Child Welfare in Albania Using a Collective Approach*

Lucia Mangiavacchi † Federico Perali ‡ Luca Piccoli §

October 17, 2012

Abstract

This study contributes to the literature on child poverty by estimating the rule governing the distribution of resources within the household describing how resources are shared by the mother, the father and their children. This information permits deriving children's own preferences and their levels of well-being. We can then overcome the traditional definition of poverty as the percentage of families with children below the poverty line in favor of a direct measure of the percentage of children below the poverty line. This task cannot be accomplished within the standard framework of unitary models of the household. The application explores the black box of Albanian's families by estimating a collective consumption model and the resource sharing rule to understand the role played by intra-household inequality for child welfare in Albania and the effects of family policies on the well-being of Albanian children. The results show that child poverty differs substantially if measured according to the traditional procedure and the direct method proposed here and the Gini coefficient increases by nearly 10 percentage points when accounting for intra-household inequality.

Keywords Child welfare, intra-household inequality, collective models, smultiple haring rule, Albania do
JEL Classification D13 H31 I32 O15

*The authors thank Arnab K. Basu, Tindara Addabbo, Gianna Claudia Giannelli and Maria Sassi for their useful comments and suggestions.

†Microsimula (Paris School of Economics) and Department of Applied Economics (University of Balearic Islands), lucia.mangiavacchi@uib.es

‡Dipartimento di Scienze Economiche, Università degli Studi di Verona, federico.perali@univr.it

§Microsimula (Paris School of Economics) and Department of Applied Economics (University of Balearic Islands), piccoli@pse.ens.fr

1 Introduction

One of the main priorities of a modern society is to care effectively about its more vulnerable members. Children are not only vulnerable but represent also the stock of human wealth on which society builds its future. The returns of the investment in child development depend upon the quality of the care. In a context where public resources are scarce, society's welfare is maximized if the investment is targeted to the children who are most in need so that making their access to resources more equal would enhance the chances to make disadvantaged children enjoy similar opportunities that more affluent children may do. The aim of this study is to contribute to the literature on children's welfare evaluation by directly estimating children's well-being.

This task cannot be accomplished within the standard framework of a unitary household model. The unitary family is a black-box within which individual consumption decisions and resource allocation processes are unknown. For example, one may assume that the household head makes all the relevant decisions, including child consumption, as if decisions were optimal for the welfare of all household members. Such an assumption would imply that a sufficient measure of the household members' welfare is per-capita income associated with an equal sharing of resources.

Equivalence scales partially deal with this aspect by assigning to each household member a weight. However, equivalence scales are approariate for inter-household comparisons, but inadequate to perform inter-personal comparisons (Sydenstricker and King, 1921; Pollak and Wales, 1981); (Browning, 1992); Ebert and Moyes (2003, 2009) and to account for inequality differences across households. These aspects are particularly relevant in the developing world where highly variable socio-economic conditions may strongly influence intra-household inequality. In developing countries, where the amount of resources is often meager, the welfare consequences caused by an unfair intra-household distribution may be relatively large. The collective approach introduced by Chiappori (1988, 1992), on the other hand, identifies the rule governing the distribution of resources determining intra-household inequality and permits recovering the structure of preferences and the welfare functions of each household member. Children, in collective context, are not considered as public goods for parents but have their own identity. Alderman et al. (1995) claim that collective models should be standard practice, while the use of unitary models should be limited to special cases where the collective approach may not be applicable.

Most applications of the collective household theory estimate the sharing rule between husband and wife. Few are the studies estimating how household resources are shared between adults and children (Arias, Atella, Perali, 2003; Bargain and Donni (2007);Lewbel, Pendakur, and ... (Malawi paper)). This study shares with the latter one the extra difficulty of estimating how resources are allocated both between parents and between parents and children. The two researches differ in terms of the information used to identify the rule. Lewbel et al. (2011) exploit information about household technologies, while, in our case, in the tradition of collective models, we base our identification strategy on the observation of goods assignable to each household member such as clothing for male, female and children. The identification of the sharing rule between parents and children and of their levels of well-being also permits the evaluation of the impact of public policies on child poverty and inequality. This is especially relevant for developing countries where a correct targeting of anti-poverty policies is crucial to effectively use the scarce resources available to public authorities (Haddad and Kanbur, 1992; Behrman, 1994; Phipps and Burton, 1996; Peluso and Trannoy, 2007; Bingley and Walker, 2007).

Several studies on child poverty in developing countries pay attention to intra-household resource allocation and child welfare (Kanbur, 1991; Inchauste, 2001; Kebede, 2004; Sahn and Gerstle, 2004; Namoro and Roushdy, 2009). However very few studies on developing countries have estimated collective consumption models aiming at estimating directly children's deprivation (Lewbel, Pendakur, et ... 2011). Data requirements for these models are usually very demanding and proper data may not be available in developing countries.

We apply the collective consumption model (Browning et al. (1994);Menon et al. (2008) 2011; Menon and Perali 2012) assuming that household decisions are Pareto efficient to identify the sharing rule and the associated individual preferences and welfare levels. From a policy point of view, the ability to open the household black box permits designing public interventions aiming at favouring a more equal distribution within the household and targeted, directly or indirectly, to children with low levels of welfare. The welfare of the household's members can be estimated directly rather than inferred from the household's welfare level: a child can be poor in a rich household and viceversa depending on the distribution of resources. Some members of the household may be relatively more or less poor than others. The traditional measurement of child poverty defines a child as poor if the child belongs to a household whose income is below the poverty line assumes erroneously that resources are allocated equally within the family. In a public policy perspective, a comprehensive normative analysis of the implications of this class of models is still far from being complete.

Following the pioneering article of Bourguignon (1999), which shows the importance of using collective models to analyze the cost of children and explains how to derive the sharing rule between parents and children, other authors followed the intuition of using collective models to analyze individual poverty and intra-household inequality (Arias, Atella, and Perali 2003,(Cherchye et al., 2008; Jeremy and Shannon, 2007), Lewbel, Pendakur 2011). This study uses the World Bank Living Standard Measurement Survey collected in Albania in 2002 with only children under five to estimate child welfare and the difference in child welfare distribution with respect to

the per-capita distribution. We also test whether receiving public transfers could induce a modification of the sharing rule.

Albania is a particularly interesting setting to study the welfare of children and its relation with household decision processes. This country has been largely affected by the transition to a market economy at the beginning of 1990 with the children becoming one of the most vulnerable groups suffering severe poverty and malnutrition problems. In spite of the fact that Albania is the youngest country in Europe, with the highest percentage of people under eighteen (UNICEF, 2009), the social protection system does not sufficiently assist children. The social protection system established during the communist period has been progressively deteriorated from the transition to a market economy. The traditional Albanian household acquired renewed relevance after the fall of the communist regime. At the end of the Second World War, Albania was a traditional rural society with patriarchal family values. In mountain and rural areas the entire social and economic structure was governed by the *Kanun* of Lek Dukagjini, a set of traditional and unwritten laws, based on patriarchy and handed down from generation to generation since the Middle Ages. This set of laws gave males unquestioned authority within the household (Gjonca et al., 2008). During the isolationist Communist regime the educational policies targeted on females changed the patriarchal household. However, the family maintained a central position in the society. With the regime's fall in the 1990s and the following rise of uncertainty, the country set back to a traditional family structure, even if large migration flows out of the country have added a new dimension to the phenomenon, especially in the rural areas (Danaj et al., 2005; Gjonca et al., 2008). Major problems are suffered by the early childhood since the importance of children's preschool years is not widely understood in the country, especially in poor areas of the north (UNICEF, 2004). The supply of public child care services is very poor and no safety nets measures targeted to households with young children exist. At the moment, the family is still the only institution able to protect vulnerable children. In such a context, it is important to look inside the household and study the relation between adulthood and childhood in terms of welfare allocation. When designing family policies, for instance, the possibility of identifying how resources are shared among household's members can be important to define eligibility rules, benefits schemes or to rank individuals in terms of equality. It has been shown that the impact of cash transfers on poverty among children depends on the response of the household (Alderman et al., 1995). On the other hand, there is a growing evidence that the identity of the recipient of a cash transfer does matter in terms of outcomes (Alderman et al., 1995; Duflo, 2000). Thus a social planner aiming to reduce child poverty through cash transfers should implement policy designs that ensure that cash transfers targeting poor children result in improvements in children's welfare, and/or investment in their human capital. A transfer to a household where resources are distributed unequally may never reach the excluded child.

2 The theoretical framework

Unitary models of consumption are derived via maximization of household utility, which depends on consumed quantities of some market goods, subject to a budget constraint. Consumption of individuals is not modeled and income pooling is assumed. The collective model, firstly introduced by Chiappori (1988, 1992), extends the unitary framework to recover individual preferences introducing a function, the "sharing rule", which determines the proportion of household resources devoted to each household member.

