of consumption and asset holdings to examine resource allocations in the extended family. In adapting the approach from household-level to family-level decision-making, I pay particular attention to issues of information asymmetry. These may emerge from the fact that members of the extended family live in different households, which arguably makes monitoring costly and introduces information frictions that may prevent the family from allocating resources optimally.

I start my empirical analysis by confirming that families do not pool resources or allocate them in a way consistent with predictions of the unitary model, which aligns with findings from earlier empirical work by Altonji et al. (1992, 1997). Then, by extending the application of collective rationality models, I show that resource allocations among generations of the same family seem inefficient. Nonetheless, I show that when information asymmetry is taken into consideration, the picture appears more nuanced. Considering proxy measures constructed by comparing adult children's reporting of information about their parents with their parent's self-reported information in the main PSID interview, I find that extended families with better information are able to allocate resources efficiently, while families who do not inefficient, leaving welfare gains on the table.

My work contributes to a few related strands of the literature. By extending the application of intrahousehold collective rationality models to the context of the extended family, I contribute to the literature on resource allocations (Chiappori and Mazzocco, 2017) and advance analysis of extended family resource allocations beyond income pooling examinations covered in earlier work (Altonji et al., 1997; Witoelar, 2013), and contributing to a more recent line of work by testing Pareto efficient allocations of resources in the family (Dalton et al., 2016; LaFave and Thomas, 2017; Rangel, 2021). Finally, I contribute to an emerging line of literature on information asymmetry and resource allocations by first documenting information asymmetry in the extended family network using observational data in a nationally representative survey and testing whether information provision matters for resource allocations (Ashraf, 2009; Ashraf et al., 2014; Chen, 2013; Weerdt et al., 2019). Ultimately, my work contributes to an important line of inquiry investigating a long-standing question in the literature regarding the appropriate decision-making unit in resource allocation: the individual, the couple, the household, or the extended family (Strauss and Thomas, 1995). Beyond theoretical interest, progress made in answering this question can improve economic modelling of decision-making processes and, in turn, have ramifications on the design and targeting of social support policies and income redistribution programs.

One example of a policy concern that this work can speak to is the hypothesized "crowding out" effect; i.e. the concern that social assistance programs and benefits from the government crowd out private transfers. To illustrate this point, think of two economic agents, a parent and her son and imagine there is an intergenerational income redistribution program that taxes the son to give to the mother. If the the mother and her son have identical preferences and pool their resources, then the unitary model predicts that the effect of the redistribution tax is completely or largely offset by private transfers and the social assistance program leaves welfare and resource allocation within the family unchanged. On the other hand, if the son and the mother have heterogeneous preferences and resource allocations in the family are determined through a bargaining process with Pareto efficient outcomes, then the income redistribution tax is not fully offset by private transfers in the family but the tax itself changes the power balance between the mother and her son and influences their relative bargaining positions which in turn affects how the family allocates resources.

2 Related Literature

The economics literature has primarily focused on modeling decision making within the household. The neoclassical decision-making model assumes either that household members share common preferences or that members' preferences are represented by those of a benevolent household head; hence termed the unitary model (Becker, 1974; 2009). Extensive empirical work has rejected the strong implications of the household unitary model (Schultz, 1990; Thomas, 1990; Fortin and Lacroix, 1997; Lundberg et al., 1997; Rangel, 2006). The literature has since moved towards a bargaining framework that accommodates for household members having individual and heterogeneous preferences and assumes that a household decision making process takes place (e.g. non-cooperative models: Leuthold, 1968; Lundberg and Pollak, 1993; Chen and Woolley, 2001; cooperative bargaining models: Manser and Brown, 1980; McElroy and Horney, 1981; collective household model: Apps and Rees, 1988; Chiappori, 1988, 1992; and Browning and Chiappori, 1998). The least restrictive of these models is the collective household model, which assumes Pareto efficient outcomes, but remains agnostic about the bargaining concept while offering testable implications. Indeed, the body of empirical studies examining intrahousehold decision-making and resource allocations has focused on these implications, with the vast majority failing to reject Pareto efficiency among coresident spouses(Thomas, 1990; Fortin and Lacroix, 1997; Chiappori et al., 2002; Chiappori and Mazzocco, 2017 for a review) as well as extended-family households (Dauphin et al., 2011;Rangel and Thomas, 2020). Mostly due to data limitations, direct applications of the collective model have been confined to decision making within the walls of a household. There is, however, plenty of evidence suggesting that households do not operate in a vacuum but are part of a family network and maintain social and financial ties with non-coresident kin.

A number of empirical studies document monetary and time transfers between parents and their adult children (Cox and Raines, 1985; Cox (1987); Altonji et al., 1997; McGarry and Schoeni, 1995; Schoeni et al., 2015). Parents help their adult children in many ways including financing their college education (Hotz et al., 2018), providing them with childcare (Compton and Pollak, 2014), and helping them recover after job displacement (Krolikowski et al., 2020). Moreover, there is solid evidence that the extended family influences household decisions and outcomes, including educational achievement (Loury, 2006), schooling attendance (Angelucci et al., 2010), and child well-being (LaFave and Thomas, 2017).

Literature examining resource allocations among non-coresident relatives followed earlier developments in household models by testing a variant of the unitary model in the extended family (Altonji et al., 1992; Hayashi et al., 1996; Witoelar, 2013). This collection of empirical work rejected predictions of the unitary model for the extended family, not surprisingly given that empirical evidence has ruled out these restrictions even within households. Additionally, unitary model assumptions are methodologically problematic as they run contrary to individualism and implications from Arrow's impossibility theorem—individual preferences cannot be aggregated through one set of representative preferences (Vermeulen, 2002). The assumption of common preferences is unlikely to hold among members of different generations of the family especially that younger and older generations of the same family likely have heterogeneous time preferences and discount rates. To accommodate for heterogeneity of preferences within the extended family, preliminary efforts by Dalton et al. (2016) and Rangel (2021) applied the collective model to multi-household families offering mixed evidence on the efficiency of the resource allocations.

