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Abstract

This study proposes a novel approach for estimating the rules governing the distribution of resources among wife, husband and children, using a complete collective demand system with individual Engel effects. The model contributes to the literature by explicitly modeling intra-household inequality and offering a powerful tool to analyze the impact of specific factors or policies on the share of resources of each household member. We apply the model to Albania, a country where gender and inter-generation inequalities are relevant social issues stemming from traditional patriarchal family values and massive international migration of male adults. The results show that the female share of resources is substantially lower respect to a fair distribution. The share of resources freed by the male migrant shifts to the left behind children but not to women, especially when migration increases the influence of women in the decision making process. This effect is increasing with the proportion of daughters.

Keywords: Intrahousehold distribution, individual welfare, collective consumption models, sharing rule, migration, left behind, Albania.

JEL Classification: D13 H31 I32 O15.

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1 Introduction

This work describes how resources are allocated among members of Albanian families, placing special emphasis on the consequences of parental and spousal migration. We use a novel collective consumption model based on a complete demand system with price variation to estimate the rule governing distribution of resources between female, male adults and children. Another original contribution to the literature is the evaluation of the impact of family split due to international migration on the rule governing the allocation of resources using a post-estimation approach on the predicted share of resources.

In the traditional unitary model, household decisions are analyzed under the hypothesis that the household is a single decision unit that maximizes the welfare of its members. This unitary family is a black-box where individual consumption decisions and resource allocation processes are not taken into account. In this framework, the household head makes all the relevant decisions, including child and spouse consumption, as if decisions were optimal for the welfare of all household members. However,the welfare consequences caused by an unfair intrahousehold distribution may be relatively large specially in developing countries, where the households' endowment of resources is often meager.

How resources are allocated within the family is also relevant when the interest is to properly evaluate the impact of a policy or other exogenous events on individual welfare and to design public interventions aiming at favoring a more equal distribution within the household, such as those targeted to females or children in needs. Rosenzweig (1986) and several recent empirical tests (Kusago and Barham, 2001; Attanasio and Lechene, 2002; Mangyo, 2008; Alam, 2012; de Brauw et al., 2014; Vijaya et al., 2014; Wang, 2014; Dunbar et al., 2013; Bargain et al., 2014) have highlighted the weakness of treating the household as an individual decision maker when studying microeconomic behaviours in developing countries, where highly variable socioeconomic conditions and culture may strongly influence intrahousehold inequality. For instance, the impact of cash transfers on poverty among children depends on the different response of each household in terms of intrahousehold re-allocation of resources (Alderman et al., 1995; Duflo, 2000; Attanasio and Lechene, 2002; Jacoby, 2002), especially considering that the identity of the recipient of a cash transfer does matter in terms of outcomes (Alderman et al., 1995; Duflo, 2000, 2003).

One way to study intrahousehold distribution of resources is to model family behavior in a collective setting. The collective approach was originally introduced by Chiappori (1988, 1992) to identify the rule governing the distribution of resources and intrahousehold inequality. The method permits recovering the structure of preferences and welfare functions of each household member. Most applications of the collective household theory estimate the sharing rule between husband and wife. Children as bargaining agents were introduced byBourguignon (1999), who show how to derive the sharing rule both between parents and between parents and children. Arias et al. (2004) estimate the sharing rule between adults and children using a complete demand system in the context of a developed country. Dunbar et al. (2013)implement a collective consumption model, although not based on a complete demand system,

in a development setting. They extended Browning et al. (1994)'s model studying how resources are allocated both between parents and between parents and children in Malawi. Their main findings are that resource allocation varies by family size and structure and standard poverty indices understate the incidence of child poverty. Similar results have been obtained by Bargain et al. (2014), using a different identification strategy, in the context of Cote d'Ivoire.

A proper implementation of collective models requires the sharing rule to be correctly identified. While intrahousehold allocation is not (fully) observable, it can be recovered using specific identifying assumptions based on observable household data about the exclusive or assignable consumption of at least one good, such as clothing for male, female and children (Browning et al., 1994; Menon and Perali, 2012; Chiappori and Meghir, 2014). Our identification strategy is based on this individual-specific consumption information and the observation of suitable distribution factors, exogenous variables that modify the intrahousehold distribution of resources but do not affect consumption choices. Differently from all other studies with the exception of Arias et al. (2004), Menon et al. (2012c) and Caiumi and Perali (2014), we also exploit exogenous price variation by constructing (pseudo) unit values using the technique first introduced by Lewbel (1989) and applied by Atella et al. (2004), Hoderlein and Mihaleva (2008) and McLaren and Yang (2014).

In the context of our collective study it is interesting to investigate how the outcome of the household decision process is affected by a family split generated by the migration of one of the spouses. The impact of migration on family members left behind has been studied by a recent stream of research, concentrating on spouses (Amuedo-Dorantes and Pozo, 2006; Lokshin and Glinskaya, 2009; Mendola and Carletto, 2012), children (Giannelli and Mangiavacchi, 2010; Antman, 2011; McKenzie and Rapoport, 2011; Antman, 2012) or elderly (Antman, 2010). This literature argues that the change in family composition due to migration leads to a shift in decision making power, possibly affecting individual outcomes. However, none of these studies deals directly with transmission mechanisms behind the empirical evidence or models intrahousehold allocation of resources explicitly. Chen (2013) proposes a non cooperative model of household decision-making finding that when the father migrates without his family, children spend more time in household production, while mothers spend less time in both household production and income-generating activities. Antman (2014) studies the relationship between international migration and children's gender discrimination in Mexico focusing on the spousal control over resources. She found empirical evidence that a greater share of resources is spent on girls relative to boys when the father is emigrated and the mother has greater decision power. Differently from these studies, we investigate the consequences of migration explicitly taking into account individual decision making and intrahousehold distribution issues.

To pursue this strategy, we face an additional empirical issue. The decision to migrate abroad is likely to be endogenous to the intrahousehold allocation of resources. In the literature, international

migration has been considered endogenous with respect to many family outcomes such as consumption, labour supply, children's education. Antman (2014) and Chen (2013) link intrahousehold gender discrimination among children and fathers' migration. Antman (2014) treats migration as endogenous with respect to household expenditure for girls and boys. Chen (2013) adopts a panel approach to deal with possible unobservable factors influencing both the decision to migrate and time use allocation. Our paper is the first one dealing with the potential endogeneity arising between the decision to migrate and the sharing rule. The share of resources allocated to each household member can be influenced by a change in household composition due to migration episodes. However, the sharing rule depends on the intrahousehold decision making process, which in turns is also determined by family values and culture. These unobservable factors may influence the decision to migrate as well, thus posing an identification problem. We address this difficulty with a post estimation approach, applying an endogenous binary treatment model to the predicted shares of resources of males, females and children.

Albania is a particularly interesting setting to study the intrahousehold allocation of resources related to migration choices. At the end of the Second World War, Albania was a traditional rural society with patriarchal family values and patrilineal kinship system. In mountain and rural areas the social and economic structure was governed by the *Kanun* of Lek Dukagjini, a set of traditional and unwritten laws, based on patriarchy handed down from generation to generation since the Middle Ages (Gjonca et al., 2008; King and Vullnetari, 2009; Vullnetari, 2012). This set of laws gave males unquestioned authority within the household. For instance, the heritage could not be transmitted to a daughter unless no sons were present. In this case, the daughter needed to become a *burrnesha* (sworn virgin) dressing and behaving like a man also in smoking and drinking habits, and, therefore, renouncing to form a family. In the Kanun, the "blood of a woman is not comparable to that of a man", and she was considered just as a "jar made just to bear." During the isolationist communist regime, the educational policies targeted on females tried to dilute the patriarchal values of Albanian household without full success. The family maintained a central position in the society archetype of Albania and patriarchal values resurfaced with the regime's fall in the 1990s and the following rise of economic uncertainty. The country partially set back to a traditional family structure with the risk of delegating women -and indirectly children-[1] to a marginal role, becoming more and more vulnerable to suffering severe poverty and malnutrition problems especially among northern communities.

In Albania, large migration flows out of the country have represented an additional challenge to the family model after 1990, especially in the rural areas where poverty is more rooted. The household structure has changed deeply since migration strongly affected family stability and role equilibria, exposing especially the left behind family members to the risk of chronic poverty. In the Albanian tradition migration is historically a male-led phenomenon (King and Vullnetari, 2009). The post-communist mi-

[1]With the collapse of the communist regime, the supporting system of kindergartens and day-care nurseries that had been put in place to enable women to participate in labor market also crumbled.

gration flow was also male-dominated with a 95 percent of migrants being young males. Such pervasive male-centered migration has left a socially relevant portion of female spouses and children behind (Giannelli and Mangiavacchi, 2010; Piracha and Vadean, 2010; Mendola and Carletto, 2012). Vullnetari (2012) studies how Albanian women participate in the migratory process suggesting that they are often the most important pillar for supporting the family migration strategy, when remaining behind, through their participation to the labor market, provision of domestic work and as caretaker for children and male migrant's parents. The absence of fathers may change the decision-making process, the distribution of duties and responsibilities, with possible implications for children's development. For example, changes in household structure and responsibilities can lead to more pressure on older children to help in the household, to assist with agricultural duties or to work in the market. In our sample, when the father migrates in 49.1 percent of families the headship shifts to the mother as compared to 6.8 percent of the whole sample, while an old male takes the headship in 21.4 percent of the left behind sub-sample. This scenario reveals a double sided research question. On one hand, we aim at understanding whether and how mothers can manage household resources after the father's departure. On the other hand, we aim at verifying whether the shift of the decision power to the hands of an elderly male poses a risk of returning towards traditional values with the consequent increase in women discrimination.