As a consequence, in order to properly estimate a collective model, the crucial point regards the estimation of the sharing rule, and in particular its econometric identification. Available cross-sectional datasets are usually collected at the household level, hence, in general, it is not possible to recover individual preferences. In such a context, the sharing rule is not identified. However, the additional information needed to identify the sharing rule is not much and is usually available to the researchers. In practice, it is sufficient to observe private consumption of at least one market good (Bourguignon, 1999; Bourguignon et al., 2009; Chiappori and Ekeland, 2006, 2009)[1].

There are mainly three empirical approaches for the identification of the sharing rule. The first approach is proposed by Chiappori (1992) and several successive works, and consists in assuming that leisure time is an exclusive good that a member of the household consumes when not working. Observing leisure time of each member and evaluating it at some market (potential) wage, it is possible to identify the sharing rule by means of a labor supply model. This approach is by construction not feasible if one is looking for the sharing rule among adults ad children since children do not work and, more importantly, do not have any (potential) wage.

The second approach proposed by Browning et al. (2006) assumes that there is no change in preferences when passing from single to married. Using available information on singles one can estimate individual preferences. These preferences are applied directly to each member of the couple, recovering the sharing rule by "difference". Again this approach is not applicable to the case of children (not to mention that it is subject to a strong behavioral assumption).

[1] If private consumption of one good is observed, and there are no externalities, for a given observed demand $x(\mathbf{p}, y)$ satisfying the Collective Slutsky property and such that the Jacobian $\partial x(\mathbf{p}, y)/\partial \mathbf{p}$ is invertible, then the sharing rule is identified.

The third approach for the identification of the sharing rule, consists in using available information on consumption of exclusive or assignable goods. If the survey records at least one expenditure category which can be exclusively assigned to just one member of the household, then it is possible to identify the sharing rule. This method shares its theoretical foundation with the first approach, but uses a different source of identification, individual consumption rather than leisure time, within a different framework, consumption demand rather than labor supply (Browning et al., 1994).

The choice of the proper approach depends on the available data and on the purposes of the analysis. In this article, since the focus is on measuring children's welfare, the third approach is the only applicable for the reasons explained above. The expenditure dataset used in this article provides information on several exclusive goods, child clothing, adult clothing, child shoes, adult shoes, education (assigned to children), alcohol and tobacco (assigned to adults).

We assume 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 assigned to a specific member of the family.

In our set up, the household of is composed by two adults 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 $i = 1, ..., n$. 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. 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, but they are observed at the household level.[2] 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 $\mathbf{d}_{123}$.

As in Menon et al. (2008) we assume caring preferences, with utility level of the individuals may depend on the utility of the other members.

$$U^k(\mathbf{c}^1, \mathbf{c}^2, \mathbf{c}^3, \mathbf{q}^1, \mathbf{q}^{2,\mathbf{q}^3}; \mathbf{d}) \quad = \quad W^k(u^1(\mathbf{c}^1, \mathbf{q}^1; \mathbf{d}), u^2(\mathbf{c}^2, \mathbf{q}^2; \mathbf{d}), u^3(\mathbf{c}^3, \mathbf{q}^3; \mathbf{d})) \tag{1}$$

for $k = 1, 2, 3$, where U^k is a monotonically increasing function in both arguments aggregating the preferences of all members. The individual sub-utility functions u^k are assumed to be continuous, twice differentiable, quasi-concave in all their arguments and increasing in $\mathbf{c}^k$ and $\mathbf{q}^k$.

Following Menon et al. (2008), the family decision problem can be decentralized into 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 in a consumption model it must be greater than zero $\phi_k > 0$ because the level of expenditure for each family member cannot be zero or negative. Then, in the second stage each member chooses her/his own optimal consumption bundle maximizing her/his utility function given her/his budget constraint.

Formally, in the primal representation of the decentralized program, each family member maximizes her own utility function

$$\max_{\mathbf{c}^k, \mathbf{q}^k} \qquad u^k(\mathbf{c}^k, \mathbf{q}^k; \mathbf{d}) \tag{2}$$

subject to her own budget constraint

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

[2] We recognize that it would be possible to derive shadow prices at the individual level using, for example, a Barten (1964) scaling transformation. We do not do so here because our main source of identification is an income rather than a price effect. In order to recover the underlying structure of the collective model, that is the sharing rule function and the system of demand equations, we use the available information about the private consumption of *** clothing and alcohol ***. 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 heavy drinker may spend less on female or child goods. Our empirical identification strategy intends to capture these income reallocation effects.

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

$$\begin{aligned} \hat{\mathbf{q}}^k &= \mathbf{q}^k\left(\mathbf{p_c}, \mathbf{p_{q^k}}, \phi_k, \mathbf{d}\right), \\ \hat{\mathbf{c}}^k &= \mathbf{c}^k\left(\mathbf{p_c}, \mathbf{p_{q^k}}, \phi_k, \mathbf{d}\right), \end{aligned} \tag{3}$$

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

$$\begin{aligned} \hat{\mathbf{q}}\left(\mathbf{p_c}, \mathbf{p_{q^1}}, \mathbf{p_{q^2}}, \mathbf{p_{q^3}}, y, \mathbf{d}\right) &= \mathbf{q}^1\left(\mathbf{p_c}, \mathbf{p_{q^1}}, \phi_1, \mathbf{d}\right) + \mathbf{q}^2\left(\mathbf{p_c}, \mathbf{p_{q^2}}, \phi_2, \mathbf{d}\right) + \mathbf{q}^3\left(\mathbf{p_c}, \mathbf{p_{q^3}}, \phi_3, \mathbf{d}\right), \\ \hat{\mathbf{c}}\left(\mathbf{p_c}, \mathbf{p_{q^1}}, \mathbf{p_{q^2}}, \mathbf{p_{q^3}}, y, \mathbf{d}\right) &= \mathbf{c}^1\left(\mathbf{p_c}, \mathbf{p_{q^1}}, \phi_1, \mathbf{d}\right) + \mathbf{c}^2\left(\mathbf{p_c}, \mathbf{p_{q^2}}, \phi_2, \mathbf{d}\right) + \mathbf{c}^3\left(\mathbf{p_c}, \mathbf{p_{q^3}}, \phi_3, \mathbf{d}\right), \end{aligned} \tag{4}$$

with $\phi_3 = y - \phi_1 - \phi_2$.

In the next section the demand system is specified and a theoretical proof of the identification of the sharing rule is provided.

3 Model specification and identification of the sharing rule

Our specification of collective demand system start from the well known quadratic Almost Ideal Demand System (Deaton and Muellbauer, 1980; Banks et al., 1997), extended with demographic modifications *a la* Gorman (Gorman, 1976).

Budget shares equations for this system a

$$\begin{aligned} w_i(y, \mathbf{p}, \mathbf{d}; \theta_i) = \alpha_i + t_i(\mathbf{d}) + \sum\nolimits_j \gamma_{ji} \ln p_j + \beta_i \left(\ln y^* - \ln a(\mathbf{p})\right) \\ + \frac{\lambda_i}{b(\mathbf{p})} \left(\ln y^* - \ln a(\mathbf{p})\right)^2, \end{aligned} \tag{5}$$

where $w_i(y, \mathbf{p}; \theta_i)$ is the good i budget share, $\theta_i = \{\alpha_i, \gamma_{ij}, \beta_i, \lambda_i\}$ are parameters, p_j is price of good j and y is total expenditure. $a(\mathbf{p})$ and $b(\mathbf{p})$ are two price indexes, defined as

$$\ln a(\mathbf{p}) = \alpha_0 + \sum\nolimits_i \alpha_i \ln p_i + \frac{1}{2} \sum\nolimits_i \sum\nolimits_j \gamma_{ij} \ln p_i \ln p_j \tag{6}$$

$$b(\mathbf{p}) = \prod\nolimits_i p_i^{\beta_i}. \tag{7}$$

and the demographic modification is introduced through

$$t_i(\mathbf{d}) = \sum\nolimits_r \tau_{ir} d_r, \tag{8}$$

$$\ln y^* = \ln y - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i, \tag{9}$$

where $t_i(y, \mathbf{d})$ is the income translating function and $\mathbf{d}$ is a vector of demographic variables or household characteristics.