One of the main reasons to believe allocative efficiency is at risk is information asymmetry, members of the extended family may fail to optimally allocate resources due to information frictions in the family network. Models of household decision making assume perfect information sharing among members. In fact, developing a Pareto efficient allocation mechanism in the collective model is predicated on playing a repeated game with an assumption of perfect information (Browning and Chiappori, 1998). However, a recent strand of the intrahousehold literature documents information hiding among spouses and highlights the role that information asymmetry plays in household decision making. Results from field experiments show that spouses hide their income from each other: husbands commit their windfalls to private consumption when their choices are not observable (Ashraf, 2009); they transfer less money to their spouse when windfalls are easily concealable (Ambler, 2015); spouses conceal their additional income by committing windfalls to investments that are hard to monitor, such as cash, or hard to reverse if discovered, such as in-kind gifts to other family members (Castilla and Walker, 2013a; 2013b); and they may forego higher returns by making investments with lower returns but relatively lower observability to avoid feeling pressured to share their additional income with their extended kin (Jakiela and Ozier, 2016). Spouses also hide their actions: in a field experiment in Zambia, wives are more likely to take up hormonal contraceptives when their participation can be hidden from their husband (Ashraf et al., 2014), and migrant husbands expend resources to monitor their wives (de Laat, 2014).

While work has largely been experimental, there are a few observational studies examining remittances and resource allocations in transnational households, where there is arguably a bigger information barrier between spouses, with indirect evidence of information asymmetry. Using payroll and remittances data, Joseph et al. (2018) show that migrants do not adjust remittances when income fluctuations are positive and easier to hide. Chen (2013) finds that spouses of migrant workers behave non-cooperatively when making choices that are hard to monitor such as household chores. Some very recent work documenting information asymmetry in the extended family by Weerdt et al. (2019) documents misconceptions of consumption and asset holdings in Tanzanian family networks. Using the same data set, Attanasio and Krutikova (2020) examine risk sharing in Tanzanian family networks. While they reject perfect risk sharing, they find that families with better information sharing insulate their members from bad economic shocks more than families that face asymmetric information.

It is then clear that the family economics literature has important gaps particularly in extending decision-making models to the inter-household context and understanding the role information asymmetry plays in resource allocation within the family. In this paper, I fill these gaps by examining how resources are allocated among non-coresident members of the extended family.

3 Theoretical Model

I extend household resource allocation models to the context of the extended family. A natural starting point is the household unitary model which implies that members of the family behave as a single unit and make allocation decisions that depend entirely on total family income (i.e. pooled resources). Though elegantly tractable, the model imposes the assumption that family members have identical preferences or alternatively they have to agree to a common set of preferences or decision weights. Model predictions have not received empirical support in the household and extended family contexts. To account for heterogeneity of preferences among generations in the family, I adapt the collective household model to the extended family. The model implies that resource allocation decisions in the family are the product of a bargaining process and depend on relative bargaining power of the different generations in the family.

To conceptualize the two models and derive their empirical predictions, assume that the extended family consists of two decision makers; the younger generation(k) and the older generation (p). Each generation has their own utility function that depends on their private consumption and the consumption of the other family members such that generational utility is a function of the younger generation's consumption bundle ($\mathbf{c_k}$), and the older generation's consumption bundle ($\mathbf{c_p}$). The extended family maximizes the weighted sum of members' utilities subject to the family budget constraint as follows:

$$\max_{\mathbf{c^k},\mathbf{c^p}} U_k(\mathbf{c_k}, \mathbf{c_p}, \epsilon_k) + \mu(z) U_p(\mathbf{c_p}, \mathbf{c_k}, \epsilon_p)$$

subject to:

$$\mathbf{P'c_k} + \mathbf{P'c_p} = Y_k + Y_p$$

where ϵ_k and ϵ_p are factors that influence preferences for the younger and older generations of the family, respectively. μ is a weight on the utility of the older generation that reflects decision power, the higher the weight the more the generation's preferences are reflected in the family's allocation decisions. The weight is a function of distribution factors, denoted by z, and can also depend on prices, income, and taste shifters. $\mathbf{P}$ is a vector of prices that the family faces in the market. Y_k and Y_p are the younger generation's total income and the older generation's total income, respectively. The solution to the maximization problem is the following demand function:

$$c_i^g(Y, P, \mu, z, \epsilon_i)$$

where the demand for a good g for $i = k, p$ depends on income, prices and the decision weight.

3.1 Unitary Model

The unitary model implies that the family can be represented by a common set of preferences. This can be achieved either by assuming that all members of the family have identical preferences or that family preferences are that of the benevolent dictator, the family head[1] (Becker, 1974, 2009). It further assumes that resource allocation decisions solely depend on total family income. This simplifies the demand function to the following:

$$c_i^g(Y, P, \mu, \epsilon_i)$$

Therefore, the model implies that individuals' share of total resources only affect family allocation decisions through their effect on total family income. In other words, conditional on total family income, changes in the distribution of resources among members or the balance of bargaining power have no effect on the family's demand for different consumption goods. Hence,

$$\frac{\delta c_i^g}{\delta z_1} = \frac{\delta c_i^g}{\delta z_2} = 0 \quad \forall g$$

where z_1 and z_2 are distribution factors and g denotes consumption goods.

The family demand system is consistent with a unitary model of family rationality if and only if demand functions for all consumption goods are not influenced by the distribution factors conditional on total family income.

3.2 Collective Model

The collective model allows for heterogeneous preferences and assumes that a bargaining process takes place and results Pareto efficient outcomes. The model explicitly assumes that allocation decisions depend on Pareto weights, which are a function of distribution factors, and serve as a proxy for relative decision power in the family.

The assumption of Pareto efficiency in the collective model dictates that distribution factors

[1]The unitary model can accommodate for individual preferences by incorporating a decision weight in the utility functions as shown in the set up above but it necessitates that the decision weights are fixed.

affect demand in a specific way. This hinges on the fact that distribution factors do not change income or preferences but rather they only affect demand through their effect on the Pareto weight. Hence, a change in a distribution factor, for example the distribution of resources within the family, affects consumption choices and allocation decision as follows:

$$\frac{\delta c_i^g}{\delta z_1} = \frac{\delta c_i^g}{\delta \mu} \frac{\delta \mu}{\delta z_1}$$

Dividing the derivative of the demand function with respect to two distribution factors:

$$\frac{\delta c^g / \delta z_1}{\delta c^g / \delta z_2} = \frac{\delta \mu / \delta z_1}{\delta \mu / \delta z_2} = \frac{\delta c^j / \delta z_1}{\delta c^j / \delta z_2} \quad \forall g, j \text{ and } g \neq j$$

where g and j are consumption goods and z_1 and z_2 are distribution factors.

The above is commonly referred to as the proportionality condition. Notice the resulting right hand-side does not depend on the goods but is a function of the Pareto weight. Therefore, the proportion should be constant across all pairs of goods. The intuition behind this testable prediction is that changes in relative bargaining power do not change the Pareto frontier itself but they change the family's location on the Pareto possibility frontier to reflect the preferences of the family member with the better bargaining position. I operationalize testable implications of the unitary model and the collective model in the empirical specification section.