Our main results suggest that when a father migrates abroad leaving the family at home, and the control of family resources shifts to the mother, she allocates substantially more resources to the children, especially when the proportion of female children is larger often at the expenses of her own resource share. We also find no evidence of a significant change in the distribution of resources when the control of resources shifts to older males. As an additional result, we find that independently on the left behind status, Albanian women sacrifice a large part of their resource share in favor of their children, with an average resource share devoted to women of 26.5 percent, respect to 37.5 percent for men and 36 percent for children. This suggests that women in Albania are suffering a prominent discrimination in the allocation of resources within the household. In general, our results show that, if appropriate policies are applied, there is scope to significantly improve the equitable distribution of resources and power within the household while relaxing the excessive burden of migration from mothers' shoulders.

The paper is organized as follows. Section 2 presents the collective model of consumption choices and specifies both the functional structure of the sharing rule and the complete collective demand system. Section 3 deals with the empirical issues faced in the application and the strategy proposed to address them. Section 4 describes the data used and the sample selection. Results are discussed in Section 5, lending special emphasis on the factors influencing the distribution of resources and the implications of international migration on the family members left behind. Section 6 reports our conclusive remarks.

2 The collective consumption framework

Our collective model of consumption assumes that the family decision process, conducted in a deterministic environment, leads to Pareto-efficient outcomes provided that individual utility functions are well-behaved and the budget sets are convex. These assumptions of the collective approach are common to all cooperative models and are necessary to implement the second fundamental welfare theorem leading to the decentralized decision program (Chiappori, 1992).

Market goods are assumed to be consumed privately by each household member. Consumption of private goods can be either assigned or non-assigned to a specific member of the household. Goods like food items are traditionally non-assignable because consumption surveys do not record individual consumption of food. On the other hand, clothing is a common example of private good whose consumption can be exclusively assigned to a specific member of the family. This individual-specific information is commonly available in household surveys and we exploit it to develop our identification strategy.

The household is composed by two adults - one male and one female - and a child indexed as $k = 1, 2, 3$. We assume that the family purchases N non-assignable goods c_j^k for $j = 1, ..., N$ and n assignable goods q_i^k, for $i = 1, ..., n$.[2] Each privately consumed good q_i^k can be assigned to a specific family member, while for the non-assignable goods we can observe only consumption at the household level so that $c_j = c_j^1 + c_j^2 + c_j^3$. The associated vectors of market prices for assignable and non-assignable goods are $\mathbf{p}_{\mathbf{q}^k}$ and $\mathbf{p}_{\mathbf{c}}$, respectively. Note that market prices of non-assignable goods are not specific to each household member: they are observed at the household level.[3] The set of demographic characteristics $\mathbf{d} = (\mathbf{d}_1, \mathbf{d}_2, \mathbf{d}_3, \mathbf{d}_{123})$ describes observable heterogeneity composed by the subset of characteristics specific to each individual k and the subset of household characteristics common to the family $\mathbf{d}_{123}$.

The family decision problem can be decentralized in two stages. In the first stage household members decide how to share household total expenditure y assigning to each of them a given amount ϕ_k of the household resources so that $y = \phi_1 + \phi_2 + \phi_3$. The function ϕ_k represents the sharing rule and must be strictly positive ($\phi_k > 0$). Then, in the second stage each member chooses her own optimal consumption bundle maximizing her utility function given her budget constraint.

In the decentralized program, each family member maximizes her own utility function

$$\max_{\mathbf{c}^k, \mathbf{q}^k} \quad u^k(\mathbf{c}^k, \mathbf{q}^k; \mathbf{d})$$

[2] For clarity of notation, we maintain that the index $k = 1, 2, 3$ refers to household members, while j and i index goods. Further, superscript $k = 1, 2, 3$ is associated with endogenous variables and subscript $k = 1, 2, 3$ with exogenous variables.

[3] We recognize that it would be possible to derive shadow prices at the individual level using, for example, a household technology *a la* Barten (1964) through a scaling modification of prices (Atella et al., 2004; Browning et al., 2013). We do not do so here because we use a technology that scales income rather than prices as discussed in Section 2.1. The skewed consumption of assignable goods induces an income redistribution effect within the family. For example, at the same level of total expenditure, families with a male "bias" may spend less on female or child goods. Our empirical identification strategy intends to capture these income reallocation effects.

subject to her own budget constraint

$$\mathbf{p}_{\mathbf{c}}'\mathbf{c}^k + \mathbf{p}_{\mathbf{q}^k}'\mathbf{q}^k = \phi_k,$$

where, in line with the caring assumption, individual utility functions may be affected also by characteristics of the other household members. The solution of this problem yields the following individual Marshallian demand functions

$$\begin{aligned}\hat{\mathbf{q}}^k &= \mathbf{q}^k\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^k}, \phi_k, \mathbf{d}\right), \\ \hat{\mathbf{c}}^k &= \mathbf{c}^k\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^k}, \phi_k, \mathbf{d}\right),\end{aligned}$$

where optimal consumption of the non-assignable good is observed at the household level as a function of the sharing rule, prices and demographic attributes.

The aggregate collective Marshallian demand system at the household level is

$$\begin{aligned}\hat{\mathbf{q}}\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^1}, \mathbf{p}_{\mathbf{q}^2}, \mathbf{p}_{\mathbf{q}^3}, y, \mathbf{d}\right) &= \mathbf{q}^1\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^1}, \phi_1, \mathbf{d}\right) + \mathbf{q}^2\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^2}, \phi_2, \mathbf{d}\right) + \mathbf{q}^3\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^3}, \phi_3, \mathbf{d}\right), \\ \hat{\mathbf{c}}\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^1}, \mathbf{p}_{\mathbf{q}^2}, \mathbf{p}_{\mathbf{q}^3}, y, \mathbf{d}\right) &= \mathbf{c}^1\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^1}, \phi_1, \mathbf{d}\right) + \mathbf{c}^2\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^2}, \phi_2, \mathbf{d}\right) + \mathbf{c}^3\left(\mathbf{p}_{\mathbf{c}}, \mathbf{p}_{\mathbf{q}^3}, \phi_3, \mathbf{d}\right).\end{aligned}$$

2.1 The collective demand system

The Quadratic Almost Ideal Demand System (QUAIDS) (Banks et al., 1997) is now derived for the collective model. For clarity of exposition we omit, for the time being, demographic information. Let the extended PIGLOG individual expenditure function be

$$\ln y_k\left(u_k, \mathbf{p}\right) = \ln A_k\left(\mathbf{p}\right) + \frac{\varphi(u_k) B_k\left(\mathbf{p}\right)}{1 - \varphi(u_k)\lambda_k\left(\mathbf{p}\right)} = \ln A_k\left(p\right) + \frac{B_k\left(\mathbf{p}\right)}{\varphi(u_k)^{-1} - \lambda_k\left(\mathbf{p}\right)}$$

where $\varphi(u_k)^{-1} = 1/\varphi(u_k)$ is an index decreasing in utility $\varphi(u_k)$. In line with the tradition of the Almost Ideal demand systems, the differentiable and concave price aggregators have the following functional forms

$$\ln A_k(\mathbf{p}) = \frac{1}{2}\left(\alpha_0 + \sum_i \alpha_i \ln p_i + \frac{1}{2}\sum_i \sum_j \gamma_{ij} \ln p_i \ln p_j\right),$$

and

$$B_k(\mathbf{p}) = \beta_0 \prod_i p_i^{\beta_i^k}.$$

$\lambda_k(\mathbf{p})$ is a differentiable function of prices specified as $\lambda_k\left(\mathbf{p}\right) = \sum_i \lambda_i^k \ln p_i$.

The translog term $A_k\left(\mathbf{p}\right)$ can be interpreted as the level of subsistence expenditure of individual k

when $u_k = 0$. It is a portion of household subsistence expenditure. We maintain that each member has equal access to household subsistence expenditure as if each member faced same individual shadow prices and thus define $\ln A_k(\mathbf{p}) = G^{-1} \ln A(\mathbf{p})$ where G is the number of groups of individuals in the family. In our case we have an adult male, an adult female and a child component in the family.[4] The price aggregators $B_k(\mathbf{p})$ and $\lambda_k(\mathbf{p})$ are associated with individual utility variation, in the expenditure definition, and with individual incomes in the budget share equation. It is the variation in individual incomes that permits the identification of the individual specific parameters $\left(\beta_i^k, \lambda_i^k\right)$.

By Shephard's lemma the individual budget share of good i is given by the following Hicksian demand

$$w_i^k = \frac{\partial \ln y_k(u_k, \mathbf{p})}{\partial \ln p_i} = \frac{\partial \ln A_k(\mathbf{p})}{\partial p_i} + \frac{\left[\frac{\partial \ln B_k(\mathbf{p})}{\partial \ln p_i}\left(\varphi(u_k)^{-1} - \lambda_k(\mathbf{p})\right) + B_k(\mathbf{p})\frac{\partial \lambda_k(\mathbf{p})}{\partial \ln p_i}\right]}{\left(\varphi(u_k)^{-1} - \lambda_k(\mathbf{p})\right)^2} \quad (1)$$

The inversion of the individual expenditure function gives the value of $\varphi(u_k)^{-1} - \lambda_k(\mathbf{p}) = B_k(\mathbf{p}) / (\ln y_k(u_k, \mathbf{p}) - \ln$ that substituted into equation (1) yields the individual budget share of good i

$$w_i^k = \frac{\partial \ln A_k(\mathbf{p})}{\partial \ln p_i} + \beta_i^k (\ln y_k - \ln A_k(\mathbf{p})) + \lambda_i^k \frac{(\ln y_k - \ln A_k(\mathbf{p}))^2}{B_k(\mathbf{p})}.$$

Because in our case individual prices are not known, we cannot estimate decentralized budget shares as derived above. Therefore, the estimable budget share of good i is aggregated at the household level by summing up the adult male, female and child component as

$$\begin{aligned} w_i = w_i^1 + w_i^2 + w_i^3 = {} & \alpha_i + \sum_j \gamma_{ij} \ln p_j \\ & + \beta_i^1 (\ln y_1 - \ln A_1(\mathbf{p})) + \lambda_i^1 \frac{(\ln y_1 - \ln A_1(\mathbf{p}))^2}{B_1(\mathbf{p})} \\ & + \beta_i^2 (\ln y_2 - \ln A_2(\mathbf{p})) + \lambda_i^2 \frac{(\ln y_2 - \ln A_2(\mathbf{p}))^2}{B_2(\mathbf{p})} \\ & + \beta_i^3 (\ln y_3 - \ln A_3(\mathbf{p})) + \lambda_i^3 \frac{(\ln y_3 - \ln A_3(\mathbf{p}))^2}{B_3(\mathbf{p})}, \end{aligned} \quad (2)$$

where $\ln y_k = \sigma_k \ln y$.