In order to comply with homogeneity properties of the demand system, this specification of the budget shares demand system is subject to a number of restrictions on the parameters. In particular, to satisfy linear homogeneity in $\mathbf{p}$ and Slutsky symmetry the following restrictions must hold

$$\sum\nolimits_i \alpha_i = 1; \quad \sum\nolimits_i \beta_i = 0; \quad \sum\nolimits_i \lambda_i = 0; \quad \sum\nolimits_i \gamma_{ij} = 0; \quad \sum\nolimits_j \gamma_{ij} = 0; \quad \gamma_{ij} = \gamma_{ji}, \tag{10}$$

while, as proven in Perali (2003), to ensure that the modified cost function maintains the homogeneity property, demographic parameters must satisfy

$$\sum\nolimits_i \tau_{ir} = 0. \tag{11}$$

To next step to obtain the collective QAIDS introducing the sharing rule. The maximization problem in (**??**) states that the sharing rule determines (the natural logarithm of) the amount of resources that each household member receives. Being the decision process individual rather than centralized, each member decides how to allocate his share of total expenditure according to

$$\begin{aligned} w_i^k(y, \mathbf{d}, \mathbf{p}; \theta_\mathbf{i}) = \alpha_i^k + t_i^k(\mathbf{d}) + \sum\nolimits_j \gamma_{ji}^k \ln p_j + \beta_i^k \left(\ln y^{k*} - \ln a(\mathbf{p})\right) \\ + \frac{\lambda_i^k}{b^k(\mathbf{p})} \left(\ln y^{k*} - \ln a(\mathbf{p})\right)^2; \quad k = a, c. \end{aligned} \tag{12}$$

Note that, as stated before, the individual demand equations can be summed to form the household demand equation. In this equation some individual parameters cannot be identified either because of collinearity - for example two constants in the same equations can not be identified - or because of data construction. For instance prices and some demographic characteristics are recorded at household level and are the same for all household members. Hence, summing up the demand equations for the male, female and the child results in

$$\begin{aligned} w_i(y, \mathbf{d}, \mathbf{p}; \theta_{\mathbf{i}}) = \alpha_i + t_i(\mathbf{d}) + \sum\nolimits_j \gamma_{ji} \ln p_j \\ + \beta_i^1 \left(\ln y^{1*} - \ln a(\mathbf{p})\right) + \frac{\lambda_i^1}{b^1(\mathbf{p})} \left(\ln y^{1*} - \ln a(\mathbf{p})\right)^2 \\ + \beta_i^2 \left(\ln y^{2*} - \ln a(\mathbf{p})\right) + \frac{\lambda_i^2}{b^2(\mathbf{p})} \left(\ln y^{2*} - \ln a(\mathbf{p})\right)^2 . \\ + \beta_i^3 \left(\ln y^{3*} - \ln a(\mathbf{p})\right) + \frac{\lambda_i^3}{b^3(\mathbf{p})} \left(\ln y^{3*} - \ln a(\mathbf{p})\right)^2 . \end{aligned} \tag{13}$$

Household expenditure has been divided into the adult and the child expenditure. In particular, in equation (13), $\ln y^{k*}$ are defined as

$$\ln y^{k*} = \ln \phi^k(p^1, p^2, p^3; y; \mathbf{s}) - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i, \tag{14}$$

where $\ln \phi^k(p^1, p^2, p^3; y; \mathbf{s})$ is the sharing rule of the k^{th} household member, p^1, p^2 and p^3 are the prices of the exclusive goods, and $\mathbf{s}$ is a set of household/environmental characteristics which is likely to influence the intra household resource distribution but not the overall household demand (the literature often refers to $\mathbf{s}$ as "distribution factors").

Note that in general the resource allocation decision process may be dependent on households or individual characteristics. In fact, households with comparable levels of income and prices may have different sharing rules, which may depend on several factors, as the social background, education of the adults and so on. To take into account this heterogeneity, the sharing rule is defined as a function of observed individual expenditure y^k, price of the exclusive goods p^k and a vector of other exogenous characteristics $\mathbf{s}$, in analogy with Barten's scaling, so that a demographically scaled income is obtained, i.e.

$$\phi^k(p^1, p^2, p^3; y; \mathbf{s}) = y^k \cdot m^k(p^1, p^2, p^3; \mathbf{s}), \tag{15}$$

which in natural logarithms becomes

$$\ln \phi^k(p^1, p^2, p^3; y; \mathbf{s}) = \ln y^k + \ln m^k(p^1, p^2, p^2; \mathbf{s}). \tag{16}$$

In equation (16), $m^k(p^a, p^c; \mathbf{s})$ is an individual income scaling function, defined over individual prices and a set of distribution factors $\mathbf{s}$.

The identifying assumption in the model is that the portion of income of each member, y^k, can be recovered from observed expenditures on exclusive or assignable goods. In practice, 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 one third[3] of expenditure in ordinary goods $\mathbf{p}'_{\mathbf{q}}\mathbf{q}$. This is equivalent to write

$$\ln y^k = \sigma^k \ln y, \tag{17}$$

where σ_i defined as

$$r^k = \frac{1}{y}\left(\mathbf{p}'_{\mathbf{c}}\mathbf{c}^k + \frac{1}{3}\mathbf{p}'_{\mathbf{q}}\mathbf{q}\right). \tag{18}$$

In the data, however, families may not be composed by just three members - a male adult, a female adult and a child - but more. To make families of different sizes comparable, we use per capita expenditures e^k and o, such that the sharing rule that we estimate should be interpreted as the sharing rule of an "equivalent" household composed by only three members. *** should we modify also the budjet shares and total expenditures??? ***

From equations (16) and (18) it follows that the sharing rules can be written as function of household income, individual prices, distribution factors and the ratio of expenditure in exclusive goods, i.e.

$$\begin{aligned} \ln \phi^1(p^1, p^2, p^3; y; \mathbf{s}) = \sigma^1 \ln y + \ln m^1(p^3, p^2, p^3; \mathbf{s}) \\ \ln \phi^2(p^1, p^2, p^3; y; \mathbf{s}) = \sigma^2 \ln y + \ln m^2(p^2, p^2, p^3; \mathbf{s}). \\ \ln \phi^3(p^1, p^2, p^3; y; \mathbf{s}) = \sigma^3 \ln y + \ln m^3(p^1, p^2, p^3; \mathbf{s}). \end{aligned} \tag{19}$$

[3] ***MP 2012*** proved that this arbitrary, but plausible value, does not influence the identification of the sharing rule. In a certain sense, the $\ln m^k(\cdot)$ function can be thought as an attempt to correct the error introduced in σ_k because of this assumption.

Since by defnition $\ln \phi^a(p^1, p^2, p^3; y; \mathbf{s}) + \ln \phi^2(p^1, p^2, p^3; y; \mathbf{s}) + \ln \phi^3(p^1, p^2, p^3; y; \mathbf{s}) = \ln y$, and, by construction, $\sigma^1 \ln y + \sigma^2 \ln y + \sigma^3 \ln y = \ln y$, given equations (19), the following constraint must hold

$$\ln m^1(p^1, p^2, p^3; \mathbf{s}) + \ln m^2(p^1, p^2, p^3; \mathbf{s}) + \ln m^3(p^1, p^2, p^3; \mathbf{s}) = 0. \tag{20}$$

In analogy to function $t_i(\mathbf{d})$, function $m^k(\cdot)$ is identified provided that there is enough variation in distribution factors $\mathbf{s}$ and prices p^k, and as long as the distribution factors differ from the demographic variables $\mathbf{d}$. The proof is similar to proving that function $t_i(\mathbf{d})$ is identified (Gorman, 1976; Lewbel, 1985).

In the empirical specification the $m(\cdot)$ function is a Cobb-Douglas function, so that the logarithmic specification is linear, that is

$$\ln m(p^1, p^2, p^3; \mathbf{s}) = \phi_1 \ln p^1 + \phi_2 \ln p^2 + \phi_3 \ln p^3 + \phi_4 \ln s_1 + \phi_5 \ln s_2 + ... \tag{21}$$

The resulting model is similar to that proposed by Menon et al. (2008) to analyse couples without children.

The following section describes the empirical strategy implemented to estimate the collective demand system (13).

4 Data and sample selection

The data used in this article are drawn from the World Bank Living Standard Measurement Survey collected in Albania in 2002[4]. These data contain information on household consumption, socio-economic conditions of the household and individual variables related to education, labour market and health. The original sample covers 3,599 households, but only households with children under-five are selected for the analysis. The sample consists of 511 households.

The decision to drop families with children older than five is due to several reasons. First, the focus is on the welfare of young children within the family and the support of public policies for early childhood. Since schooling is mandatory for children aged 6 and more, preschooling represents an in-kind public transfer relevant for child wellbeing[5] and very selective for transition countries[6]. Second, children under-five are not affected by the phenomenon of child labor which can influence children's bargaining power. Since the dataset used does not collect information on child labour, this would represent an unobservable factor for the present study. Third, the sharing rule is estimated for an equivalent household composed by one adult and one child controlling for household composition at the household level. However, the presence of children of very different age would severely affect both the estimate of the sharing rule and of the overall system of consumption demand of goods, posing an identification problem[7] for the sharing rule (Chiappori and Ekeland, 2009)[8].

The estimation of the demand system is conducted over six categories of goods: food, alcohol and tobacco, clothing, meat, housing and other goods[9]. Household-specific prices, or pseudo unit values, of these goods are assigned following the procedure described in the previous section.

As proved in Section 3, the identification of the sharing rule comes from two observed exclusive expenditures. In this dataset, both clothing and footwear are recorded for males, females and children. Moreover, it is sufficiently safe to assume that consumption of alcoholic beverages and tobacco is exclusive to the adults. Expenditure in education, moreover, is assumed to be exclusive to children -only expenditures strictly related to preschool are included. Finally, in order to take into account the number of family members, per-capita individual consumption is introduced among the explanatory variables. In this way, within each household, the individual expenditures equivalent to an hypothetical household composed by one adult and one child are computed.