4 Data

The empirical strategy outlined imposes extensive data requirements including data on extended families with more than one generation living in different households. It also requires detailed information on generation specific consumption of different commodities and asset holdings. To meet all of these data requirements, I employ data from the Panel Study of Income Dynamics (PSID). PSID is a nationally representative longitudinal survey of American households. It started in 1968 with 5,000 families, which have been followed and re-interviewed along with their offspring every 1-2 years. This allows me to construct a data set of extended families.

To construct my sample, I start with a dyadic design using the parent-child pairs roster in the Roster and Transfers (R&T) module. I restrict the sample to parent-child pairs for which both the parent and the child are heads or spouses, live in separate households, were interviewed in the main PSID interview in 2013, and responded to questions that appear in the R&T Module. I define the extended family unit as parents (old generation) and their adult non-coresident offspring (young generation). Practically, the parent's household is linked to the households of their split-off children using the parent's ID. To eliminate outliers, I trim the sample to exclude the top and bottom 5% of families in total family consumption, total parents' assets, and total children's assets. The resulting sample consists of 1,839 extended families with the majority of extended families comprised of two or three households. Unweighted sample characteristics are reported in table 19.

I construct measures of budget shares by summing household expenditures on different commodity groups by each generation in the family and dividing by total family expenditures. Budget shares were constructed for the following commodity groups: food, housing, transportation and other commodities which is the sum of clothing, childcare, healthcare, education and recreation. On average, families allocate the biggest share of their resources to housing expenditures; 25% of the family's expenditures is spent on housing for adult children and 16% on housing for parents.

I also calculate assets measures by generation of the family, and I construct the measure by taking the sum of household holdings of business and farm assets, bank accounts, investments in real estate, value of stocks, vehicles, annuities, IRA's, and home equity. On average, parents have $219,700 in assets and children have $147,300. Lastly, I use the natural logarithm of family per capita expenditure as a proxy for total family income. Family per capita expenditure was calculated by summing total household expenditures for all households in the family and dividing by the number of members.

Table 1: Sample Characteristics

	Adult Child		Parent	
Head's Age	36.74	(11.10)	60.99	(11.49)
Female Head	0.26	(0.44)	0.36	(0.48)
Married	0.52	(0.50)	0.53	(0.50)
Employed	0.78	(0.41)	0.53	(0.50)
In School	0.02	(0.14)	0.01	(0.09)
Retired	0.02	(0.13)	0.31	(0.46)
Total Persons in Household	2.70	(1.47)	2.12	(1.10)
Number of Children	0.96	(1.19)	0.23	(0.60)
N	3164		1839	
Extended Family Characteristics				
Parent's Assets 0000	21.97	(31.66)		
Children's Assets 0000	14.73	(23.81)		
Total Family Consumption 0000	10.95	(6.00)		
Budget Shares				
Food Share (Parents)	0.07	(0.05)		
Food Share (Children)	0.11	(0.05)		
Housing Share (Parents)	0.16	(0.10)		
Housing Share (Children)	0.25	(0.10)		
Transportation Share (Parents)	0.08	(0.08)		
Transportation Share (Children)	0.14	(0.09)		
Other Commodities Share (Parents)	0.07	(0.07)		
Other Commodities Share (Children)	0.12	(0.08)		
N	1,839			

Unweighted sample averages. Standard deviations are in parentheses. Source: PSID 2013.

Specifically instrumental to this study are data from the PSID Rosters and Transfers (R&T) Module administered in 2013. The module has a battery of questions designed to better understand the different ways members of the extended family support each other (Schoeni et al., 2015). Respondents were asked general questions about the economic conditions of their extended family members. In latter sections of the paper, I use data from the R&T Module along with data from the main PSID survey to construct measures of information asymmetry in the extended family. Respondents were also asked whether they have made or received transfers from them in time or money.

Indeed, households of the same extended family are not completely isolated from each other. Parents and adult children help each other with money and time transfers as summarized in table 2. Approximately 39% of children report spending time helping their parent in the last year and the average amount of help with time is 95 hours. 17% of adult children helped their parent with money in the year prior to the survey, and children gave their parents $171, on average. Similarly, 33% of parents report helping their adult child with time and their average time spent helping their child with various activities, including babysitting, chores, and errands, is 86 hours. 31% of parents report giving money to their child in the year prior to the survey, and the average amount of financial help is $617. Parents also report other forms of financially supporting their adult child, since the child turned 18 years of age. They report making on average a transfer of $5,000 to help their child with education expenses including tuition, and $652 with home ownership expenses including making a down payment, and $931 to help with other various expenses.

Table 2: Transfers Among Parents and Adult Children

	mean	SD
To Parents		
Time transfer	0.39	(0.49)
Amount in hours	94.99	(395.03)
Money transfer	0.17	(0.38)
Amount in dollars	171.14	(1,202.67)
From Parents		
Time transfer	0.33	(0.47)
Amount in hours	86.38	(325.90)
Money transfer	0.31	(0.46)
Amount in dollars	617.45	(3,141.91)
Help paying for school (amount in dollars)	5,000.35	(18,125.03)
Help buying a home (amount in dollars)	651.66	(8,459.85)
Financial help with other Expenses (amount in dollars)	931.43	(4,699.66)

Unweighted sample averages. Average amount reported is unconditional on making any transfer. Standard deviations are in parentheses. Source: PSID R&T Module.

4.1 Imperfect Information

To measures imperfect information within the extended family, I contrast the parent's reporting of their adult child's economic outcomes, including home ownership, employment in the last year, household annual earnings from the R&T Module, with the child's reporting of their own outcomes in the main PSID interview. I also compare the adult child's reporting of their parents' economic condition with the parents' own account in the main PSID interview.

First, I examine the proportion of respondents who state that they "*do not know*" when as asked about their parent or adult child. As presented in table 3, small and negligible fractions of parents report they do not know their child's age (0%), employment status (1%), general health

(1%), educational attainment (1%), marital status (1%), whether they care cohabitation with a romantic partner (3%), number of children (1%) , and home ownership (2%). Similarly, 1%-2 % of children do not know their parents' age, employment status, general health, and whether their parents own a home. In contrast, a large proportion of parents and adult children report that they do not know their child's income and their parent's income, respectively. About 32% of parents report they do not know their child's income when asked and 26% of adult children report they do not know when asked about how much income their parents earned in the last year.

