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Abstract

The present paper aims at contributing to the literature on children welfare evaluation by taking into account for intra-household distribution of resources and, as a consequence, intra-household inequality. This task cannot be accomplished within the standard framework of unitary model of consumption, and equivalence scales helps only partially, since their scope is different. To investigate what happens within the family's black box we refer to collective models, recovering information about the decision of how resources are distributed within the household. We use the estimated sharing rule to draw some conclusions about the role played by intra-household inequality for children welfare in Albania and look at the effects that different public policies can have on child welfare. We find that taking into account for intra-household inequality raises the Gini of children welfare by nearly 10 percentage points and that in-kind transfers are more effective than cash transfers in ameliorating children well-being.

Keywords: Child welfare, intra-household inequality, collective models, sharing rule, Albania.
JEL Classification: D13, H31, I32, O15.

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1 Introduction

It is common opinion that one of the main aim of a modern society is to take care of its more vulnerable members. Several categories of individuals fall into the definition of vulnerable person: disables, people suffering from chronic illness, jobless, and so on. Children are part of this list for several reasons, and even though they usually do not suffer of critical living conditions, the policy maker should always pay particular attention to child well-being, an investment for the future of their country. With this paper we aim at contributing to the literature on children welfare evaluation by taking into account for intra-household distribution of resources and, as a consequence, intra-household inequality.

This task cannot be accomplished within the standard framework of unitary model of consumption: in these models the reference unit is the household, which is seen as a black-box within which consumption decision and resources allocation processes are unknown and assumed to be non-relevant. For example, one may assume that the household head takes all the relevant decisions, including child consumption, and that this is not important for the welfare of the household. Such an assumption is unsatisfactory for the purposes of the paper, since it would imply that a sufficient measure of the welfare of household's members is per-capita income.

Equivalence scales partially deal with this problem taking into account for family composition, which implies assigning to each household member a weight according to which individual equivalent income can be computed (Sydenstricker and King, 1921; Pollak and Wales, 1981). However, the use of fixed equivalence scales, a common practice in the applied poverty and inequality literature, could lead to ignore important household characteristics and the associated behavioral characteristics. These factors are particularly relevant in developing world where cultural aspects and socio-economic conditions may strongly influence intra-household inequality. Moreover, as pointed out by Ebert and Moyes (2003, 2009), for the computation of the equivalence scales, only the cost of maintaining a child should be taken into account. In contrast with the cost of raising a child (Browning, 1992), the former includes only child's basic needs, such as, for example, food, clothing and housing.

The discussion about the use of a more or less restricted monetary value of child welfare to correct poverty and inequality measures of a country is beyond the scope of the paper. However, what sounds clear to us is that to measure the welfare of a child, taking into account only for his/her basic needs is not sufficient. As a consequence, we need a measure of children well-being that accounts for the actual distribution of resources within the household. This decision is crucial for evaluating child welfare, especially for poorer households, where the amount of resources small and the welfare

loss caused by an unfair intra-household distribution may be relatively large.[1]

To investigate what happens within the family's black box we refer to the collective model of Chiappori (1988, 1992). This framework allows to spot some light into the household decision about resources distribution. Keeping the assumption of Pareto efficient choices, this approach assumes that the distribution of resources within the household is governed by a function of exogenous factors, which is called "sharing rule". The identification of this function helps us to look inside the black box for two reasons: first, it allows to recover individual preferences, and hence individual welfare; second, it provides information on how decision to allocate resources within the family is taken, potentially allowing for public interventions aiming at favoring a more equal intra-household distribution. In other words, the welfare of the household's members can be estimated directly rather than inferred from the household's relative position with per-capita or equivalent income.

Traditionally, the measurement of monetary child poverty has been criticized in favor of multidimensional indicators of children well-being. One of the main point against monetary child poverty is that it implicitly assume that resources are allocated equally within the family and in the same way between the households. With the use of collective models this critic falls: some members of the household may be relatively more or less poor than others.

In a public policy perspective, we have to say that a comprehensive normative analysis of the implications of this class of models is still far from being complete. However, Ebert and Moyes (2009) moved the first steps in this direction and, following the pioneering article of Bourguignon (1999), which shows the importance of using collective models to analyze the cost of children, other authors followed the intuition of using collective models to analyze individual poverty and intra-household inequality (Cherchye et al., 2008; Lise and Seitz, 2007).

In line with this stream of literature we try explore new perspectives allowed by collective models for child welfare analysis, following a theoretical approach similar to Menon et al. (2008). In particular we look at the difference in the child welfare distribution respect to a per-capita income approach and test whether receiving public transfers could induce a modification of the sharing rule. To analyze in depth these questions we focus on Albanian households with only children under five[2] using

[1]It should be noted, however, that the question of intra-household distribution of resources is relevant also at the aggregate level of welfare analysis. It may be the case that a rather large part of the population suffers from an unequal intra-household distribution with the consequence that even when income distribution among households can be considered rather egalitarian, that society could still be affected by a considerable level of inequality (see Peluso and Trannoy, 2007).