Observed heterogeneity is introduced using a translating household technology $t_i(\mathbf{d})$ that modifies the demand system (2) so that demographic characteristics interact additively with income in a theoretically plausible way (Gorman, 1976; Lewbel, 1985; Perali, 2003). Thus, the demographically modified collective share equation (2) becomes

[4] The assignment of one third the committed expenditure to each member of the family is used here to illustrate the derivation of individual demands but has no implications for the estimation of the collective demand system because the term $\ln A(\mathbf{p}) = \ln A_1(\mathbf{p}) + \ln A_2(\mathbf{p}) + \ln A_3(\mathbf{p})$ is specified at the household level.

$$
\begin{aligned}
w_i &= \alpha_i + t_i(\mathbf{d}) + \sum_j \gamma_{ij} \ln p_j \\
&+ \beta_i^1 \left(\ln y_1^* - \ln A_1(\mathbf{p})\right) + \lambda_i^1 \frac{\left(\ln y_1^* - \ln A_1(\mathbf{p})\right)^2}{B_1(\mathbf{p})} \\
&+ \beta_i^2 \left(\ln y_2^* - \ln A_2(\mathbf{p})\right) + \lambda_i^2 \frac{\left(\ln y_2^* - \ln A_2(\mathbf{p})\right)^2}{B_2(\mathbf{p})} \\
&+ \beta_i^3 \left(\ln y_3^* - \ln A_3(\mathbf{p})\right) + \lambda_i^3 \frac{\left(\ln y_3^* - \ln A_3(\mathbf{p})\right)^2}{B_3(\mathbf{p})},
\end{aligned} \tag{3}
$$

where $\ln y_1^*$, $\ln y_2^*$ and $\ln y_3^*$ are the log individual expenditures modified by a translating household technology as

$$\ln y_k^* = \ln y_k - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i,$$

where for empirical convenience the translating demographic functions $t_i(\mathbf{d})$ are specified as $t_i(\mathbf{d}) = \sum_r \tau_{ir} \ln d_r$ for $r = 1, ..., R$. The system of budget shares (3) allows estimating individual income parameters β_i^1, β_i^2, β_i^3,λ_i^1,λ_i^2 and λ_i^3 and the associated individual Engel effects, but the intercept α_i, the price parameters γ_{ji}, and the parameters of the scaling function $t_i(\mathbf{d})$ are estimated at the household level.

2.2 The sharing rule

In system (3) the sharing rule can be specified as a function of observed individual expenditure y_k and a vector of distribution factors $\mathbf{z}$ that affect the decision rule but not tastes. In analogy with Barten's scaling (1964), individual incomes y_k are scaled by a function $m_k(z) \in \left(0, \frac{y}{y_k}\right)$ (Menon et al., 2012a) as $\phi_k(y, \mathbf{z}) = y_k \cdot m_k(\mathbf{z})$, such that in logarithms it becomes additively separable

$$\ln \phi_k(y, \mathbf{z}) = \ln y_k + \ln m_k(\mathbf{z}).$$

This property makes the estimation of the sharing rule independent of income as shown in Menon and Perali (2012) and Dunbar et al. (2013), and empirically validated in Menon et al. (2012b).

The portion of income of each member, y_k, can be recovered from observed expenditures on exclusive or assignable goods. Observed individual income y_k is determined on the basis of the ratio of the expenditure in exclusive goods, σ_k. Assuming that each member's expenditure is defined as the expenditure on his exclusive good $\mathbf{p}_\mathbf{c}'\mathbf{c}^k$ plus $1/G$ the expenditure in ordinary goods $\mathbf{p}_\mathbf{q}'\mathbf{q}$. This is equivalent to write $\ln y_k = \sigma_k \ln y$, where σ_k is the resource share defined as $\sigma_k = \frac{1}{y}\left(\mathbf{p}_\mathbf{c}'\mathbf{c}^k + \frac{1}{G_k}\mathbf{p}_\mathbf{q}'\mathbf{q}\right)$, with G_k being the number of family members belonging to group k. For instance, G_1 is the number of adult males in the household. This makes families with groups of different sizes comparable, because they are 'translated'

into three-members households.

The sharing rules can thus be written as function of household income, distribution factors and the ratio of expenditure in exclusive goods, i.e.

$$\ln \phi_1(y, \mathbf{z}) = \sigma_1 \ln y + \ln m_1(\mathbf{z})$$
$$\ln \phi_2(y, \mathbf{z}) = \sigma_2 \ln y + \ln m_2(\mathbf{z})$$
$$\ln \phi_3(y, \mathbf{z}) = \sigma_3 \ln y + \ln m_3(\mathbf{z}).$$

Because by definition $\ln \phi_1(y, \mathbf{z}) + \ln \phi_2(y, \mathbf{z}) + \ln \phi_3(y, \mathbf{z}) = \ln y$, the following constraint on $\ln m_k(\mathbf{z})$ must hold:

$$\ln m_1(\mathbf{z}) + \ln m_2(\mathbf{z}) + \ln m_3(\mathbf{z}) = 0. \tag{4}$$

The income modifying function m_k behaves as a scaling index that describes the transfers between household members. When the scaling function is less than 1 the expenditure transfer goes from, say, $k = 1$ to $k = 2$ and $k = 3$. The direction of the transfer is inverted for $m_k > 1$. Therefore, the scaling function m_k explains both the amount and direction of the allocation of resources between household members. It also clarifies that the amount of resources allocated to member k, that is ϕ_k, differs from the observable amount of individual spending y_k.

In the empirical specification the $m_k(\mathbf{z})$ function is a Cobb-Douglas, so that the logarithmic specification is linear

$$\ln m_k(\mathbf{z}) = \sum_{l=1}^{L} \phi_k^l \ln z_l \ \forall k = 1, 2, 3 \tag{5}$$

where L is the dimension of vector $\mathbf{z}$. Note that this specification drives the restriction $\sum_k \phi_k^l = 0$ for all $l = 1, ..., L$.

Summarizing, the introduction of the sharing rule through the $m_k(z)$ scaling function modifies system 3 by substituting $\ln y_k^*$ with $\ln \phi_k^*$, defined as

$$\ln \phi_k^*(y, \mathbf{z}) = \ln y_k + \ln m_k(\mathbf{z}) - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i.$$

3 Empirical estimation and post-estimation strategies

This section discusses empirical issues related to the estimation of demand systems -such as the infrequency of purchases, the construction of household specific prices, the potential endogeneity of total

household expenditure- and the post-estimation strategy applied to infer about the impact of parental migration on the intrahousehold distribution of resources.

Infrequency of purchases

Cross-section household expenditure data often involve positive as well as zero purchases. The behavioral information contained in the observations with zero expenditures has significant econometric as well as economic implications. It is the manifestation of a choice that needs to be explained. In many cases the household deliberately chooses not to consume particular goods given their budget constraint. In other cases, the realization of zero expenditures can be explained by the short duration of the recall period of the survey design.

In our sample of Albanian families, for example, alcohol and tobacco expenditure is censored in non negligible size (see Table 1). We assume that the decision process generating the corner solutions is based on disposable income, prices and preferences. This assumption underlies the type III Tobit model (Maddala, 1983; Amemiya, 1985) that we implement in a system-wide setting with an Heckman two-steps estimator (Heckman, 1979). The sample selection bias is corrected by the inverse Mill's ratio that is the ratio between the predicted normal density and cumulative probability function estimated in the first stage Probit regression. This study adopts a generalized Heckman two-step estimator for a censored system of equations in line with Amemiya (1978), Amemiya (1979), Heien and Wessells (1990), Shonkwiler and Yen (1999), Perali and Chavas (2000) and Arias et al. (2004).

Consider the following limited dependent variables system of $i = 1, .., M$ equations

$$x_i^* = x(g_i, \theta_i) + \epsilon_i, \quad h_i^* = s_i'\tau_i + \upsilon_i, \tag{6}$$
$$h_i = \begin{cases} 1 & \text{if } h_i^* > 0 \\ 0 & \text{if } h_i^* \leq 0 \end{cases}, \quad x_i = h_i x_i^*,$$

where $x(g_i, \theta_i)$ represents the observed censored continuous variable of interest, h_i are the indicator variables, x_i^* and h_i^* are the latent variables, g_i and s_i are vectors of exogenous variables, θ_i and τ_i are parameters, and, ϵ_i and υ_i are bi-variate normal error terms. System (6) can be summarized as

$$x_i = \Psi(s_i'\tau_i)x(g_i, \theta_i) + \eta_i\psi(s_i'\tau_i) + \xi_i, \tag{7}$$

where Ψ and ψ are uni-variate normal standard cumulative distribution and probability density functions respectively. The element $\xi_i = x_i - E[x_i|g_i]$ belongs to the vector $\xi \sim MVN(0, \Omega)$.