Table 3: Proportion of participants reporting "I Don't Know"

	Parents	Children
Age	0.00	0.02
Employment status	0.01	0.01
General health	0.01	0.01
Education	0.01	-
Marital Status	0.00	-
Cohabitation	0.03	-
Number of Children	0.00	-
Home Ownership	0.02	0.02
Income	0.32	0.26
Observations	3156	

Unweighted sample averages. Source: PSID R&T Module.

In addition to those reporting that they do not know, a non-negligible fraction of parents (28%) and adult children (30%) report income wrong when asked about their adult child or parent respectively. Examining parent-child dyads in the sample, 20% of parents under estimate their adult child's income by placing in a lower bracket, and 8% of parents overestimate their child's income. When asked about their parents' income, 12% of children underestimate their parents' income and 18% of children overestimate income.

Table 4: Misinformation in the Extended Family

Dyads Level				
Respondent	Underestimate	Correct	Overestimate	DK
Parent	0.20	0.40	0.08	0.32
Child	0.12	0.45	0.18	0.26
N		3156		

Unweighted sample averages. Source: PSID 2013 and R&T Module.

5 Empirical Specification

To implement tests of the unitary and collective models, I estimate the following augmented Working-Leser specification of Engel curves:

$$w_f^g = \beta_0^g + \beta_p^g Z_{pf} + \beta_k^g Z_{kf} + \gamma' Y_f + \lambda' X_f + \epsilon_f^g,$$

Where the outcome, w_f^g, is share of total family expenditures spent on commodity g. Commodity groups include generation specific expenditures on food, housing, transportation, and other commodities (clothes, childcare, healthcare, education, and recreation). Demand is modeled as a linear function of log of per capita family expenditures Y_f , as a proxy for total family income[2]. I control for a vector of family demographics including log of number of persons in the family and the share of family members in each sex 5-year age group. Demand system equations were estimated jointly with robust standard errors.

I use asset holdings of each generation in the extended family as distribution factors. Z_{pf} and Z_{kf} are asset holdings of parents and adult children in family f, respectively. Asset holdings are arguably a good marker for bargaining power in the family because if the family were to cut ties today, that is what members would walk away with.

I follow a sequential testing procedure. First, I test whether predictions of the unitary model hold. As discussed, the unitary model predicts that conditional on total family income, distribution factors should have no effect on demand:

$$\beta_p^g = \beta_k^g = 0 \quad \forall g$$

If predictions of the unitary model are rejected, I move on to examine predictions of the collective model by testing the proportionality condition as follows:

$$\frac{\beta_p^g}{\beta_k^g} = \frac{\beta_p^j}{\beta_k^j} \quad \forall g, j, g \neq j$$

[2]Results are not sensitive to this specification choice, and are robust when using a specification with a second degree polynomial, and a more flexible specification of a spline with knots at the quarterlies of log per capita family expenditures. Results from these different specifications are presented in the Appendix

I reformulate the test as follows:

$$\beta_p^g \beta_k^j = \beta_k^g \beta_p^j \quad \forall g, j, g \neq j$$

Though algebraically equivalent, the nonlinear Wald test of the cross product form has better numerical properties (Gregory and Veall, 1985). I conduct a series of nonlinear Wald tests to test the condition for each pair of commodity groups in addition to a joint test.

6 Empirical Results

I begin by testing the theoretical predictions of the unitary model. I jointly estimate the demand system equations, coefficients are reported in table 5. In Panel A, I report the coefficients on the distribution factors (asset holdings for parents and asset holdings for children). Coefficients on log family expenditure per capita and demographic controls are omitted from the table. In Panel B, I report the test statistic for each commodity group and a joint test for all commodities. First, it is important to note that distribution factors have a statistically significant effect on demand equations conditional on total family resources. In other words, relative bargaining positions in the family affect how the family allocates its resources even after controlling for total family resources. This runs contrary to the unitary model predictions which imply that distribution factors cannot directly affect family demand. Moreover, the hypothesis that both distribution factors are equal and have no effect on allocation choices can be rejected for all commodity groups at the 5% significance level and the joint test has a p-value of less than 5%. Therefore, the unitary model for the extended family is rejected, members of the extended family do not share common preferences or pool their resources. This conclusion is consistent with empirical results in the literature examining resource allocation the extended family (Hayashi et al., 1996 ; Witoelar, 2013).

Next, I test the collective model proportionality condition. As derived in the theoretical model section, the model implies that the ratio of distribution factors effects are equal for all pairs of commodities. A summary of the results is reported in Panel C of table 5. I find that the proportionality condition is rejected for 19 out of the 28 pairs of goods at the 5% significance level. Moreover, the joint test of the 28 conditions has a p-value 0.00. Hence, I reject the hypothesis that the extended family is collectively rational, extended families do not allocate their resources efficiently.

To summarize, extended families do not appear to allocate resources in a manner consistent with predictions of the unitary model and they also do not allocate family resources efficiently. These conclusions are robust to different empirical specifications of the demand system. I report empirical results using a specification with disaggregated "other" commodity group into its individual components, includes a quadratic term or a spline for total family income are reported in appendix.

Table 5: Results: Tests of the Unitary and Collective Models

	Panel A: Demand System Regression Coefficients							
	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Assets (Parents)	.016	-.014	.046	-.034	.009	-.064	.049	-.008
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.16]	[0.00]	[0.00]	[0.22]
Assets (Children)	-.021	.027	-.058	.093	-.059	-.012	-.054	.060
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.17]	[0.00]	[0.00]
	Panel B: Unitary Model Tests							
Joint test of significance (assets P and assets C) χ^2	48.25	37.99	66.70	88.40	41.51	47.05	116.37	34.43
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2	208.21							
[p-value]	[0.00]							
	Panel C: Collective Model Tests							
Number of Rejections	19/28							
Joint Test	[0.00]							
N	1,839							

Source: PSID 2013 and R&T Module. P-values of the nonlinear collective model tests on each pair of goods are reported in table 10 in the Appendix.

Failure of collective rationality in the extended family is rather a surprising result in light of the literature consistently failing to find empirical evidence against collective rationality in different contexts (Chiappori and Mazzocco, 2017). One reason collective rationality may not empirically prevail is mechanical; the tests used are not calibrated to account for multiplicity of decision makers. This is an issue raised by Rangel and Thomas (2020), though the tests they deal with are income based, they argue that widely used tests lead to over-rejection of collective rationality in complex household structures where there are more than two decision makers. To address this concern, I split the sample by number of households in the extended family. The first subset is the group of small families that has exactly two households (one parent household and one adult child household). The second subset includes all families that have more than two households. Unitary and collective model results are reported in the appendix. Collective rationality is rejected for both small and big families.