[4] 2005 data are not used because it was not possible to reconstruct the consumption categories from the row data as needed. This is due to some intermediate datasets which are not included in the available data and cannot be reconstructed from the do files provided by the World Bank.

[5] Empirical studies focusing on developed countries have shown the importance of early childhood programs for skill formation. For example, Heckman and Masterov (2007) show that investing in early childhood programs is a kind of public investment not affected by the equity-efficiency trade off. The authors also focus on social benefits of preschool programs, especially for disadvantaged children. In developing countries, preschool attendance is typically considered important for monitoring children's health and nutrition status, especially in the case of poor children (see the empirical works of Behrman et al., 2004; Alderman et al., 2006). Preschool is like a multidimensional indicator, for example within the context of UNICEF's basic framework of survival, protection, development and participation, preschool attendance in developing countries is relevant for all the domains.

[6] Micklewright (1999) shows that enrolment rates in kindergarten, which is non-compulsory, have dropped sharply during the transition in the Caucasus, Central Asia, South-east Europe and the Western CIS while similar rates have fallen only slightly in Central Europe and the Baltic States. At the end of communist period in Albania preschool enrolment was about 60% (Danaj et al., 2005), in 1992 the rate reached the 34% (UNICEF, 2004) while during the recovery period children attending preschool programs still were only around 45-50% UNICEF (2004, 2009).

[7] For example it is not clear if children above twelve consume child or adult clothing and children between six and twelve attend mandatory school.

[8] We plan to deal with this problem in a future work, aiming at extending the collective model to take into account of resources distribution among males, females and children simultaneously.

[9] To avoid unnecessary complications only non durable goods are considered.

The gender dimension, which has been neglected in the model because of the choice of an adult/child sharing rule[10], is recovered with a dummy variable indicating if females are more than males in the household, a dummy variable indicating the highest level of education of household's head, dummy variables for head's or spouse's chronic illness or disability, variables on family composition (number of children, number of adults and number of elderly), a variable indicating the presence of multiple couples within the household (enlarged families), a subjective declaration about a minimum income necessary to survive, a subjective declaration of socio-economic status, a dummy variable taking "1" if the house is bigger than 100 squared meters, a dummy owning a telephone and a dummy indicating if at least a member has emigrated abroad after the " pyramids crisis" in 1997[11].

The distribution factors **s** chosen to be in the sharing rule are: the price ratio of the two comparable exclusive goods (the price of adult clothing divided by the sum of adult clothing and children clothing), household declaring to belong to religious minorities (other than Muslim or Orthodox)[12] or not religious, chronically illness of the child, both partners employed ("bi-active couple"), age ratio defined as female age divided by the sum of partners' ages, education ratio defined as wife's years of schooling divided by the sum of the couple's years of schooling, *Ndihma Ekonomike* participation, and attending early-childhood programs delivered by the public sector (the variable takes "0" if no child attends preschool in the family, "1" if at least one child currently attends and "2" if all children attend preschool.). These last two variables are introduced to test the possibly different impacts of cash and in-kind transfers. In fact, *Ndihma Ekonomike* is a sort of minimum income cash program, while preschooling can be considered as the most important in-kind transfer from which a child is recipient. As regards the variables used in the first stage probit estimates of the zero correction estimator, **z**, a larger set of variables than **d** is used. A description of this variables is omitted because it is self-explained in Table 1 which reports the estimates of the probit regressions used for the "zero correction".

5 Results

This section presents the results of the two-steps estimation of model (**??**). When zero expenditure are observed for one good in the data, the first step estimates the probability of observing a positive consumption with a probit model, while the second stage uses the predicted Mill's ratios to estimate the demand system with Full Information Maximum Likelihood, imposing a-priori parameters' restrictions.[13]

Table 3 presents the estimates of the collective QAIDS demand system[14]. Income and price parameters are significant, with some exceptions, as income parameter of housing expenditure for the adult and alcohol parameter for the child, which are all non significant[15]. Among demographic variables, the general evidence is towards small parameters values, even if many are still significantly different from zero. In particular the interaction of higher education of the household head with income has a positive influence on consumption of goods, even if more education does not involve more consumption of alcohol and of tobacco. The number of children in the family influences positively the household consumption of clothing and food, as expected, and to live in an enlarged family has a positive effect on the consumption of food. The consumption of alcohol and tobacco is influenced by having members emigrated abroad and by the number of adults in the family. "Other goods" is mostly composed by education and cultural expenditures which are influenced positively by the education of the household head and by the self-reported socio-economic status.

Table **??** shows income and price elasticities. Signs are consistent with consumption theory, with negative own price elasticities. The relevant exception is alcohol and tobacco price elasticities which are positive. These goods may suffer from different effects on the estimate of own price elasticities: first, alcohol and tobacco are not consumed by child but he/she could still influence household consumption in a way that may not be properly captured by the model. Second, Albania has a strong smoking tradition and a huge traditional consumption of made home *raki rrushi*[16] which may bias estimates. Third, alcohol and tobacco are addictive goods, thus their consumption may not be much affected by their market prices.

[10]Indeed, the research focusing on transfers between adults and children should not anyway neglect transfers between husbands and wives (Bourguignon, 1999).

[11]The big financial crisis was due to the follows. Pyramid's (or Ponzi) schemes had been operating since 1992 and in February 1997 they collapsed with a large share of the population's savings. The diffused rebellion, induced by the collusion between pyramid entrepreneurs and the government elected democratically in 1992, ended in a civil disorder and collapse of state power with the south of the country controlled by armed groups. This caused a huge economic recession and massive migrations flows.

[12]The two major religious groups of Albania.

[13]Symmetry and homogeneity are ensured by construction, with the Slutsky matrix having two individual income terms which sum up to the household income effect, because of the symmetry of the individual transfers shown in equation (20).

[14]The parameters of the sharing rule are estimated simultaneously with the demand system, but are report in a separate table. Instead, the estimates of the first stage probit regressions are not reported: they are available upon request.

[15]It is true that alcohol is not consumed by the child but the demand system is estimated at the household level, and it is possible that the presence of children may influence the overall demand, and not only trough the "sharing rule".

[16]Raki rrushi is the Albanian version of the Turkish *raki*. It is a spirit considered to be the national drink by Albanians. It is made using 100% pure grape (*rushi* is the Albanian word for grape and it is so pure that Albanians even use it to heal cuts and scrapes.)

According to their size, clothing and housing are the most elastic good to price changes, while meat and food are the less elastic. As for income elasticities, which could estimated individually. For the adult, the most elastic good is clothing, while, as expected alcohol and tobacco have the smallest elasticity. For the child, the larger elasticity belongs to "other goods", all expected results since this category contains also educational and recreational expenses. From a policy perspective, this is an important result since it means that more resources devoted to children in the household would end in investment in human capital. The less elastic good is alcohol and tobacco, which is around zero. Since the child is under five, it is clear that he/she does not consume this good, so the elasticity should be expected to be null.

To properly interpret the parameters of the sharing rule, it must remembered that $m^a(\cdot) = m(\cdot)$ and $m^c(\cdot) = -m(\cdot)$, hence the estimated parameters refer to the sharing rule of the adult, while the same parameters' values have the opposite effect on the sharing rule of the child. Estimate of the parameters of the sharing function are reported in Table 5. They show that the ratio between the prices of adult and child clothing influences positively the propensity to allocate resources in favour of adults. This suggests that subsiding child specific goods would not have a positive influence on children's welfare because this would increase the price ratio reducing the share of resources of the child. The age differential between female and male (age ratio) influences negatively child welfare: small differences in age between the partners may indicate a balanced couple with more caring for their son/daughter. Even if to receive a monetary support (*Ndihma Economike*) has no influence on child welfare, attending a preschool programs influences the distribution of resources within the family in favour of the child. This evidence seems to favour in-kind benefits rather than cash transfers for the welfare of children, at least from an intra-household perspective. The NE cash transfer has proven to be quite non-effective in alleviating poverty (Mangiavacchi and Verme, 2009) and in supporting child welfare in families with young children, despite the fact that it is the only family allowance program operated in the country. It is possible to conclude that it has an equal negative effect on adult and child being, it is no effective for the household welfare as a whole and for the vulnerable individuals within the household. To add further details to the analysis, figures 1 and 2, show the relative sharing rule, expressed as the ratio between the expenditure for child and total household expenditure ($\phi^c(\cdot)/y$). These pictures are drawn by means of non-parametric regressions of the sharing rule on total household expenditure.

Figure 1 shows that share of child/adult expenditure goes from 21% for poor households to 39% for higher income households. This difference between poor and rich families is mostly driven by urban households, in fact Figure 2 shows that urban children in the richest deciles have the highest share of resources. The socio-economic status influences positively the attitude toward children for households living in the cities. Instead, in rural areas the distribution of resources within the family is constant along the distribution of the household welfare. This could be driven by the scarce development of rural areas in Albania: even if the household is rich, there may not be much to do for children with that money because of the absence of toy-shops, recreational and cultural activity centers, fashion shops.