Household specific prices

Because of the lack of quantity information (except for food consumption) that would allow the direct derivation of unit values from expenditure information, we compute household specific pseudo unit values using the procedure adopted by Atella et al. (2004), Hoderlein and Mihaleva (2008) and McLaren and

Yang (2014), based on theory results developed by Lewbel (1989). Even when monthly price indices are available for each commodity present in the expenditure survey at a relatively small territorial level, such aggregate price indexes do not have sufficient variation to identify all parameters and to provide plausible estimates. Lewbel's method consists in reproducing the cross-sectional price variability using the variability of the budget shares at the highest level of disaggregation available.[5] In summary, pseudo unit values are estimated by means of

$$\hat{p}_i = \left(\frac{1}{k_i^*} \prod_{j=1}^{J} w_{ij}^{-w_{ij}} \right) ex_i,$$

where ex_i is expenditure on the i-th good, w_{ij} is the sub-category budget share,[6] and k_i^* is a scaling factor defined as

$$k_i^* = \prod_{j=1}^{J} \bar{w}_{ij}^{-\bar{w}_{ij}}$$

with $\bar{w}_{ij}$ being the average sub-category budget share.

Endogeneity of total expenditure

Demand system estimations are often exposed to potential endogeneity of total expenditure. The main cause is measurement error, either due to the infrequency of purchases or to recall errors. Although the potential endogeneity attributable to the infrequency of purchases is already treated, we are still exposed to recall errors, thus we instrument total expenditure using wealth indicators. Because in non-linear models the use of the first stage prediction in place of the endogenous variable is biased and inconsistent (Terza et al., 2008), we use the control function approach. Similarly to the Hausman endogeneity test, it consists in estimating an augmented regression formed by including the predicted residuals from the first stage OLS regression of the endogenous variable on all covariates of the main regression plus the instruments.

Defining $\mathbf{s}$ a vector composed by prices of goods $\mathbf{p}$, demographic variables $\mathbf{d}$, and a set of instruments such as wealth discussed in Section 4, the first stage regression is

$$\ln y = \mathbf{s}\pi + \omega,$$

where ω is a spherical error term, whose prediction, $\hat{\omega} = \ln y - \mathbf{s}\hat{\pi}$, is used in the demand system as

[5] Atella et al. (2004) estimate a complete quadratic demand system using a time series of cross-sections of Italian household budgets including, in turn, aggregate price indexes and unit values constructed *a la* Lewbel (1989). The results show that the matrix of compensated price elasticities is negative semidefinite only if estimated unit values are used. In order to have a counterfactual experiment, the Atella et al. (2004) study also considers a household survey with actual unit values and compare them with Lewbel-type unit values. The experiment shows that in most cases unit values maintain the relevant characteristics of the distribution of actual unit values. Overall, the study concludes that reconstructed unit values are better than aggregate price indexes for sound demand and welfare analysis.

[6] Good i is a good category of the demand system, which is the aggregation of j sub-category goods. For example food is the aggregation of fruit, vegetables, bread, and so on.

specified in the next Section.

Specification of the empirical model

The system can be estimated by means of a two-step procedure. The vector of parameters τ_i of the Heckman correction is estimated using a Maximum Likelihood probit estimator to obtain the predicted cumulative and probability density functions $\hat{\Psi}(s_i'\hat{\tau}_i)$ and $\hat{\psi}(s_i'\hat{\tau}_i)$. Then the predicted residuals $\hat{\omega}$ of the endogenous regressor (total expenditure, $\ln y$) are obtained by OLS estimation of the endogenous variable on all covariates and the instruments. Finally, estimates of θ_i, η_i and ζ_i are obtained by Full Information Maximum Likelihood of the demand system in budget share form, as

$$\begin{aligned} w_i &= \hat{\Psi}_i[\alpha_i + t_i(\mathbf{d}) + \sum\nolimits_j \gamma_{ji} \ln \hat{p}_j + \beta_i^1 \left(\ln \phi_1^\star - \ln A_1(\hat{\mathbf{p}})\right) + \frac{\lambda_i^1}{B_1(\hat{\mathbf{p}})} \left(\ln \phi_1^\star - \ln A_1(\hat{\mathbf{p}})\right)^2 \\ &+ \beta_i^2 \left(\ln \phi_2^\star - \ln A_2(\hat{\mathbf{p}})\right) + \frac{\lambda_i^2}{B_2(\hat{\mathbf{p}})} \left(\ln \phi_2^\star - \ln A_2(\hat{\mathbf{p}})\right)^2 \\ &+ \beta_i^3 \left(\ln \phi_3^\star - \ln A_3(\hat{\mathbf{p}})\right) + \frac{\lambda_i^3}{B_3(\hat{\mathbf{p}})} \left(\ln \phi_3^\star - \ln A_3(\hat{\mathbf{p}})\right)^2] + \eta_i \hat{\psi}_i + \zeta_i \hat{\omega} + \xi_i. \end{aligned} \tag{8}$$

System (8) is estimated imposing standard regularity conditions for QUAIDS estimation: adding-up ($\sum_i \alpha_i = 1$), homogeneity ($\sum_i \tau_{ir} = 0$, $\sum_i \gamma_{ij} = \sum_j \gamma_{ij} = 0$ and $\sum_i \beta_i^k = \sum_i \lambda_i^k = 0$ for each $k = 1, 2, 3$), and symmetry ($\gamma_{ij} = \gamma_{ji}$, $\forall i \neq j$) .

Post-estimation strategy

Turning to the objective of verifying whether and how migration of one parent influences the distribution of resources within the household, this section describes the post-estimation employed. To be a legitimate policy analysis, in the context of a structural collective consumption model, the variable of interest must be a) a proper distribution factor, and b) exogenous. Being left behind by a migrant parent violates both a) and b). On one hand being left behind is likely to modify consumption behavior, at least since one household member is not consuming anymore. On the other hand, both the distribution of household resources and the decision to migrate might be determined by a common set of unobservable characteristics, such as family values and culture. For these reasons we propose here a post-estimation analysis on the predicted sharing rule. In particular, since the variable of interest is binary, the analysis is conducted using an Endogenous Binary Treatment (EBT) model (Cameron and Trivedi, 2005, sec. 16 and 25, and Wooldridge, 2010, sec. 21). Compared to matching methods, EBT models are robust to violations to the unconfoundedness assumption (or conditional independence assumption), that is the possibility that some unobservable factors influence both the treatment and the outcome. Differently from linear IV models, the set of variables explaining the endogenous variable do not need to include all explanatory variables of the outcome equation. Still, the explanatory variables for the treatment equation must include at least one instrument (exclusion restriction), that is an exogenous variable that is significantly correlated with the endogenous variable but not directly with the outcome.

The EBT model can be specified as

$$o_j = \mathbf{v}_j\vartheta + \delta t_j + \nu_j, \tag{9}$$
$$t_j = \begin{cases} 1 & \text{if } \mathbf{k}_j\kappa + \mu_j > 0 \\ 0 & \text{otherwise} \end{cases}$$

where o_j is the outcome variable for the j-th observation corresponding in our context to the predicted share of resources assigned to each household member, $\mathbf{v}_\mathrm{j}$ are the exogenous covariates used to model outcome, t_j is the endogenous binary variable - the "treatment"- and $\mathbf{k}_j$ are the exogenous covariates used to model the endogenous binary variable. ν_j and μ_j are bi-variate normal error terms.

When there are no interaction terms between the endogenous variable and other outcome covariates, parameter δ corresponds to the Average Treatment Effect (ATE) and to the Average Treatment Effect on the Treated (ATET). When there are reasons to think that the endogenous variable may change some parameters of the outcome equation, then interactions of the endogenous variable with those covariates may be added. In this case, the ATE and ATET need to be computed after the estimation of the model.

4 Data and sample selection

We estimate the collective QUAIDS using household data drawn from the World Bank Living Standard Measurement Survey collected in Albania in 2002.[7] It is a rich dataset containing information on household consumption, socio-economic conditions and income sources. The survey records detailed individual information on education, labor market participation, health and migration history.

Estimation of the collective demand system (8) requires data on household expenditure on market goods, their prices, relevant household and individual characteristics, and expenditure on at least one exclusive or assignable good. Expenditure on market goods and observed heterogeneity come from the LSMS survey itself.

We select households with children up to fifteen years old (1702 observations) and exclude those households for which exclusive goods consumption is zero for at least one household group (142 observations). The original sample covers 3,599 households, that after the selection reduces to 1560 families with children. Table 1 provides descriptive statistics for the variables described below.

The estimation of the demand system is conducted over five categories of goods: protein food, other food, clothing, alcohol and tobacco, and other goods.[8] The other goods category includes expenditure on education, leisure, personal care, banking and other non specified services and good categories. Unit

[7] 2005, 2008 and 2012 data could not be used because it was not possible to reconstruct consumption sub-categories as needed for pseudo unit value estimation (as explained in Section 3).

[8] We distinguish protein food from other foods such as cereals, fruit and vegetables because generally considered as a luxury food in Albania.

values are observed for protein food and other food, for the remaining categories we use pseudo unit values computed following Lewbel's procedure described in the previous section. Exclusive consumption good available in the dataset are clothing and footwear for males, females and children. Expenditure in education is assigned to children. Durables are excluded from the system.

The set of demographic variables **d** includes:[9] household head characteristics, as gender, being younger than 35, having tertiary education; health status with dummies indicating whether the head, the spouse or any child are in bad health conditions defined as a chronic illness or disability lasting for more than three months. To account for enlarged families we construct a dummy indicating the presence of more than one couple within the household. Economic status is captured by a family labor supply variable that relates the number of working members to family size, and an indicator for those dwellings that have no continuous water supply. Finally we include a variable indicating residence in a rural area.

The set of variables selected as distribution factors **z** traditionally used in the literature includes: patents education difference (husband-wife normalized by the average education of the spouses), parents age difference (wife-husband normalized by the average age) and its square, and the proportion of female children. We also include a community level dummy indicating whether a relevant percentage of children under the age of 15 work (either with their parents or in the market). This is a question posed to the community chief asking whether in the community there are children that work even for a short period during the year. Possible answers include none, very few, less than half, half, more than half, most children. The dummy is equal to 1 for all answers except none and very few.