A theoretically grounded reason for why collective rationality fails in the extended family is imperfect information sharing. As discussed earlier, existing conceptualizations assume perfect information among members, which is a strong assumption and often hard to test. The issue of imperfect information sharing is especially more salient in this context of extended families where members do not live under the same roof by definition and construction of the sample, imposing additional hurdles to monitoring or sharing information within the family.

I examine whether information provision in the extended family influences efficiency of resource allocations. I use adult children's answers about their parents' income to split the sample by information quality. One subsample with symmetric information which consists of extended families in which no one gave the wrong answer or answered with "I do not know". The other subsample is comprised of the set of families with asymmetric information (i.e. at least one of the adult children said I do not know or gave incorrect information about their parents' income). I conduct the same sequential testing procedure for both subsamples. Predictions of the unitary model are rejected in both groups, results are reported in Panels A and B of table 6 for the subsample with asymmetric information and table 7 for the subsample with symmetric information. I reject the hypothesis that distribution factors do not affect demand for different commodity groups conditional on total family income in both subsamples.

Next, I test theoretical predictions of the collective model. Results for the subsample with asymmetric information are reported in Panel C of table 6. Allocative efficiency can still be rejected for the subsample with at the 5% significance level. To provide a point of reference for how inefficient these extended families are, I compare the efficiency of their allocations to those of synthetic and randomly assigned families. To do this, I randomly match parents and children in my sample to form synthetic extended families. Then I run the collective model tests on the resulting sample. I repeat this process a 1000 times and record both the p-value and the number of test rejections. Simulation results are reported in figures 1. Allocations of extended families with asymmetric information are as inefficient as those of artificial families.

Table 6: Results: Tests of the Unitary and Collective Model Predictions - Asymmetric information

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Panel A: Demand System Regression Coefficients								
Assets (Parents)	.014	-.014	.028	-.025	.008	-.059	.047	.001
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.29]	[0.00]	[0.00]	[0.88]
Assets (Children)	-.017	.023	-.039	.078	-.005	-.012	-.037	.050
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.61]	[0.00]	[0.00]
Panel B: Unitary Model Tests								
Joint test of significance (assets P and assets C) χ^2	25.25	25.69	22.24	42.58	33.60	18.18	55.13	12.19
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2	107.84							
[p-value]	[0.00]							
Panel C: Collective Model Tests								
Number of Rejections	17/28							
Joint Test	[0.00]							
N	1,226							

Source: PSID 2013 and R&T Module.

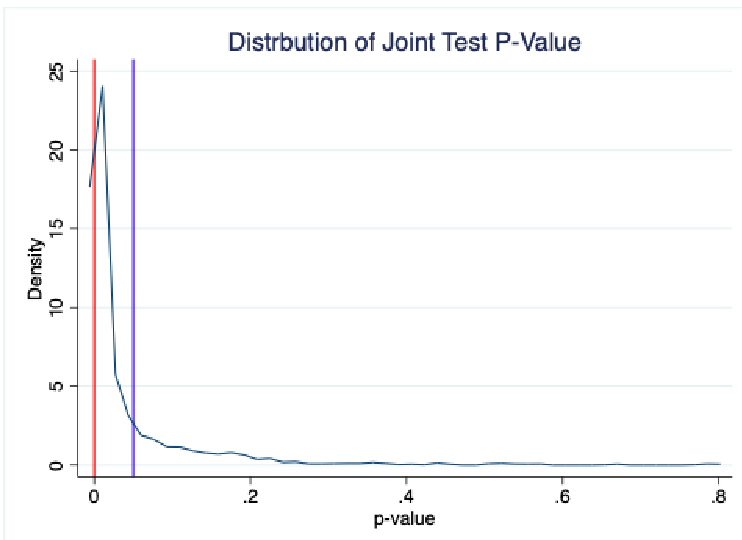

Figure 1: Simulation's P-Value

The vertical red line is at 0, corresponding to the p-value of the joint test statistic in the main subsample of families with asymmetric information. The blue line is at 5%.

On the other hand, I fail to reject efficiency for the subsample of extended families with symmetric information. Collective model tests are reported in Panel C of table7. Failure to reject efficiency seems to be driven by the subsample for which both parents and children are right about each other (results are reported in the appendix).

Table 7: Results: Tests of the Unitary and Collective Model Predictions - Symmetric information

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Panel A: Demand System Regression Coefficients								
Assets (Parents)	.018	-.014	.070	-.044	.010	-.071	.052	-.021
[p-value]	[0.00]	[0.06]	[0.00]	[0.00]	[0.88]	[0.00]	[0.00]	[0.02]
Assets (Children)	-.020	.028	-.086	.105	-.068	.059	-.086	.068
[p-value]	[0.02]	[0.02]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]
Panel B: Unitary Model Tests								
Joint test of significance (assets P and assets C) χ^2	13.57	8.26	44.10	35.95	8.46	27.95	69.38	22.65
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2	122.25							
[p-value]	[0.00]							
Panel C: Collective Model Tests								
Number of Rejections	8/28							
Joint Test	[0.36]							
N	613							

Source: PSID 2013 and R&T Module.

Taken altogether, results provide suggestive evidence that information asymmetry may prevent extended families from allocating family resources efficiently.

7 Robustness Checks

7.1 Sensitivity to Sample Size

Given that the subsample of families classified with good information is about a third of the total sample, failing to reject the null hypothesis of collective rationality may be attributed to lack of power. To alleviate this concern and illustrate that the conclusions are true, I run a simulation where I randomly sample 613 extended families from the total sample and re run tests. The resulting distribution of p-value and the number of rejections are presented in figures 2 and 3. It is clear to see that there are plenty of rejections in this exercise. This leads me to conclude that failure to reject rationality is not due to power issues or small sample size