The estimated value of the "sharing rule" refer to an hypothetical equivalent household composed by two members: one adult and one child. In other words individual consumption of the adult and the child, the source of sharing rule identification, are rescaled to take account number of adults and children in the household. To say something more general about regarding children's welfare and the effects on intra-household inequality, it is necessary to recover the real individual expenditure of each child in the family, given the "sharing rule" that has been estimated.

In order to have proper measure of individual child welfare the following equation, which rescales back the "sharing rule" to obtain the true values of individual consumption taking into account the real household composition, since the "sharing rule" is estimated on an one adult/one child equivalent household:

$$S_c = \frac{\rho^c}{n_c\rho^c + n_a(1-\rho^c)}\, y \tag{22}$$

where ρ^c is the estimated child's relative "sharing rule", computed as ϕ^c/y, n_c and n_a are the number of children and of adults in the household. The resulting value is the actual share of total expenditure of each child and can be used to perform poverty and inequality analyses of child welfare. In other words this is a sort of household specific equivalence scale, where the scales not only depend on household composition and/or characteristics, but also on intra-household resource distribution.

The following analysis focused on child welfare, ignoring what happens to adults. Moreover the sample is compose only by children under five, hence the results are very specific to this group of study and cannot be generalized to all Albanian children. A more general analysis with gender differentiation and a proper modeling of children of different ages is planned in a future work.

Figure 3 shows the distribution of child welfare using the estimated share of children's consumption (continuous line) and the per-capita consumption measure (dashed line), computed assuming an equal distribution among household's members. The kernel density distribution reveals that child welfare is distributed more unequally if also intra-household allocation is considered and that the average level of child consumption is lower.

The plotted Cumulative Distribution Functions of individual consumption shares and per-capita consumption show that taking into account intra-household inequality, child consumption is smaller both on average and along the whole distribution. Just to give a crude number, inequality in child consumption measured by the Gini index shifts from a 0.286 computed using per-capita consumption to a 0.382 computed using the "sharing rule". Intra-household inequality accounts for almost ten percentage points of the Gini index for children under five in Albania. The estimated "sharing rule" exploit the information on expenditure for children within the household. This procedure improves a simple per-capita index where an equal distribution of expenditure among household's members is assured.

Turning to policy issues, economists have traditionally been skeptical about in-kind income support policy measures, viewing cash transfers as superior in terms of recipients' utility, since unitary models assume that the resources within the household are allocated optimally according to individual needs. From the estimated "sharing rule" (Table 5), instead, shows that family allowances have no effects in the proportion of resources allocated to young children while preschool participation (an in-kind transfer) has a positive impact.

To explore further the effects of public transfers on children's welfare, figure 4 shows the children "sharing rule" ρ^c of two groups of families: one with no child attending preschool and the other with at least one child currently attending preschool. The "sharing rule" of attending children is nearly constant along the consumption distribution and close to 0.4. On the other hand, the "sharing rule" for non-attending children U shaped, where the lowest and highest income families seem to take more care for their children. The difference in the two "sharing rules" is significant along the whole income distribution, in line with the correspondent "sharing rule" parameter.

As to the effects on intra-household inequality of public cash transfers, Figure 5 shows that the poor household, well targeted and effectively in needs of a minimum income, do not show a significantly different behaviour whether they receive or not the benefit. Nonetheless, it seems that the share of aid that would go to the child is rather low, around 0.2. On the other hand, the "leakage" households (that is those households that are not poor but beneficiary) behave more egoistically toward their children with respect to similar households not receiving the benefit. These results show once again the negative effects of bad targeting on the program's effectiveness if one considers behavioural responses.

These considerations on cash transfers are partial, both because the reference sample is not representative of the whole Albanian population and because the analysis is subject to further improvements manly to take into account gender inequality in the estimation of the demand system. However, the use of collective models for welfare analysis is superior simply because there are too many aspects that with an unitary approach cannot be taken into account.

6 Concluding remarks

This article applies the collective framework to the measurement of intra-household inequality to study child welfare in Albania. Albanian households have been deeply affected by the transition to a market economy from a regime that revolutionized the previous patriarchal tradition. The effect of the transition seems to be that of bringing back those traditional values, with a marginal role for women and negligence toward childhood, especially in rural area. At the same time, the household structure is changing deeply since migration has affected strongly family's equilibria. To open the family's black-box in this case is highly relevant to study individual welfare and evaluate the impact of public policies on the intra-household distribution of resources. The analysis is conducted on Albanian households with children under five, using consumption variables present in the Albanian Living Standard Measurement Survey.

Is has been shown that intra-household inequality measured on the share of expenditure plays an important role in determining child welfare. The Gini index for children increases when child welfare is computed using the "sharing rule" method versus the per-capita income method. It has also been tested whether receiving public transfers induces a modification of the "sharing rule" with respect to similar households who do not receive benefit from these transfers. A distinction has been made between cash transfers and in-kind transfers, the latter been represented by preschool attendance (which is paid by the government). In-kind transfers are likely to improve the condition of children within the household for all income level. On the other hand, means testing cash transfers do not seem to ameliorate the relative position of children within the household, while if cash transfers go to non poor families intra-household inequality between adults and children may worsen. This finding suggests that if properly conceived, in-kind transfers can be effective, both because well targeted and because they fulfil precise needs. Attending preschool for young children is on the contrary a way of increasing share of resources dedicated to children within the family and this finding suggests the goodness of this particular in-kind transfer.

References

Alderman, H., J. Hoddinott, and B. Kinsey (2006) 'Long term consequences of early childhood malnutrition.' *Oxford Economic Papers* 58(3), 450

Alderman, H., P.A. Chiappori, L. Haddad, J. Hoddinott, and R. Kanbur (1995) 'Unitary versus collective models of the household: is it time to shift the burden of proof?' *The World Bank Research Observer* 10(1), 1

Banks, J., R. Blundell, and A. Lewbel (1997) 'Quadratic Engel Curves and Consumer Demand.' *The Review of Economics and Statistics* 79(4), 527–39

Bargain, O., and O. Donni (2007) 'A Theory of Child Targeting.' IZA Discussion Papers 2669, Institute for the Study of Labor (IZA), March

Barten, A. P. (1964) 'Family Composition, Prices and Expenditure Patterns.' In *Econometric Analysis for National Economic Planning: 16th Symposium of the Colston Society,* ed. P. Hart, G. Mills, and J. K. Whitaker (Butterworth)

Behrman, J.R. (1994) 'Intra-family distribution in developing countries.' *The Pakistan Development Review* 33(3), 253–296

Behrman, J.R., Y. Cheng, and P.E. Todd (2004) 'Evaluating preschool programs when length of exposure to the program varies: A nonparametric approach.' *Review of Economics and Statistics* 86(1), 108–132

Bingley, P., and I. Walker (2007) 'There's no such thing as a Free Lunch: Altruistic parents and the response of household food expenditures to nutrition program reforms.' Working Paper Series 200719, Geary Institute, University College Dublin

Bourguignon, F. (1999) 'The Cost of Children: May the Collective Approach to Household Behavior Help?' *Journal of Population Economics* 12, 503–21

Bourguignon, F., M. Browning, and P. A. Chiappori (2009) 'Efficient Intra-Household Allocations and Distribution Factors: Implications and Identification.' *Review of Economic Studies* 76(2), 503–528

Browning, M. (1992) 'Children and household economic behavior.' *Journal of Economic Literature* 30(3), 1434–1475

Browning, M., F. Bourguignon, P.A. Chiappori, and V. Lechene (1994) 'Income and outcomes: a structural model of intrahousehold allocation.' *Journal of Political Economy* pp. 1067–1096

Browning, M., P. Chiappori, and A. Lewbel (2006) 'Estimating Consumption Economies of Scale, Adult Equivalence Scales, and Household Bargaining Power.' Boston College Working Paper WP588, Department of Economics, Boston College

Cherchye, L., B. de Rock, and F. Vermeulen (2008) 'Economic Well-Being and Poverty Among the Elderly: An Analysis Based on a Collective Consumption Model.' Discussion Paper 2008-15, Tilburg University, Center for Economic Research

Chiappori, P. A. (1988) 'Rational Household Labor Supply.' *Econometrica* 56(1), 63–90

_ (1992) 'Collective Labor Supply and Welfare.' *Journal of Political Economy* 100(3), 437–67

Chiappori, P. A., and I. Ekeland (2006) 'The Microeconomics of Group Behavior: General Characterization.' *Journal of Economic Theory* 127(1), 1–26

_ (2009) 'The Microeconomics of Efficient Group Behavior: Identification.' *Econometrica* 77(3), 763–799

Danaj, E., P. Festy, A. Guxho, M. Lika, and E. Zhllima (2005) 'Becoming an adult: challenges and potentials of youth in Albania.' Technical Report, INSTAT

Deaton, A. S., and J. Muellbauer (1980) 'An Almost Ideal Demand System.' *American Economic Review* 70, 321–26