Similarly to Dunbar et al. (2013), to instrument household total expenditure we use a set of wealth indicators: ownership of video player, refrigerator, washing machine, generator, air conditioning and car/truck. Even though other wealth indicators were available, only the non redundant ones were selected.

For the post-estimation analysis of migrant sending families, the endogenous binary treatment model described above requires two sets of regressors: one explaining the outcome of interest and one explaining the treatment. In our case, the outcome of interest is the share of resources assigned to each household member. The treatment variable is the left behind dummy, indicating that one the parents has been abroad for at least three months at the date of interview. In most cases, about 95 percent, the migrant is the father confirming the gendered face of migration in Albania (Giannelli and Mangiavacchi, 2010; Mendola and Carletto, 2012). About 7.2 percent of the households in our sample are left behind by a migrant parent.

The main variable of interest in the outcome equations is being left behind, which we interact with the proportion of female children and a dummy indicating that the head of the household is a woman. The other covariates explaining the outcomes include all the distribution factors **z** plus a set of relevant

[9]In the choice of the demographic variables and distribution factors to include in the demand system estimation we have been careful to include only exogenous demographic variables and distribution factors. The objective is to have a robust estimation of the sharing rule, whose prediction can than be subsequently investigated with a post-estimation analysis.

household characteristics: the head of the household being young, living in a rural settlement, living in the costal, central, mountain area, education level of the head and the spouse, and family composition variables, such as average age of children, number of children under 5, number of children in primary education age (6-11), number of disable working-age members, number of elderly (>65), number of male and female adults. We also control for the remittances sent by the migrant parent by constructing the ratio of remittances with respect to total household expenditure in consumption. In average, the relative importance of remittances as compared to the total level of household expenditures is 3.3 percent (Table 1), although the conditional mean is about 46.3 percent, indicating that most families left behind are in need and the amount received is substantial for family sustenance (for amost 20 percen of left behind families remittances represent at least 80 percent of consumption).

As to the treatment equation, the main concern was to find a valid instrument for being left behind. While the literature proposes several options(Cattaneo, 2012; Mendola and Carletto, 2012), we established that a reasonable non-weak instrument that could be applied were the proportion of families in the community which had a member abroad continuously for at least 12 months in the period 1997-2001 and the district share of migrants that left behind some family member in the period 1990-2001, distinguishing between urban and rural areas. While the first can be considered a good instrument for international migration in general, the latter is more specific to our variable of interest. Indeed migrants that leave behind their family members are only one part of the migration flow, and the motivations for this kind of migration may be of different nature. Other instruments suggested by the literature are: the economic conditions of the main destinations (in our case mostly Italy and Greece), that we found to be non significant in several specifications; the distance from ports (we tried both the Vlore port, the main destination for those that illegally migrated to Italy, and Kakavia, the main frontier pass to Greece, but they were very weak); credit market variables, such as the prevailing interest rate for a loan at the community level, and the reliability of obtaining a loan by some neighbor within the community, which were non significant at all; and the district share of families that spoke Italian, Greek and English in 1990,[10] which also were not significant. Other potentially interesting instruments that were not available within our data were if past economic shocks (mainly the Pyramid crisis - a set of financial Ponzi schemes that precipitated in 1997 involving about two thirds of the Albanian population) hit the family and whether the migrant spoke a foreign language prior migration. The other regressors included in the treatment equations are: the number of associations providing community services (e.g. NGOs, village committees, political groups, parent's associations, and so on), the presence of more than one couple in the household, the average distance from services (bus, school and doctor) in minutes by walk, area of residence (coastal, central and mountain), and the education level of the household head and the spouse.

[10]We obtained this information from the 2005 LSMS, so we could not use this instrument at the household level.

5 Results

This section presents the results of the estimation of model (8) along with the corresponding individual elasticities and sharing rule results. The description follows with the post-estimation analysis on the predicted relative sharing rule used to asses the impact of being left behind by a migrated family member on the intrahousehold distribution of resource.[11]

Demand system estimation

Table 2 reports the estimates of the first stage probit regressions for alcohol and tobacco. Relevant variables in explaining positive alcohol and tobacco consumption are: total expenditure and its own price, both with a positive effect, while the price of other food, the head of the household being a female or young, or the spouse being older than the head all reduce the probability of consuming. The number of elderly, having both parents working and the subjective well-being indicator increase the probability to drink or smoke. The lack of a doctor or an hospital in the community both reduce the probability of consumption. In the demand system estimation the selection parameter η for alcohol and tobacco is not significant, indicating that sample selection bias may not be a problem for this good even though the proportion of zeros is quite large (about 42 percent).

The first stage IV regression for household total expenditure reported in Table 3 shows that all wealth assets chosen as instruments are significant at 5 percent. This evidence together with a partial R^2 of 0.109, and an F statistic for the excluded instruments of 18.83 indicate that the chosen instruments are sufficiently strong.[12] Anderson's under-identification test is strongly rejected, with a χ^2 of 171.04. The coefficients ζ_i of the predicted residuals in the demand system estimation are never significant, except for protein food, revealing that endogeneity of total expenditure might not be a severe issue in our sample.

Table 4 presents the estimates of the collective QUAIDS demand system. The parameters of the sharing rule are estimated jointly with the demand system, but are reported separately in Table 6. Most income and price parameters are significantly different from zero and with the expected sign. In general demographic effects are not large, though several are significantly different from zero. Household head characteristics are important in determining consumption choices. For example, when the household head is a woman, protein food consumption increases, while clothing decreases, while having tertiary education increases consumption of meat and other goods that also includes education and cultural expenditures. The presence of more than one couple, typically grandparents, reduces both alcohol-tobacco and other goods consumption. Also the ratio between number of workers and family size has a significant impact, increasing protein food and clothing consumption and reducing other food consumption. Living in a

[11] It is worth noting that while it may seem straightforward to use the sharing rule to perform welfare analysis, as shown by Chiappori and Meghir (2014) this is a more delicate issue. In particular, the proposed model disregards whether some goods consumed by the household can be (partially) public goods -along with the associated economies of scale-, and household production technologies. The data requirements for a collective consumption model with public goods and household production, however, are quite demanding and Albanian data are not suitable for this analysis.

[12] The Stock-Yogo critical value for a maximum bias of the IV estimator of 5 percent and 10 percent are 20.74 and 11.49 respectively.

rural area reduces the consumption share of all categories but other food.

Table 5 shows individual specific income elasticities for males, females and children, and household price elasticities along with the associated standard errors. Signs are consistent with the theory. Individual Engel effects are important because they allow predicting how changes in the sharing rule may affect individual consumption decisions. Men reveal near unity elasticities for all categories but other goods, which is inelastic. Females show larger elasticities for protein food, clothing and alcohol-tobacco, while other goods and, to some extent, other food are inelastic. Children reveal a rather different pattern, with unitary elasticity for protein food and other food, small elasticities for clothing and alcohol and tobacco, and a large elasticity for other goods. This effect is as expected because the aggregate other goods includes cultural, educational and recreational expenditures as the most relevant items, which are important for children but less for adults, especially males. The comparison of uncompensated and compensated price elasticities in the middle and bottom part of Table 5 reveals that the size of the income term of the Slutsky matrix evaluated at the means is relatively small with the notable exception of protein food and other food. As required by consumption theory all diagonal terms are negative. The own price effect of protein food is relatively more elastic, while that of alcohol and tobacco, as expected, is quite inelastic. The cross-effects of the compensated price elasticities show generally significant complementary relations of alcohol with protein food, clothing and other goods, while protein food and other food are substitute for the other categories.

The estimates of the parameters of the sharing function $m_k(\mathbf{z})$ are reported in Table 6, while Figure 1 depicts nearly constant (on average) share of resources all along the income distribution.[13] Parents education difference works as expected, increasing the bargaining power of the woman and reducing that of men when she is relatively more educated. Similarly performs parents age difference and its square. The resource share of children is unaffected by these variables. On the other hand, living in a community where a relevant share of children works has a positive impact on men and children resource shares and negative on female's. On one hand this may be an evidence that if children have more possibility to work they may also gain bargaining power because possible source of money for the family (Basu, 2006). On the other hand, this variable could be an indicator for a traditional agriculture-based area, where the patriarchal values may be more rooted, revealing possible gender discrimination. A further concern is about discrimination of female children within the household: our evidence shows that the proportion of female children improves the child sharing rule, even though this happens at the expenses of female adults rather than males.

The predicted sharing rule, presented in Table 7, shows how resources are distributed among household members. In Albania, on average, male members control about 37.3 percent of the household resource pool mainly at expenses of female members that remain with 26.7 percent of resources. Chil-

[13]This empirical evidence is relevant for the income independence assumption as explained in Section 2.1 and is in line with the evidence reported by Menon et al. (2012b).

dren have 36 percent of resources. These average figures show that the distribution of resources within the family is quite unequal. The bargaining power of Albanian women is much weaker with respect to men's control over household resources. This evidence is in line with the Albanian patriarchal family model that excludes women from the household decision making process. The predicted distribution of resources does not markedly affect what children receive because children's share is slightly above the "fair" share of 33 percent.

These results are strong signals of a critical situation for Albanian mothers, in part victim of a subtle gender discrimination occurring within the household walls. Moreover, women have an even lower resource share in favor of children whenever at risk, a situation that may occur when child work is particularly spread and the majority of children are female. Below, we seek further insights on this issues by implementing a post-estimation analysis of the sharing rule, concentrating on the effects of migration on the share of resources for left behind family members, a critical variable that could not be included among the distribution factors.

The impact of migration on the intrahousehold distribution of resources

When a parent migrates abroad, the distribution of resources within the household may substantially change. When the migrant member leaves, he frees part of the home resources that become available for other members of the household. The migrated parent also contributes new resources by sending remittances home. In our sample, most migrants are fathers - this is the case for more than 95 percent of left behind families- and 98 percent of them send remittances. Among those sending remittances, the prevailing declared objective is to buy food or necessity goods (57 percent of households), to invest in construction (12 percent), and to cover medical expenses (12 percent). The declared objective is child support only for 3 percent of the household, while remittances are never used for educational purposes.[14] The remaining is more or less evenly distributed among purchasing a durable good, paying for a wedding or funeral, charity, investment in the household enterprise, and other destinations.