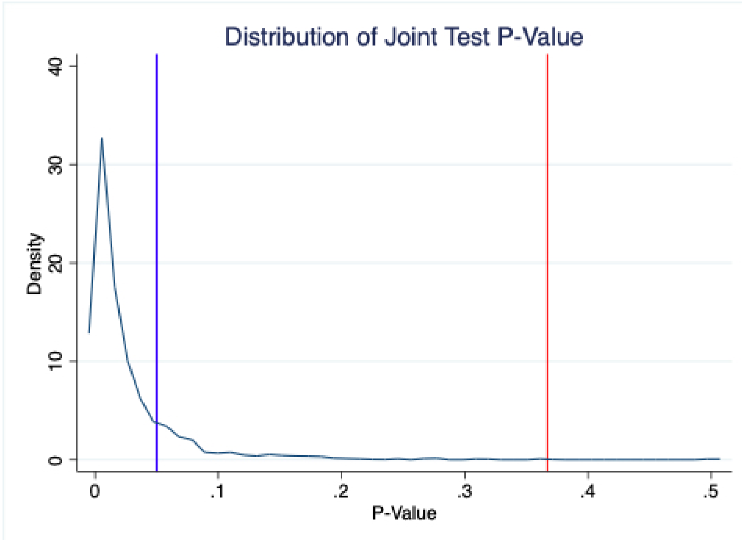

Figure 2: Simulation's P-Value

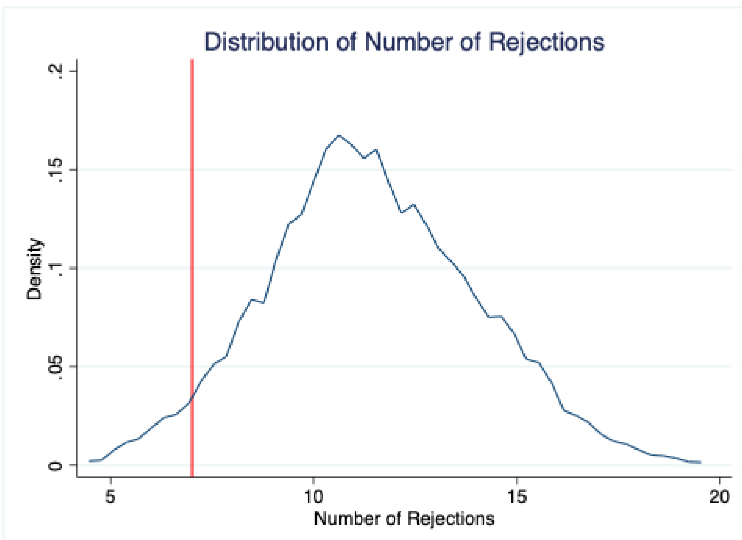

Figure 3: Simulation's Number of Rejections

7.2 Sensitivity to Influential Families

To ensure that estimation results and conclusions are not driven by influential observations in the sample, I re-estimate the demand system with a jackknife estimation procedure. The model is fitted while suppressing one observation (extended family) at a time and the standard errors are bootstrapped to account for the resampling procedure. To examine whether conclusions for the two subsamples are driven by influential families, I re-estimate the models with jackknife standard errors and re-run the unitary and collective model tests. Results for the sample with asymmetric information are reported in table 8 and for the subsample with more accurate information in table 9. Results and conclusions are robust and are not sensitive to influential families.

Table 8: Robustness Check: Tests of the Unitary and Collective Model Predictions (Jackknife) - Asymmetric information

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Panel A: Demand System Regression Coefficients								
Assets (Parents)	.014	-.014	.028	-.025	.008	-.059	.047	.001
[p-value]	[0.00]	[0.00]	[0.00]	[0.01]	[0.31]	[0.00]	[0.00]	[0.88]
Assets (Children)	-.017	.023	-.039	.078	-.005	-.012	-.037	.050
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.63]	[0.00]	[0.00]
Panel B: Unitary Model Tests								
Joint test of significance (assets P and assets C) χ^2	23.22	23.83	20.60	39.46	30.98	16.96	51.11	11.29
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2	14.29							
[p-value]	[0.00]							
Panel C: Collective Model Tests								
Number of Rejections	16/28							
Joint Test	[0.00]							
N	1,226							

Source: PSID 2013 and R&T Module.

Table 9: Robustness Check: Tests of the Unitary and Collective Model Predictions (Jackknife)- Symmetric information

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Panel A: Demand System Regression Coefficients								
Assets (Parents)	.018	-.014	.070	-.044	.010	-.071	.052	-.021
[p-value]	[0.00]	[0.09]	[0.00]	[0.00]	[0.42]	[0.00]	[0.00]	[0.03]
Assets (Children)	-.020	.028	-.086	.105	-.068	.059	-.086	.068
[p-value]	[0.04]	[0.03]	[0.00]	[0.00]	[0.01]	[0.01]	[0.00]	[0.00]
Panel B: Unitary Model Tests								
Joint test of significance (assets P and assets C) χ^2	11.70	7.03	37.48	30.37	6.98	23.80	59.80	19.45
[p-value]	[0.00]	[0.01]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]
Joint Test χ^2	15.08							
[p-value]	[0.00]							
Panel C: Collective Model Tests								
Number of Rejections	5/28							
Joint Test	[0.50]							
N	613							

Source: PSID 2013 and R&T Module.

8 Conclusion

Despite the fact that the family is an important source for care and support to its members, resource allocation in extended families is understudied. The limited attention to dynamics of decision making in extended families is possibly due to data limitations. In this paper, I fill this gap in the literature and I overcome the data requirements limitation by exploiting the richness of the Panel Study of Income Dynamics. I use data from PSID to construct a panel of extended families (i.e. a network of non-coresident kin) with detailed consumption, demographic, and asset holdings data. I then extend the unitary and collective intra-household models and their empirical applications to the context of the extended family to systematically examine how resources are allocated among members of the family. Upon testing empirical predictions of the models, I find that overall families do not pool their resources and they do not allocate resources efficiently.

Imperfect information sharing is one reason extended families may not be able to do the best with the resources available, leaving something on the table. The issue of asymmetric information is more prevalent in the context of non-coresident kin because living in different households makes it harder to monitor income, consumption, and other markers of economic well-being. In turn, such information imperfections may keep extended families from allocating their resources efficiently and may account for why Pareto efficiency does not prevail in the extended family context. To explore this possibility, I make novel use of data from the PSID Roster and Transfers Module to provide descriptive evidence of such information asymmetries. I find that a significant proportion of respondents do not know or have incorrect beliefs about other family members' income. When accounting for information asymmetry, I find that extended families that have better information allocate resources in a way that is Pareto efficient and consistent with empirical implications of the collective model.

These findings provide suggestive evidence that information asymmetry may hamper optimally of resource allocation decisions in the family. This lends empirical support to well understood theoretical notions that information frictions hinder efficiency. This opens future avenues for research focusing on how and why information frictions arise in the family, and how to adapt existing theoretical framework to model resource allocations in the family with strategic information revelation.

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Appendices

A Detailed Collective Model Test Results

A summary of these results is reported in the result tables in the main text.