Duflo, E. (2000) 'Child health and household resources in South Africa: Evidence from the Old Age Pension program.' *American Economic Review* pp. 393–398

Ebert, U., and P. Moyes (2003) 'Equivalence Scales Revisited.' *Econometrica* 71, 319–344

_ (2009) 'Household decisions and equivalence scales.' *Journal of Population Economics* 22(4), 1039–1062

Gjonca, A., A. Aassve, and L. Mencarini (2008) 'Trends and patterns, proximate determinants and policies of fertility change: Albania.' *Demographic research* 19(11), 261–292

Gorman, W. M. (1976) 'Tricks with Utility Functions.' In *Proceedings of the 1975 AUTE Conference, Essays in Economic Analysis,* ed. M. J. Artis and A. R. Nobay (Cambridge: Cambridge University Press)

Haddad, L., and R. Kanbur (1992) 'Intrahousehold inequality and the theory of targeting.' *European Economic Review* 36(2-3), 372–378

Heckman, James J., and Dimitriy V. Masterov (2007) 'The Productivity Argument for Investing in Young Children.' *Review of Agricultural Economics* 29(3), 446–493

Inchauste, G. (2001) 'Intrahousehold Allocation of Resources: The Bolivian Family.' Working Paper WP/01/57, IMF

Jeremy, L., and S. Shannon (2007) 'Consumption inequality and intra-household allocations.' IFS Working Papers W07/09, Institute for Fiscal Studies

Kanbur, R. (1991) 'Children and intra-household inequality: a theoretical analysis.' Policy Research Working Paper Series 685, World Bank

Kebede, B. (2004) 'Decomposition of Household Expenditure and Child Welfare in Rural Ethiopia.' Technical Report, EconWPA, Development and Comp Systems

Lewbel, A. (1985) 'A Unified Approach to Incorporating Demograpic or Other Effects Into Demand Systems.' *Review of Economic Studies* 70(1), 1–18

Mangiavacchi, L., and P. Verme (2009) 'Evaluating Pro-poor Transfers When Targeting is Weak: The Albanian Ndihma Ekonomike Program Revisited.' *Department of Economics-University of Florence, Working Papers Series*

Menon, M., F. Perali, and L. Piccoli (2008) 'The passive drinking effect: evidence from Italy.' PSE Working Paper 2008-33, Paris School of Economics

Micklewright, J. (1999) 'Education, inequality and transition.' *Economics of Transition* 7(2), 343–376

Namoro, S., and R. Roushdy (2009) 'Intrahousehold Resource Allocation In Egypt: Women Empowerment And Investment In Children.' *Middle East Development Journal* 1(01), 105–121

Peluso, E., and A. Trannoy (2007) 'Does less inequality among households mean less inequality among individuals?' *Journal of Economic Theory* 133(1), 568–578

Perali, F. (2003) *The Behavioral and Welfare Analysis of Consumption. The Cost of Children, Equity and Poverty in Colombia* (Springer-Verlag)

Phipps, S.A., and P.S. Burton (1996) 'Collective models of family behaviour: implications for economic policy.' *Canadian Public Policy/Analyse de Politiques* 22(2), 129–143

Pollak, R., and T. J. Wales (1981) 'Demographic Variables in Demand Analysis.' *Econometrica* 49(6), 1533–51

Sahn, D.E., and A. Gerstle (2004) 'Child allowances and allocative decisions in Romanian households.' *Applied Economics* 36(14), 1513–1521

Sydenstricker, E., and W.I. King (1921) 'The measurement of the relative economic status of families.' *Quarterly Publications of the American Statistical Association* pp. 842–857

UNICEF (2004) 'Situation Surrounding Early Childhood in the Main Sectors: Analysis and Targets for the Future.' Technical Report, UNICEF Albania

_ (2009) 'Child Well-Being at a Crossroads: Evolving challenges in Central and Eastern Europe and the Commonwealth of Independent States.' Innocenti Social Monitor, UNICEF Innocenti Research Centre

Table 1: Descriptive Statistics of the Variables Used in The Collective Model - Households with Children

	Trunc. %	Mean	Std. Dev	Min	Max
Shares					
Meat	1.99	0.142	0.081	0.000	0.541
Clothing	5.32	0.125	0.100	0.000	0.723
Alcohol-tobacco	42.57	0.016	0.023	0.000	0.244
Others	0	0.098	0.082	0.004	0.678
Food	0	0.619	0.136	0.147	0.989
Observed Resources Shares					
Male	0	0.321	0.038	0.086	0.544
Female	0	0.328	0.039	0.091	0.660
Chile	0	0.352	0.057	0.158	0.819
Total Expenditure And Unit Values					
Total Expenditure		9.458	0.481	7.792	11.571
Meat		5.878	0.668	-0.614	7.170
Clothing		6.945	0.947	3.596	9.412
Alcohol-tobacco		5.318	1.003	1.662	8.741
Others		5.619	0.872	2.439	8.679
Food		2.862	1.336	-1.353	5.854
Demographic Variables					
Female Head Of Household		0.084	-	0.000	1.000
More Females Than Males In The Hh.		0.198	-	0.000	1.000
Head Is Young		0.160	-	0.000	1.000
Head Has Primary Education		0.547	-	0.000	1.000
Headn Has University Education		0.100	-	0.000	1.000
Spouse Is Older		0.071	-	0.000	1.000
Head Has Bad Health		0.217	-	0.000	1.000
N. Child Under 5		0.738	0.817	0.000	5.000
N. Elderly		0.328	-	0.000	1.000
Bi-active Couple		0.133	-	0.000	1.000
Subjective Socio-economic Status		3.590	1.701	1.000	10.000
Small House		0.136	-	0.000	1.000
Big House		0.135	-	0.000	1.000
No Preschool In Community		0.207	-	0	1
No Doctor In Community		0.173	-	0	1
N. Of Telephones		1.759	0.428	1	2
Presence Of Migrated Sending Remmittances		0.189	-	0	1
N. Of Migrations In The Past		0.271	0.642	0	6
No Continuous Water Supply		0.314	-	0	1
Distance From School		13.768	12.480	1	90
Distance From Doctor		20.457	20.136	1	96
Distance From Bus		17.169	18.880	1	99
Presence Of Hospital In Community		0.371	-	0	1
Tirana		0.134	-	0	1
Spouse Had Bad Health		0.254	0.435	0	1
N. Of Adults		2.521	1.009	0	10
Multiple Couples In The Hh.		0.191	-	0	1
N. Workers/Fam Size		0.327	0.196	0	0.875
N Migrations In The Past		0.271	0.642	0	6
N. Of Disables		0.245	-	0	1
Rural		0.507	-	0	1
Christian Religion		0.144	-	0	1
Proportion Of Childern Ill		0.026	-	0	1
Children Sex Ratio (Female)		0.460	-	0	1
Left Behind Now		0.056	-	0	1
Head Is Old		0.111	-	0	1
Children $<$ 15 Working (Comm)		1.536	1.505	0	5
Average Age Of Children		8.074	4.313	0	16

Table 2: Probit Estimates for the Correction of the Zero Expenditure

	Clothing	Alcohol
Female Head Of Household	1.064*** (0.288)	-0.146 (0.190)
More Females Than Males In The Hh.	0.336* (0.196)	-0.415*** (0.109)
Head Is Young	-0.154 (0.123)	-0.114 (0.079)
Head Has Primary Education	0.011 (0.138)	-0.160** (0.081)
Headn Has University Education	-0.218** (0.109)	0.065 (0.063)
Spouse Is Older	0.168 (0.214)	-0.053 (0.106)
Head Has Bad Health	0.030 (0.183)	-0.335*** (0.110)
N. Child Under 5	-0.012 (0.098)	0.127* (0.070)
N. Elderly	0.087 (0.060)	0.017 (0.036)
Bi-active Couple	-0.055 (0.111)	0.316*** (0.069)
Subjective Socio-economic Status	-0.111 (0.150)	0.237** (0.093)
Small House	0.111*** (0.035)	0.092*** (0.019)
Big House	-0.165 (0.127)	0.095 (0.083)
No Preschool In Community	0.089 (0.156)	0.076 (0.085)
No Doctor In Community	0.219 (0.139)	-0.046 (0.083)
N. Of Telephones	0.182 (0.139)	-0.187** (0.088)
Presence Of Migrated Sending Remmittances	0.084 (0.121)	0.050 (0.079)
N. Of Migrations In The Past	-0.286*** (0.111)	-0.171** (0.072)
No Continuous Water Supply	-0.033 (0.081)	-0.045 (0.042)
Distance From School	0.187* (0.102)	0.049 (0.060)
Distance From Doctor	0.006 (0.005)	0.001 (0.003)
Distance From Bus	0.000 (0.004)	-0.002 (0.002)
Presence Of Hospital In Community	0.001 (0.004)	-0.003 (0.002)
Tirana	-0.084 (0.110)	-0.124* (0.069)