In a general context, it is natural to expect that left behind families are composed by the mother and her children without adult males. In Albania, this is the case only for 6 households that we dropped from the analysis. Thus, the large majority of migrant fathers leave behind the family only if there is at least another adult male in the household and send remittances. The resources freed by the migrant member plus the remittances, though not so important as compared to total household outlays as shown in the data section, sent are likely to be reallocated between the remaining adult males, adult females and children. We expect two kind of behavioral reactions to the migration episode: on one hand the wife may take over the control of household resources and decide on the reallocation, probably favoring children. On the other hand, in the patriarchal tradition, the control of resources may shift to the older

[14]This is in line with Cattaneo (2012), who finds that remittances have no impacts on education expenditure, and with Giannelli and Mangiavacchi (2010), that find a negative of parental migration on children schooling.

remaining male that would probably keep a distribution of resources similar to the pre-migration state[15]. In both cases we expect that the male share of resources reduces -since there is one adult male less in the household- and that the beneficial of the redistribution would be the children since a) women are naturally more caring towards children or b) older males may have stronger traditional values that tend to discriminate women. We intend to disentangle these aspects by controlling for the presence of elderly and for the wife declaring to be head of the household.

We now first comment the results of the treatment equation, with a special emphasis on the endogeneity issue of the left behind status. Subsequently, we turn our attention to the outcome equations, where we investigate the aforementioned issues.[16]

Table 8 reports the treatment equations of the post-estimation analysis of the share of resources of each family member. The variable left behind, which indicates migration of one parent, is treated as endogenous by means of an Endogenous Binary Treatment (EBT) model regressing the left behind status on a set if instruments and other relevant variables.[17] The main instruments, or exclusion restrictions, are the community share of households with at least a member abroad consecutively for at least 12 months since 1997, and the share of families with migrants leaving behind the wife and/or children in the period 1990-2001, computed at the district level using 2005 data. We found these instruments to be those that work best in explaining the left behind status without being directly correlated with the share of resources of each family member. Both coefficients are significant at 1 percent in all equations, except for the women share equation, where the latter is significant at 10 percent. A further potential instrument that we used is the number associations providing community services present in the community, with the idea that the more categories are present, the more likely it is that a family receives some kind of support and that migration of one of the parents may be less necessary. We found this variable to be negative and significant at 1 percent in the treatment equations for men and children, but not significant for women. The last potential instrument we included in the treatment equation is the average distance from services in minutes by walk. Again, it is significant at least at 5 percent for men and children, but not significant for women. In all equations it has the expected negative sign. The other variables included in the treatment equation, that we recognize could also affect directly the sharing rule, and thus not suitable as instruments are the household head having only primary education, the spouse being older than the head and the presence of more than one couple within the household, all significant with positive sign.

Table 9 shows the outcome equations of the EBT regressions. Here the share of resources of each household member is regressed on a set of relevant variables, including the distribution factors used in

[15] There is evidence of a common practice among migrant fathers to send remittances to their parents rather than their wives (King and Vullnetari, 2009).

[16] Although the results of the treatment and outcome regressions are presented in Tables 8 and 9, they are jointly estimated by Full Information Maximum Likelihood.

[17] Note that typically remittances should be considered as endogenous as well, but the endogeneity is due to the migration decision, which in our case is already instrumented.

the collective demand system estimation, a set of household characteristics and a set of variables related with the migration of one of the parents. The last two lines of Table 9 report the Average Treatment Effect and Average Treatment Effect on the Treated of being left behind. The computation of the ATE and ATET is necessary because interactions of left behind with other explanatory variables are included in the regression and the parameter of the left behind variable alone is netted of the interaction effects. The results show that having a migrant parent reduces the male adults share of resources by 4.4 percentage points and improves that of children by 8.8 percentage points, while the ATE on women share of resources is not significantly different from zero.[18] These findings can be due to two different channels suggested by the literature. The first follows the Basu and Van's hypothesis (1998) that children, in this case substituting the loss of labor force of the migrant member, increases their bargaining power. An alternative explanation could be that the mother decides to allocate the share of resources left by the migrant husband to the children. This would reinforce the vision that when the bargaining power is shifted to women they grant more resources to children, especially female ones as suggested in previous studies (Attanasio and Lechene, 2002; Duflo, 2003).

As to the specific parameters of each equation, the left behind variable has a negative and significant impact on male resource share. Interestingly, when left behind is interacted with the proportion of female children we find that more female child increase the share of resources of adult males, but only for families that are not left behind. Moreover, if the head of the household is a woman and the father migrates abroad, the share of male resources significantly reduces. This evidence shows that when the father is absent, the mother is willing to give the share resources freed by the migrant to children, in particular when there are more females. As expected, the distribution factors significantly affect the resource share of males, and with the same sign of the collective demand system estimation. Geographical variables are also relevant. Living in a rural area moderately increases the male share of resources and among regional indicators, living in the coastal area reduces males resources share. Family composition, as expected, is also important. The share of resources of males is smaller when there are more male adults, when children are older and when there are more young children.

Inspection of the results referring to female resource share shows that having a larger proportion of female children reduces women's share, mostly for families left behind. On the other hand, a household headed by a women does not show a larger women resource share, left behind or not. Again, distribution factors are significant and with the same sign as in the demand system estimation. Rural slightly increases women's share, while regional variables are not significant. When children are older the share reduces but the number of young children increases women's share, especially the number of preschool children.

[18] As a robustness check we ran regressions on the relative sharing rule by using a standard OLS estimator (thus treating the left behind variable as exogenous) and a standard IV regression (thus neglecting the binary nature of the endogenous variable). While OLS regressions revealed weaker and mostly non significant ATEs, the IV regressions produce similar results, with the ATE on male share of resources being slightly larger (-0.075), the female ATE being non significant, and child ATE being almost identical (0.089) to the EBT results. These results are available upon request.

As expected, the share reduces with the number of female adults.

Children's share of resources substantially increase when left behind especially if in female headed household. The proportion of female children always increases the share of resources devoted to children, but more when the family is left behind by a migrant parent (in line with Antman, 2014). It is worth noting that this increase always happens at the expenses of women's share. In this case the proportion of remittances on total consumption has a slightly significant negative impact on the child share of resources. This may be because remittances are large with respect to consumption for very poor households. Again the distribution factors act with the same sign and significance as in the demand system estimation. Living in a rural area significantly reduces the share of resources, while regional variables are not significant. The education of the head plays a significant role in increasing children share of resources, as well as the average age of children. One possible explanation is that older children are able to help more in household and farm duties, allowing them to increase their bargaining power. Family composition is important, with the expected signs and significance.

Adults age indicators are in general non significant. One of the strongest concerns respect to fathers migration is the possibility that the headship of the household shifts to elderly members following traditional patriarchal household conducts, to the detriment of women and children (Giannelli and Mangiavacchi, 2010; Antman, 2011, 2012) . However, we found that both the indicator for a young household head and the number of elderly living in the household are not significantly affecting the distribution of resources within the household.

The overall picture has clearly defined traits. Children in Albania are effectively protected from the risks associated with male migration both by their mothers or by elder household members taking control over resources. When a variable has a positive impact on the share of resources assigned to children, in most cases it has a negative impact on women's share, and a non significant or positive impact on men's share. Two notable exceptions are observed for the education of the household head and female headed households left behind by a migrant member. The more educated the household head, the less resources go to male adults to the advantage of children. When a father migrates and the headship of the household is taken by the wife (in Table 9 the interaction between female head of the household and left behind), then a substantial share of resources passes from men to children. Again, it is worth noting that women do not keep resources left by the migrant husband for themselves, as the left behind parameter is not significant.

6 Concluding remarks

This study applies the collective consumption framework to the measurement of distribution of resources within Albanian households, placing special emphasis on the impact of international migration of one

parent and on possible discrimination arising from an unfair distribution of resources. The analysis is conducted on households with children up to fifteen years of age observed by the Albanian Living Standard Measurement Survey in 2002.

Albanian households have been deeply affected by the transition to a market economy from a regime that reduced the intensity of previous patriarchal tradition. One of the social effects of transition was the restoration of those traditional values previously rooted as strongly patriarchal with village level customary laws, with the risk of delegating women to a marginal role, especially in rural areas. At the same time, the household structure changed deeply due to sustained migration flows affecting family stability. In order to improve our understanding of these delicate economic and social issues, our study provides detailed information about the distribution of household resources between genders and generations and its relation with migration. To achieve this objective, we identify a sharing rule for the adult male and female component and a sharing rule for children along with their individual Engel effects using a statistically robust identification strategy and a collective complete demand system that is an original contribution to the literature. We also analyze the impact of being left behind by a migrant parent on the resource share of each household member by means of an endogenous binary treatment model.

Our results suggest that when a father migrates abroad leaving the family at home, and the control of family resources shifts to the mother, substantially more resources are allocated to children, especially when the proportion of female children is larger and at the expenses of women resources share. We also find no evidence of a significant change in the distribution of resources when the control of resources shifts to older males. Independently on the left behind status, women share of resources is substantially lower with respect to a fair distribution, suggesting that Albanian women are suffering a prominent discrimination in the allocation of resources within the household.

Such a relevant level of inequality affecting especially women calls for a policy intervention focusing on gender-parity policies such as incentives for female education and work participation. These policies would improve the relative bargaining position of women with respect to men, reducing the risk of female discrimination within the household. Further, if female members both contribute more resources and have more control over them, the migration flows may mitigate, which is a declared governmental objective since 2006. Also, an increasing empowerment of women within the Albanian family may provide an effective safety net especially in those family situations where migration decisions are triggered by husband's inability to provide sufficient resources to the family.