Table 10: Results: Tests of the Collective Model Predictions

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.302]	[0.855]	[0.021]	[0.001]	[0.000]	[0.441]	[0.002]
Food (C)		[0.182]	[0.384]	[0.021]	[0.000]	[0.070]	[0.041]
Housing (P)			[0.007]	[0.000]	[0.000]	[0.549]	[0.000]
Housing (C)				[0.025]	[0.000]	[0.000]	[0.107]
Transport (P)					[0.000]	[0.000]	[0.889]
Transport(C)						[0.000]	[0.000]
Other (P)							[0.000]
Joint test				[0.000]			
N				1,839			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

Table 11: Results: Tests of the Collective Model Predictions - Asymmetric information

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.554]	[0.870]	[0.041]	[0.010]	[0.000]	[0.199]	[0.010]
Food (C)		[0.671]	[0.233]	[0.032]	[0.000]	[0.063]	[0.029]
Housing (P)			[0.087]	[0.028]	[0.000]	[0.195]	[0.008]
Housing (C)				[0.169]	[0.000]	[0.000]	[0.124]
Transport (P)					[0.000]	[0.000]	[0.401]
Transport(C)						[0.000]	[0.000]
Other (P)							[0.000]
Joint test				[0.000]			
N				1,226			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

Table 12: Results: Tests of the Collective Model Predictions - Symmetric information

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.379]	[0.821]	[0.123]	[0.046]	[0.636]	[0.389]	[0.080]
Food (C)		[0.394]	[0.858]	[0.227]	[0.211]	[0.724]	[0.587]
Housing (P)			[0.095]	[0.030]	[0.220]	[0.220]	[0.034]
Housing (C)				[0.096]	[0.031]	[0.233]	[0.573]
Transport (P)					[0.009]	[0.043]	[0.385]
Transport(C)						[0.037]	[0.020]
Other (P)							[0.163]
Joint test				[0.363]			
N				613			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

B Disaggergated Commodity Groups

I test sensitivity of main findings using a more detailed specification of the family demand system. Specifically, I estimate the same main specification but disaggregate the other commodity groups into their individual components as follows:

$$w_f^g = \beta_0^g + \beta_p^g Z_{pf} + \beta_k^g Z_{kf} + \gamma' Y_f + \lambda' X_f + \epsilon_f^g,$$

Where the outcome, w_f^g, is share of total family expenditures spent on commodity g. In this subsection, commodity groups include generation specific expenditures on food, housing, transportation, clothes, childcare, healthcare, education, and recreation). Results are reported in tables. Unitary and collective models predictions are rejected at the 5% significance level

Table 13: Tests of the Unitary Model Predictions with Disaggregated Commodity Groups

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Clothing (P)	Clothing (C)	Recreation (P)	Recreation (C)	Education (P)	Education (C)	Childcare (P)	Childcare (C)	Healthcare (P)	Healthcare (C)
Assets (Parents)	.016	-.014	.046	-.034	.009	-.064	.003	-.007	.025	.003	.006	.000	-.000	-.002	.015	-.002
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.16]	[0.00]	[0.00]	[0.00]	[0.00]	[0.33]	[0.03]	[0.96]	[0.86]	[0.21]	[0.00]	[0.70]
Assets (Children)	-.021	.027	-.058	.093	-.059	.012	-.004	.007	-.012	.020	-.011	.002	-.000	.001	-.026	.030
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.17]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.71]	[0.05]	[0.63]	[0.00]	[0.00]
Joint test of significance (assets P and assets C) χ^2	48.25	37.99	66.70	88.40	41.51	47.05	21.04	27.62	92.30	11.21	13.61	0.09	0.75	1.38	33.38	17.75
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.76]	[0.39]	[0.24]	[0.00]	[0.00]
Joint Test χ^2									243.26							
[p-value]									[0.00]							
N									1,839							

Source: PSID 2013 and R&T Module.

Table 14: Results: Tests of the Collective Model Predictions with Disaggregated Commodity Groups

	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Education (P)	Education (C)	Childcare (P)	Childcare (C)	Healthcare (P)	Healthcare (C)	Clothing (P)	Clothing (C)	Recreation (P)	Recreation (C)
Food (P)	[0.302]	[0.855]	[0.021]	[0.001]	[0.000]	[0.513]	[0.760]	[0.219]	[0.590]	[0.461]	[0.004]	[0.763]	[0.394]	[0.003]	[0.001]
Food (C)		[0.182]	[0.384]	[0.021]	[0.000]	[0.909]	[0.793]	[0.361]	[0.462]	[0.854]	[0.032]	[0.330]	[0.113]	[0.000]	[0.005]
Housing (P)			[0.007]	[0.000]	[0.000]	[0.423]	[0.756]	[0.205]	[0.610]	[0.378]	[0.001]	[0.854]	[0.447]	[0.002]	[0.000]
Housing (C)				[0.025]	[0.000]	[0.467]	[0.825]	[0.470]	[0.370]	[0.262]	[0.082]	[0.106]	[0.012]	[0.000]	[0.004]
Transportation (P)					[0.000]	[0.135]	[0.897]	[0.697]	[0.259]	[0.028]	[0.582]	[0.022]	[0.000]	[0.000]	[0.097]
Transportation (C)						[0.001]	[0.707]	[0.039]	[0.768]	[0.000]	[0.000]	[0.006]	[0.031]	[0.095]	[0.000]
Education (P)							[0.787]	[0.363]	[0.481]	[0.970]	[0.092]	[0.443]	[0.189]	[0.004]	[0.033]
Education (C)								[0.979]	[0.724]	[0.784]	[0.939]	[0.751]	[0.738]	[0.714]	[0.967]
Childcare (P)									[0.262]	[0.326]	[0.809]	[0.203]	[0.136]	[0.043]	[0.976]
Childcare (C)										[0.489]	[0.233]	[0.651]	[0.745]	[0.963]	[0.200]
Healthcare (P)											[0.025]	[0.448]	[0.157]	[0.002]	[0.003]
Healthcare (C)												[0.019]	[0.003]	[0.000]	[0.351]
Clothing (P)													[0.692]	[0.047]	[0.005]
Clothing (C)														[0.145]	[0.000]
Recreation (P)															[0.000]
Joint								[0.000]							
N								1,839							

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

C Results using a Quadratic Specification

I estimate the following specification:

$$w_f^g = \beta_0^g + \beta_p^g Z_{pf} + \beta_k^g Z_{kf} + \gamma' Y_f + \tau' Y_f^2 + \lambda' X_f + \epsilon_f^g,$$

Note that the main difference between this specification and the main specification is that this includes a quadratic term in log of family expenditure per capita. Coefficients and test results are reported in tables 15 and 16.