Figure 1: Semi-parametric plot of the Child “Sharing Rule" by Total Expenditure - Whole Sample

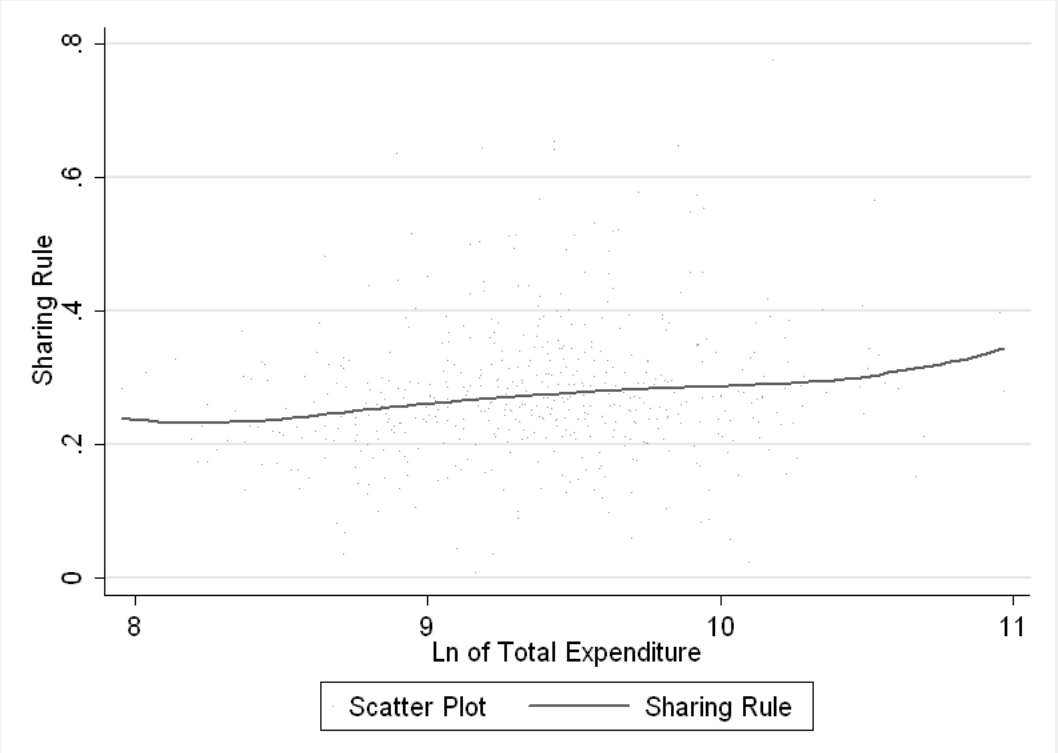

Table 3: Parameters and Demographic Variables of the Collective Demand System

	Meat	Cloth	Alcohol-tobacco	Others	Food
α	0.264*** (0.014)	0.260*** (0.015)	0.091*** (0.009)	0.109*** (0.009)	0.276*** (0.024)
γ	0.028*** (0.003)	-0.009*** (0.002)	-0.002** (0.001)	-0.008*** (0.002)	-0.009** (0.004)
		0.087*** (0.004)	-0.005*** (0.001)	0.006*** (0.002)	-0.079*** (0.005)
			0.024*** (0.001)	-0.003*** (0.001)	-0.014*** (0.002)
				0.055*** (0.002)	-0.050*** (0.004)
					0.152*** (0.008)
β^1	0.030 (0.022)	0.092*** (0.010)	0.012* (0.006)	0.019* (0.010)	-0.153*** (0.027)
β^2	0.018 (0.012)	0.119*** (0.008)	0.027*** (0.005)	0.059*** (0.007)	-0.222*** (0.017)
β^3	0.023** (0.011)	0.059*** (0.007)	-0.006* (0.004)	0.061*** (0.005)	-0.136*** (0.014)
λ^1	0.009 (0.006)	0.030*** (0.003)	0.006*** (0.002)	0.014*** (0.003)	-0.059*** (0.008)
λ^2	-0.004 (0.003)	0.026*** (0.002)	0.007*** (0.001)	0.025*** (0.002)	-0.053*** (0.005)
λ^3	0.006 (0.003)	0.034 (0.002)	0.001 (0.001)	0.014 (0.001)	-0.054 (0.004)
η_i	-	-0.432** (0.169)	-0.043 (0.048)	-	-
Headn Has University Education	0.007 (0.007)	-0.005 (0.005)	0.001 (0.002)	0.010*** (0.003)	-0.012 (0.009)
Head Has Bad Health	0.007 (0.006)	-0.007* (0.004)	-0.002 (0.002)	-0.003 (0.003)	0.006 (0.008)
Spouse Has Bad Health	-0.005 (0.006)	-0.006 (0.004)	0.005** (0.002)	-0.001 (0.003)	0.007 (0.008)
N. Child Under 5	-0.014*** (0.003)	-0.012*** (0.002)	0.000 (0.001)	-0.002 (0.002)	0.028*** (0.004)
N. Adults	0.000 (0.002)	0.006*** (0.002)	0.000 (0.001)	-0.002* (0.001)	-0.003 (0.003)
H. Elderly	0.010* (0.005)	0.010** (0.004)	-0.009*** (0.002)	-0.009*** (0.003)	-0.002 (0.008)
Multiple Couples In The Hh.	0.002 (0.006)	0.004 (0.005)	-0.004** (0.002)	-0.003 (0.003)	0.001 (0.009)
N. Workers/Fam Size	0.016 (0.011)	0.023** (0.009)	0.003 (0.004)	-0.020*** (0.006)	-0.021 (0.016)
Subjective Socio-economic Status	0.010*** (0.001)	-0.006*** (0.001)	-0.004*** (0.001)	0.002*** (0.001)	-0.002 (0.002)
Big House	0.004 (0.006)	-0.010** (0.004)	-0.004** (0.002)	0.002 (0.003)	0.007 (0.008)
Presence Of Migrated Sending Remmittances	-0.001 (0.005)	0.018*** (0.005)	0.008*** (0.002)	-0.008*** (0.003)	-0.017** (0.008)
N. Migrations In The Past	-0.004 (0.003)	0.004* (0.002)	0.000 (0.001)	0.004** (0.002)	-0.003 (0.004)
No Continuous Water Supply	-0.002 (0.004)	-0.011*** (0.003)	0.000 (0.001)	0.005** (0.002)	0.008 (0.006)
N. Of Disables	-0.004 (0.006)	0.005 (0.005)	-0.002 (0.002)	0.001 (0.003)	-0.001 (0.009)
No Doctor In Community	-0.004 (0.006)	-0.019*** (0.005)	0.007*** (0.002)	0.003 (0.003)	0.012 (0.009)
Rural	0.001 (0.006)	-0.012*** (0.005)	-0.002 (0.002)	-0.009*** (0.003)	0.022*** (0.008)
Tirana	0.018*** (0.006)	-0.020*** (0.005)	0.001 (0.002)	-0.009*** (0.003)	0.011 (0.009)

Table 4: Income and Price elasticities

Income	Meat	Cloth	Alcohol-tobacco	Others	Food
Male	1.010 (0.028)	0.998 (0.036)	0.802 (0.057)	0.725 (0.034)	1.050 (0.011)
Female	1.212 (0.024)	1.258 (0.035)	1.121 (0.058)	0.698 (0.030)	0.928 (0.009)
Child	1.028 (0.020)	0.566 (0.028)	0.669 (0.049)	1.198 (0.021)	1.070 (0.007)
Uncompensated	Meat	Cloth	Alcohol-tobacco	Others	Food
Food	-0.903 (0.019)	-0.216 (0.013)	-0.035 (0.006)	-0.114 (0.011)	0.018 (0.011)
Alcohol	-0.107 (0.016)	-0.485 (0.019)	-0.068 (0.009)	-0.084 (0.013)	-0.078 (0.012)
Clothing	-0.003 (0.037)	-0.233 (0.033)	-0.108 (0.047)	-0.142 (0.031)	-0.105 (0.025)
Edu.Rec.	-0.034 (0.017)	-0.032 (0.016)	-0.053 (0.008)	-0.428 (0.020)	-0.074 (0.012)
Other	0.002 (0.005)	-0.033 (0.005)	-0.011 (0.002)	-0.033 (0.003)	-0.972 (0.005)
Compensated	Meat	Cloth	Alcohol-tobacco	Others	Food
Food	-0.742 (0.030)	-0.055 (0.024)	0.125 (0.017)	0.047 (0.022)	0.179 (0.022)
Alcohol	-0.009 (0.027)	-0.386 (0.030)	0.030 (0.019)	0.015 (0.024)	0.021 (0.023)
Clothing	0.010 (0.039)	-0.221 (0.036)	-0.095 (0.049)	-0.129 (0.033)	-0.093 (0.028)
Edu.Rec.	0.042 (0.025)	0.044 (0.023)	0.024 (0.015)	-0.351 (0.027)	0.003 (0.019)
Other	0.563 (0.020)	0.528 (0.020)	0.551 (0.017)	0.528 (0.018)	-0.410 (0.020)