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Table 1: Descriptive statistics (1560 observations).

	Trunc. %	Mean	Std. dev.	Min	Max
Budget shares					
Protein food	1.7	0.144	0.079	0.000	0.541
Clothing	0	0.130	0.096	0.001	0.553
Alcohol and tobacco	41.7	0.017	0.024	0.000	0.244
Other goods	2.6	0.060	0.070	0.000	0.585
Other food	0	0.617	0.131	0.147	0.974
Observed share of assignable good					
Male	0	0.320	0.037	0.086	0.544
Female	0	0.328	0.037	0.091	0.660
Child	0	0.352	0.056	0.158	0.819
Total expenditure and unit values					
Log of total expenditure		9.419	0.479	7.916	11.543
Log of price of protein food		5.894	0.671	-0.614	7.170
Log of price of clothing		6.840	0.948	3.538	9.375
Log of price of alcohol-tobacco		5.316	0.983	1.364	8.739
Log of price of other goods		5.389	1.070	1.834	8.961
Log of price of other food		2.919	1.311	-0.765	5.854
Household characteristics					
Female head of the household		0.098	-	0	1
More females than males in the household		0.190	-	0	1
Household head is young (< 35)		0.209	-	0	1
Household head has only primary education		0.519	-	0	1
Household head has university education		0.108	-	0	1
Education of the household head		2.136	1.562	0	6
Education of the spouse		0.835	1.312	0	5
The spouse is older than the household head		0.072	-	0	1
Household head is in bad health conditions		0.215	-	0	1
Number of children under 5		0.916	0.835	0	5
Number of primary school children (6-11)		0.870	0.843	0	4
Number of disable working-age members		0.261	0.540	0	4
Number of elderly (>65)		0.544	0.784	0	4
Number of male adults		1.472	0.763	1	6
Number of female adults		1.532	0.713	1	6
Average age of children		6.402	3.755	0	14
Both parents work		0.134	-	0	1
Subjective socioeconomic status		3.668	1.700	1	10
Dwelling is small ($< 40\,m^2$)		0.135	-	0	1
Dwelling is big ($\geqslant 100\,m^2$)		0.137	-	0	1
There are no preschool services in the community		0.191	-	0	1
There is no doctor in the community		0.154	-	0	1
Household has a telephone		0.267	-	0	1
Dwelling has no continuous water supply		0.327	-	0	1
Distance from school (in minutes by walk)		13.611	12.412	1	90
Distance from doctor (in minutes by walk)		20.114	19.931	1	96
Distance from bus (in minutes by walk)		16.516	17.998	1	99
Presence of a hospital in the community		0.399	-	0	1
Household lives in Tirana		0.154	-	0	1
Household lives in the costal area		0.266	-	0	1
Household lives in the central area		0.267	-	0	1
Household lives in the mountain area		0.313	-	0	1
The spouse of the head is in bad health conditions		0.251	-	0	1
Number of children in bad health conditions		0.108	0.352	0	3
Presence of more than one couple in the household		0.225	-	0	1
Employment ratio: number of workers/family size		0.313	0.189	0	0.833
Household lives in a rural area		0.476	-	0	1

Table 1: Descriptive statistics (1560 observations).

	Trunc. %	Mean	Std. dev.	Min	Max
Parents education difference (wife - husband)		-1.104	1.012	-2	2
Children under 15 working (community)		1.526	1.472	0	5
Proportion of female children		0.455	-	0	1
Parents age difference (wife - husband)		-0.266	0.520	-2	0.526
Parents age difference squared		0.341	1.071	0	4
Number of rooms in the dwelling		2.413	1.077	1	8
Ownership of a video player		0.230	-	0	1
Ownership of a refrigerator		0.821	-	0	1
Ownership of a washing machine		0.528	-	0	1
Ownership of a generator		0.014	-	0	1
Ownership of air conditioning		0.021	-	0	1
Ownership of a car/truck		0.116	-	0	1
Community share of families with members abroad continuously for a year since 1997		0.040	0.076	0	0.875
District share of migrants leaving behind families since 1990		0.561	-	0	1
Number of associations providing community services		4.512	3.638	0	14
Distance from services (in minutes by walk)		16.747	14.307	1.333	90
Left behind		0.072	-	0	1
Proportion of remittances on consumption		0.033	0.155	0	1.764

Table 2: Probit estimates for the sample selection bias correction on alcohol-tobacco

Constant	-4.105*** (0.837)
Log of total expenditure	0.167* (0.097)
Log of price of protein food	0.020 (0.056)
Log of price of clothing	0.051 (0.044)
Log of price of alcohol-tobacco	0.473*** (0.038)
Log of price of other goods	-0.003 (0.037)
Log of price of other food	-0.067** (0.030)
Female head of the household	-0.528*** (0.133)
More females than males in the household	-0.119 (0.105)
Household head is young (< 35)	-0.174* (0.091)
Household head has only primary education	0.063 (0.082)
Household head has university education	-0.204 (0.129)
The spouse is older than the household head	-0.353** (0.138)
Household head is in bad health conditions	-0.036 (0.090)
Number of children under 5	-0.001 (0.045)
Number of elderly	0.309*** (0.089)
Both parents work	0.261** (0.119)
Subjective socioeconomic status	0.058** (0.025)
Dwelling is small ($< 40\,m^2$)	0.105 (0.106)
Dwelling is big ($\geqslant 100\,m^2$)	-0.082 (0.103)
There are no preschool services in the community	0.158 (0.112)
There is no doctor in the community	-0.369*** (0.118)
Household has a telephone	-0.064 (0.098)
Dwelling has no continuous water supply	0.043 (0.074)
Distance from school (in minutes by walk)	0.001 (0.003)
Distance from doctor (in minutes by walk)	-0.004 (0.003)
Distance from bus (in minutes by walk)	-0.003 (0.003)
Presence of a hospital in the community	-0.163* (0.088)
Household lives in Tirana	-0.015 (0.102)

Note: Standard errors in parenthesis.

Table 3: First stage OLS regression of total expenditure

Log of price of protein food	0.067*** (0.014)
Log of price of clothing	0.155*** (0.011)
Log of price of alcohol-tobacco	0.031*** (0.009)
Log of price of other goods	0.082*** (0.009)
Log of price of other food	0.007 (0.008)
Female head of the household	-0.098** (0.042)
Household head is young (< 35)	-0.056** (0.024)
Household head has university education	0.162*** (0.032)
Household head is in bad health conditions	0.020 (0.024)
The spouse of the head is in bad health conditions	-0.014 (0.026)
Number of children in bad health conditions	0.028 (0.026)
Presence of more than one couple in the household	0.096*** (0.024)
Employment ratio: number of workers/family size	0.159*** (0.052)
Dwelling has no continuous water supply	-0.017 (0.019)
Household lives in a rural area	0.120*** (0.026)
Parents education difference (wife - husband)	-0.010 (0.009)
Children under 15 working (community)	-0.004 (0.007)
Proportion of female children	0.009 (0.024)
Parents age difference (wife - husband)	0.090 (0.098)
Parents age difference squared	0.084 (0.051)
Dwelling is small ($< 40\,m^2$)	-0.075** (0.029)
Dwelling is big ($\geqslant 100\,m^2$)	0.071** (0.030)
Number of rooms in the dwelling	0.027** (0.011)
Household has a telephone	0.041 (0.026)
Ownership of a video player	0.076*** (0.023)
Ownership of a refrigerator	0.051* (0.027)
Ownership of a washing machine	0.067*** (0.024)
Ownership of a generator	0.194** (0.079)
Ownership of air conditioning	0.154** (0.067)
Ownership of a car/truck	0.151*** (0.031)
Constant	7.001*** (0.119)

Note: Standard errors in parenthesis.

Table 4: Parameters and demographic variables of the collective demand system

	Protein food	Clothing	Alcohol-tobacco	Other goods	Other food
α_i	0.321*** (0.013)	0.184*** (0.012)	0.068*** (0.008)	0.120*** (0.009)	0.308*** (0.016)
γ_{ij}	0.027*** (0.003)	-0.009*** (0.002)	-0.002** (0.001)	0.002 (0.002)	-0.019*** (0.005)
		0.079*** (0.004)	-0.007*** (0.001)	0.007*** (0.002)	-0.070*** (0.006)
			0.021*** (0.001)	-0.001* (0.001)	-0.011*** (0.002)
				0.034*** (0.002)	-0.042*** (0.004)
					0.142*** (0.012)
β_i^1	0.035*** (0.013)	0.082*** (0.008)	0.005 (0.006)	0.021*** (0.007)	-0.143*** (0.011)
β_i^2	0.048*** (0.010)	0.114*** (0.008)	0.024*** (0.005)	0.044*** (0.007)	-0.229*** (0.009)
β_i^3	0.024*** (0.009)	0.053*** (0.007)	0.000 (0.004)	0.074*** (0.005)	-0.151*** (0.010)
λ_i^1	0.009** (0.004)	0.028*** (0.003)	0.002 (0.002)	0.015*** (0.002)	-0.054*** (0.005)
λ_i^2	0.005 (0.003)	0.025*** (0.003)	0.006*** (0.002)	0.017*** (0.002)	-0.053*** (0.004)
λ_i^3	0.006** (0.003)	0.032*** (0.003)	0.002 (0.001)	0.015*** (0.002)	-0.054*** (0.004)
η_i			-0.019 (0.029)		
ζ_i	0.053** (0.024)	-0.057 (0.081)	-0.014 (0.272)	0.003 (0.137)	0.015 (0.316)
Female head of the household	0.015* (0.009)	-0.005 (0.006)	0.002 (0.003)	-0.007 (0.005)	-0.004 (0.013)
Household head is young (< 35)	-0.012** (0.006)	-0.007 (0.004)	0.006*** (0.002)	-0.010*** (0.003)	0.023*** (0.009)
Household head has university education	0.023*** (0.008)	0.001 (0.005)	-0.001 (0.002)	0.014*** (0.004)	-0.036*** (0.010)
Household head is in bad health conditions	-0.004 (0.006)	-0.004 (0.004)	0.005*** (0.002)	-0.003 (0.003)	0.006 (0.009)
The spouse of the head is in bad health conditions	-0.008 (0.006)	0.002 (0.004)	0.003* (0.002)	-0.003 (0.003)	0.006 (0.009)
Number of children in bad health conditions	-0.009 (0.007)	0.001 (0.005)	0.001 (0.002)	0.003 (0.003)	0.004 (0.010)
Presence of more than one couple in the household	0.005 (0.006)	0.007* (0.004)	-0.006*** (0.002)	-0.009*** (0.003)	0.004 (0.008)
Employment ratio: number of workers/family size	0.057*** (0.013)	0.026*** (0.009)	0.001 (0.004)	0.000 (0.006)	-0.084*** (0.018)
Dwelling has no continuous water supply	0.004 (0.005)	-0.003 (0.003)	0.001 (0.001)	0.005** (0.002)	-0.008 (0.007)
Household lives in a rural area	-0.016*** (0.006)	-0.002 (0.004)	-0.004** (0.002)	-0.011*** (0.003)	0.033*** (0.008)

Note: Standard errors in parenthesis.