Table 15: Tests of the Unitary Model Predictions with a Quadratic Specification

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Assets (Parents)	.016	-.014	.046	-.034	.009	-.064	.049	-.008
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.16]	[0.00]	[0.00]	[0.22]
Assets (Children)	-.021	.027	-.058	.093	-.059	-.012	-.054	.060
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.17]	[0.00]	[0.00]
Joint test of significance (assets P and assets C) χ^2	48.25	37.99	66.70	88.40	41.51	47.05	116.37	34.43
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2					208.21			
[p-value]					[0.00]			
N					1,839			

Source: PSID 2013 and R&T Module.

Table 16: Results: Tests of the Collective Model Predictions Quadratic Specification

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.302]	[0.855]	[0.021]	[0.001]	[0.000]	[0.441]	[0.002]
Food (C)		[0.182]	[0.384]	[0.021]	[0.000]	[0.070]	[0.041]
Housing (P)			[0.007]	[0.000]	[0.000]	[0.549]	[0.000]
Housing (C)				[0.025]	[0.000]	[0.000]	[0.107]
Transport (P)					[0.000]	[0.000]	[0.889]
Transport(C)						[0.000]	[0.000]
Other (P)							[0.000]
Joint test				[0.000]			
N				1,839			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

D Results using a Spline Specification

I model demand as a function of total family resources more flexibly by including a spline for log family expenditure per capita. I estimate the following specification:

$$w_f^g = \beta_0^g + \beta_p^g Z_{pf} + \beta_k^g Z_{kf} + \gamma_q' \sum_{q=1}^{4} Y_{qf} + \tau' Y_f^2 + \lambda' X_f + \epsilon_f^g,$$

Where budget shares are a function of a linear spline in log family per capita expenditures with knots at the quarterlies of the distribution. This specification allows for greater flexibility in modelling income effects. Results are reported in tables 17 and 18 below. Unitary and collective models predictions are rejected at the 5% significance level

Table 17: Tests of the Unitary Model Predictions with a Spline Specification

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Assets (Parents)	.016	-.014	.046	-.034	.009	-.064	.049	-.008
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.16]	[0.00]	[0.00]	[0.22]
Assets (Children)	-.021	.027	-.058	.093	-.059	-.012	-.054	.060
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.17]	[0.00]	[0.00]
Joint test of significance (assets P and assets C) χ^2	48.25	37.99	66.70	88.40	41.51	47.05	116.37	34.43
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2					208.21			
[p-value]					[0.00]			
N					1,839			

Source: PSID 2013 and R&T Module.

Table 18: Results: Tests of the Collective Model Predictions Spline Specification

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.302]	[0.855]	[0.021]	[0.001]	[0.000]	[0.441]	[0.002]
Food (C)		[0.182]	[0.384]	[0.021]	[0.000]	[0.070]	[0.041]
Housing (P)			[0.007]	[0.000]	[0.000]	[0.549]	[0.000]
Housing (C)				[0.025]	[0.000]	[0.000]	[0.107]
Transport (P)					[0.000]	[0.000]	[0.889]
Transport(C)						[0.000]	[0.000]
Other (P)							[0.000]
Joint test				[0.000]			
N				1,839			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

E Results by Family Size

Table 19: Distrbution of Number of Households

Number of Households	Numeber of Extended Families
2 HH	937
3 HH	608
4 HH	206
5 HH	62
6 HH	17
7 HH	4
8 HH	4
9 HH	1

Source: PSID 2013.

Table 20: Results: Tests of the Unitary Model Predictions for Small Families

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Assets (Parents)	.010	-.001	.044	-.030	-.003	-.059	.054	-.006
[p-value]	[0.05]	[0.12]	[0.00]	[0.00]	[0.76]	[0.00]	[0.00]	[0.52]
Assets (Children)	-.028	.041	-.091	.115	-.091	.045	-.077	.086
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]
Joint test of significance (assets P and assets C) χ^2	11.84	15.40	27.45	33.18	23.32	23.77	47.83	21.59
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2					87.07			
[p-value]					[0.00]			
N					937			

Source: PSID 2013 and R&T Module.

Table 21: Results: Tests of the Collective Model Predictions for Small Families

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.588]	[0.547]	[0.727]	[0.095]	[0.028]	[0.189]	[0.189]
Food (C)		[0.165]	[0.813]	[0.139]	[0.009]	[0.042]	[0.370]
Housing (P)			[0.185]	[0.011]	[0.017]	[0.351]	[0.014]
Housing (C)				[0.007]	[0.003]	[0.015]	[0.198]
Transport (P)					[0.000]	[0.000]	[0.465]
Transport(C)						[0.087]	[0.000]
Other (P)							[0.000]
Joint test				[0.003]			
N				937			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.

Table 22: Results: Tests of the Unitary Model Predictions for Big Families

	Food (P)	Food (C)	Housing (P)	Housing (C)	Transportation (P)	Transportation (C)	Other (P)	Other (C)
Assets (Parents)	.013	-.008	.033	-.011	.006	-.058	.031	-.007
[p-value]	[0.00]	[0.12]	[0.00]	[0.21]	[0.33]	[0.00]	[0.00]	[0.43]
Assets (Children)	-.012	.018	-.040	.062	-.040	-.005	-.026	.043
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.61]	[0.00]	[0.00]
Joint test of significance (assets P and assets C) χ^2	19.15	9.97	31.09	19.71	17.59	14.11	32.95	12.33
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Joint Test χ^2					72.03			
[p-value]					[0.00]			
N					902			

Source: PSID 2013 and R&T Module.

Table 23: Results: Tests of the Collective Model Predictions for Big Families

	Food (C)	Housing (P)	Housing (C)	Transport (P)	Transport (C)	Other (P)	Other (C)
Food (P)	[0.188]	[0.590]	[0.004]	[0.005]	[0.007]	[0.793]	[0.027]
Food (C)		[0.324]	[0.384]	[0.291]	[0.004]	[0.124]	[0.424]
Housing (P)			[0.014]	[0.016]	[0.000]	[0.423]	[0.033]
Housing (C)				[0.915]	[0.000]	[0.002]	[0.939]
Transport (P)					[0.000]	[0.002]	[0.993]
Transport(C)						[0.001]	[0.001]
Other (P)							[0.020]
Joint test				[0.000]			
N				902			

P-values from tests for each pair of goods. Rejections are reported in red. Source: PSID 2013 and R&T Module.