Table 5: Adult Sharing Rule Parameters in $m(\cdot)$

	Male	Female	Child
Christian Religion	-0.056 (0.220)	-0.026 (0.169)	0.169 (0.081)
Female Head Of Household	-0.119 (0.080)	0.001 (0.048)	0.048 (0.119)
Proportion Of Childern Ill	0.092 (0.303)	-0.152 (0.223)	0.223 (0.060)
Children Sex Ratio (Female)	0.069 (0.116)	-0.201** (0.082)	0.082 (0.131)
Left Behind Now	0.485*** (0.183)	-0.312** (0.132)	0.132 (-0.173)
Head Is Old	0.240* (0.141)	-0.163 (0.109)	0.109 (-0.077)
Children $<$ 15 Working (Comm)	0.046 (0.029)	-0.086*** (0.022)	0.022 (0.039)
Average Age Of Children	0.038*** (0.010)	-0.052*** (0.008)	0.008 (0.014)

Table 6: Statistics on the sharing rule

Variable	Mean	S.D.	Min	Max
Total Expenditure	9.458	0.481	7.792	11.571
Sharing Rule - Male	3.476	0.419	1.278	5.887
Sharing Rule - Female	2.413	0.501	0.249	5.768
Sharing Rule - Child	3.568	0.618	1.583	8.762
Emme - Male	0.445	0.207	-0.129	1.505
Emme - Female	0.684	0.269	-1.740	0.000
Emme - Child	0.239	0.113	-0.173	0.606
Relative S.R. Male	0.368	0.041	0.122	0.582
Relative S.R. Female	0.255	0.051	0.024	0.594
Relative S.R. Child	0.377	0.060	0.163	0.839

Figure 2: Semi-parametric plot of the Child “Sharing Rule" by Total Expenditure - Urban/Rural

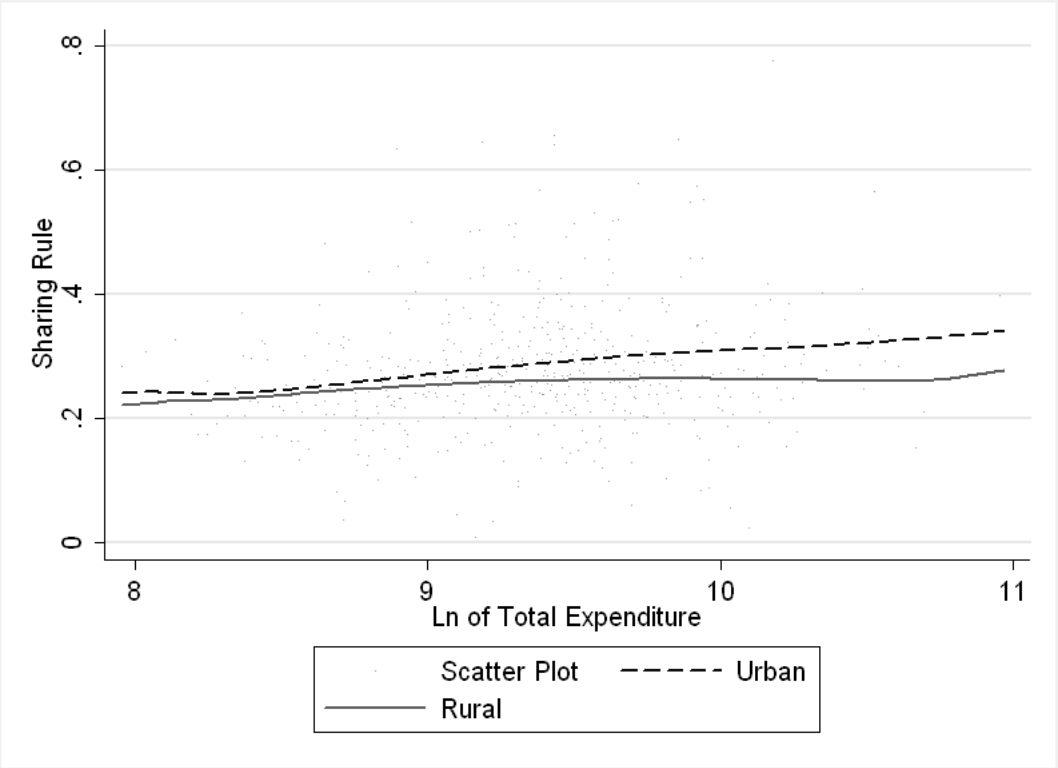

Figure 3: Individual Child Expenditure Distribution: “Sharing Rule" vs. Per-capita Consumption

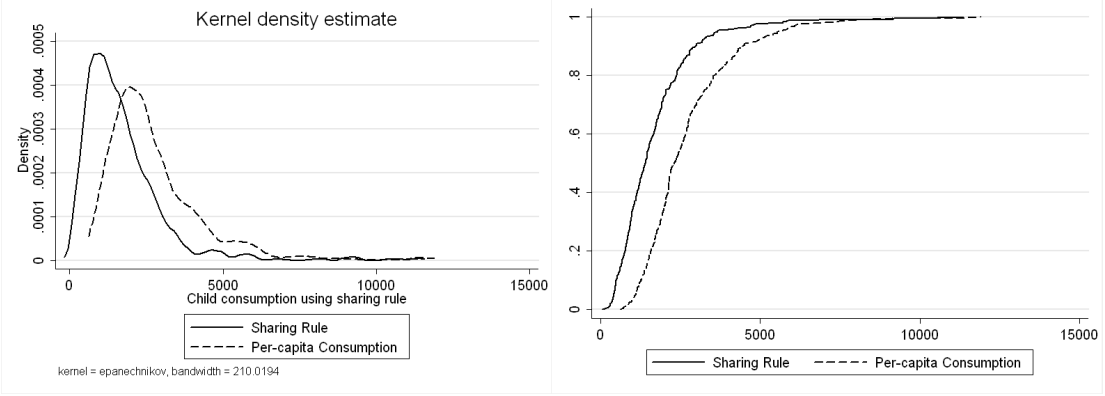

Figure 4: Semi-parametric plot of the Child "Sharing Rule" by Total Expenditure - Impact of Attending Preschool on the "Sharing Rule"

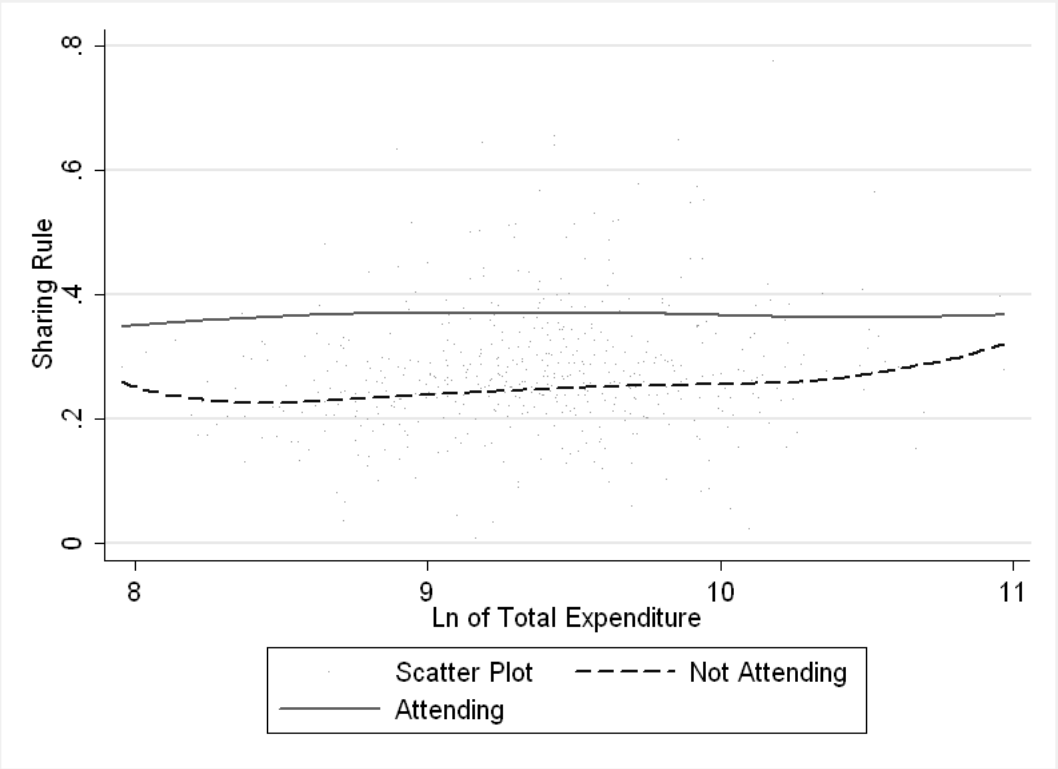

Figure 5: Semi-parametric plot of the Child "Sharing Rule" by Total Expenditure - Impact of *Ndihma Economike* on the "Sharing Rule"