Table 5: Income and price elasticities

Income	Protein food	Clothing	Alcohol-tobacco	Other goods	Other food
Male	1.055 (0.026)	1.022 (0.031)	0.967 (0.067)	0.559 (0.050)	1.019 (0.009)
Female	1.216 (0.025)	1.300 (0.032)	1.231 (0.064)	0.775 (0.051)	0.905 (0.008)
Child	1.038 (0.022)	0.605 (0.028)	0.776 (0.063)	1.526 (0.036)	1.029 (0.008)
Uncompensated	Protein food	Clothing	Alcohol-tobacco	Other goods	Other food
Protein food	-0.956 (0.019)	-0.249 (0.013)	-0.044 (0.006)	-0.079 (0.009)	0.017 (0.012)
Clothing	-0.159 (0.017)	-0.538 (0.020)	-0.085 (0.008)	-0.065 (0.011)	-0.081 (0.014)
Alcohol-tobacco	-0.158 (0.043)	-0.471 (0.042)	-0.137 (0.089)	-0.140 (0.028)	-0.069 (0.030)
Other goods	-0.056 (0.031)	-0.140 (0.028)	-0.066 (0.014)	-0.486 (0.029)	-0.113 (0.021)
Other food	0.028 (0.004)	0.004 (0.003)	-0.001 (0.002)	-0.005 (0.002)	-0.978 (0.005)
Compensated	Protein food	Clothing	Alcohol-tobacco	Other goods	Other food
Protein food	-0.789 (0.031)	-0.082 (0.024)	0.123 (0.017)	0.088 (0.020)	0.184 (0.023)
Clothing	-0.049 (0.028)	-0.428 (0.030)	0.025 (0.018)	0.045 (0.021)	0.029 (0.025)
Alcohol-tobacco	-0.145 (0.045)	-0.457 (0.045)	-0.123 (0.092)	-0.127 (0.030)	-0.055 (0.033)
Other goods	-0.007 (0.038)	-0.091 (0.035)	-0.017 (0.020)	-0.437 (0.036)	-0.064 (0.028)
Other food	0.670 (0.020)	0.646 (0.019)	0.641 (0.018)	0.637 (0.019)	-0.337 (0.021)

Note: Standard deviation in parenthesis.

Table 6: Sharing Rule Parameters in $m_k(\mathbf{z})$

	Male	Female	Child
Parents education difference (wife - husband)	-0.129*** (0.032)	0.114*** (0.029)	0.015 (0.017)
Children under 15 working (community)	0.084*** (0.026)	-0.128*** (0.024)	0.044*** (0.014)
Proportion of female children	0.150* (0.090)	-0.248*** (0.082)	0.098** (0.043)
Parents age difference (wife - husband)	-1.569*** (0.287)	1.330*** (0.268)	0.240 (0.187)
Parents age difference squared	-0.772*** (0.146)	0.629*** (0.135)	0.143 (0.094)

Note: Standard errors in parenthesis.

Table 7: Estimated resource share: descriptive statistics

Variable	Mean	Std. dev.	Min	Max
$\ln y$	9.401	0.487	7.771	11.543
$\ln \phi^m$	3.511	0.462	1.291	6.328
$\ln \phi^f$	2.514	0.453	0.300	5.842
$\ln \phi^c$	3.395	0.582	1.948	8.512
$\ln m^m(\cdot)$	0.493	0.233	-0.552	1.421
$\ln m^f(\cdot)$	-0.573	0.261	-1.572	0.271
$\ln m^c(\cdot)$	0.081	0.084	-0.113	0.410
$s^m = \ln \phi^m / \ln y$	0.373	0.046	0.124	0.595
$s^f = \ln \phi^f / \ln y$	0.267	0.045	0.029	0.603
$s^c = \ln \phi^c / \ln y$	0.360	0.056	0.201	0.816
σ_m	0.320	0.037	0.086	0.544
σ_f	0.328	0.037	0.091	0.660
σ_c	0.352	0.056	0.158	0.819

Table 8: Endogenous binary treatment estimation - treatment regressions (being left behind).

Variables	Male		Female		Child	
Constant	-1.328***	(0.234)	-1.323***	(0.241)	-1.222***	(0.213)
Community share of families with members abroad continuatively for a year since 1997	1.951***	(0.410)	2.344***	(0.512)	1.253***	(0.326)
District share of migrants leaving behind families since 1990	0.560***	(0.196)	0.456*	(0.256)	0.568***	(0.170)
Number of associations providing community services	-0.046***	(0.016)	-0.029	(0.019)	-0.051***	(0.012)
Presence of more than one couple in the household	0.470***	(0.104)	0.504***	(0.109)	0.334***	(0.090)
Distance from services (in minutes by walk)	-0.008**	(0.004)	-0.006	(0.005)	-0.009***	(0.003)
Household lives in the costal area	-0.007	(0.184)	-0.040	(0.188)	-0.051	(0.168)
Household lives in the central area	0.058	(0.183)	-0.010	(0.179)	0.086	(0.163)
Household lives in the mountain area	-0.140	(0.191)	-0.277	(0.184)	-0.006	(0.166)
Education of the household head	-0.116***	(0.040)	-0.128***	(0.047)	-0.094***	(0.034)
Education of the spouse	-0.236***	(0.074)	-0.252***	(0.081)	-0.152***	(0.045)
ρ	0.635***	(0.073)	-0.265	(0.269)	-0.840***	(0.033)
σ	0.036***	(0.001)	0.035***	(0.002)	0.055***	(0.003)

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Endogenous binary treatment estimation - outcome regressions (resource shares).

Variables	Male		Female		Child	
Constant	0.353***	(0.007)	0.337***	(0.007)	0.311***	(0.010)
Distribution factors						
Parents education difference (wife - husband)	-0.013***	(0.001)	0.011***	(0.001)	0.003	(0.002)
Children under 15 working (community)	0.008***	(0.001)	-0.012***	(0.001)	0.004***	(0.001)
Parents age difference (wife - husband)	-0.168***	(0.009)	0.152***	(0.010)	0.014	(0.012)
Parents age difference squared	-0.083***	(0.004)	0.074***	(0.005)	0.008	(0.006)
Household characteristics						
Household head is young (< 35)	-0.002	(0.002)	0.001	(0.003)	-0.000	(0.003)
Household lives in a rural area	0.004*	(0.002)	0.003*	(0.002)	-0.007**	(0.003)
Household lives in the costal area	-0.008**	(0.004)	0.001	(0.003)	0.007	(0.005)
Household lives in the central area	-0.002	(0.004)	0.003	(0.003)	-0.001	(0.005)
Household lives in the mountain area	0.001	(0.004)	0.004	(0.003)	-0.003	(0.005)
Education of the household head	-0.003***	(0.001)	-0.000	(0.001)	0.004***	(0.001)
Education of the spouse	0.000	(0.001)	0.002	(0.001)	-0.001	(0.002)
Average age of children	-0.002***	(0.000)	-0.002***	(0.000)	0.004***	(0.001)
Number of children under 5	0.003**	(0.001)	0.004**	(0.002)	-0.008***	(0.002)
Number of primary school children (6-11)	0.003***	(0.001)	0.002**	(0.001)	-0.005***	(0.002)
Number of disable working-age members	0.001	(0.002)	-0.002	(0.002)	0.001	(0.003)
Number of elderly (>65)	0.001	(0.002)	0.003	(0.002)	-0.003	(0.002)
Number of male adults	-0.008***	(0.002)	0.002	(0.002)	0.006**	(0.003)
Number of female adults	-0.002	(0.002)	-0.012***	(0.002)	0.011***	(0.003)
Migration variables						
Proportion of remittances on consumption	-0.006	(0.009)	0.014	(0.011)	-0.016*	(0.009)
Proportion of female children	0.016***	(0.003)	-0.026***	(0.003)	0.011***	(0.004)
x left behind	0.009	(0.007)	-0.032***	(0.009)	0.024**	(0.010)
Female head of the household	-0.005	(0.006)	0.003	(0.008)	0.004	(0.008)
x left behind	-0.023***	(0.006)	-0.005	(0.008)	0.030***	(0.008)
Left behind	-0.039***	(0.008)	0.020	(0.020)	0.080***	(0.009)
ATE[1] of being left behind	-0.044***	(0.007)	0.017	(0.020)	0.089***	(0.008)
ATET[1] of being left behind	-0.051***	(0.007)	0.014	(0.019)	0.098***	(0.009)

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

1. ATE and ATET stand for Average Treatment Effect and Average Treatment Effect on the Treated respectively.

Figure 1: Sharing rule of child, female and male