[2]We concentrate on these households to have a more homogeneous sample and to avoid possible identification issues. More details can be fund in section 3.2.

data from Albanian Living Standard Measurement Survey.

Albania is a particularly interesting setting where to study the welfare of children and its relation with household decision processes. This country has been largely affected by the passage on the market economy at the beginning of 1990 with the children becoming the most vulnerable group suffering sever poverty and malnutrition problems. In spite the fact that Albania is the youngest country in Europe, with the highest percentage of the under eighteen population, the social protection system does not favor children and young people in any form. In fact, the social protection system established during communist era has been progressively deteriorated from the transition to a market economy.

Traditional Albanian household acquired renewed relevance after the fall of the communist regime. At the end of the Second World War Albania still was a very traditional rural society with patriarchal family values, in mountain and rural area the entire social and economic structure was governed by the Canon of Lek Dukagjini, a set of traditional and unwritten laws, based on patriarchy and handed down from the Middle Ages. This set of laws gave males unquestioned authority over females (see Falkingham, 2001). During the isolationist Communist regime the educational policies focusing on female education 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 self set back to a traditional family structure, even if large migration flows added a new dimension to the phenomenon, especially in the rural areas (see Danaj et al., 2005; Gjonca et al., 2008).

Major problems are suffered by the early childhood since the importance of children's pre-school years is not widely understood in the country, especially in poor areas of the north. 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. There 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, Chiappori, Haddad, Hoddinott, and Kanbur, 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.

To our knowledge, in the literature there are no other empirical studies on the link between public transfers programs (both cash and in-kind) in developing or transition countries and intra-household distribution of resources, but, even if we cannot compare our results with previous works, our findings seem rather clear. These findings seem to support those critical toward neo-classical theory of public transfers and the advantage of conditional transfers programs like those implemented in many Latin America countries. Attending pre-schooling for young children is on the contrary a variable favoring their share of resources within the family, suggesting the goodness of in-kind programs.

The rest of the paper is organized as follows. Section 2 presents the theoretical model, the specification of the demand system and the issue of the econometric identification of the sharing rule. In Section 3 we describe the econometric model and the data used to estimate the collective demand system. Section 4 illustrates our results and Section 5 concludes the paper.

2 Resources allocation and consumption decisions

2.1 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 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, 2009a).[3]

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 seeks for the adult/children sharing rule 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).

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 paper, since we are interested in measuring children welfare, we are forced to use the third approach. The expenditure dataset used in this paper provides information on several exclusive goods, child clothing, adult clothing, child shoes, adult shoes, education (assigned to children), alcohol and tobacco (assigned to adults).

To properly describe the theoretical model, it is important to distinguish between ordinary, assignable and an exclusive goods.

Definition. *A good is* ***ordinary*** *when private consumption of this good is not observed or deducible.*

This is the common case in household expenditure surveys. The good will be

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

consumed by each member of the household, but it is impossible to know in which proportion. Examples are numerous, and include food, communications, recreation and so on.

Definition. *A good is* ***assignable*** *when it is consumed in observable proportions by each member of the household.*

For example, if we have information on how far is working place of each member, we could assign traveling expenditure proportionally, if both spouses work.

Definition. *A good is* ***exclusive*** *when private consumption of a good is observed for an identifiable member of the household.*

This is the case of toys or schooling expenditures, which should be consumed only by children.

Assume that an household is composed by two members, an adult and a child. The vector of households consumption[4], denoted by $\mathbf{x}$, is composed of ordinary goods $\mathbf{o}$ and exclusive (or assignable) goods $\mathbf{e}^a$ and $\mathbf{e}^c$, and is additively separable, i.e. $\mathbf{x} = \mathbf{x}^a + \mathbf{x}^c$.[5] Individual consumption $\mathbf{x}^a$ and $\mathbf{x}^c$ is not observed, while expenditures and prices of the exclusive goods ($\mathbf{e}^a$, $\mathbf{e}^c$, $\mathbf{p}^a$ and $\mathbf{p}^c$) are observed and exogenous.

For explanatory purposes, but without loss of generality, assume the vector $\mathbf{x}$ to be composed by one ordinary good o, with price normalized to 1, and two exclusive goods e^a and e^c, with prices p^a and p^c respectively. Assume also that the household is not engaged in production and that labor supply is fixed. As a consequence, household income is exogenous and assumed to be approximated by total expenditure of the household, denoted by y and equal to $\mathbf{p}'\mathbf{x}$, with $\mathbf{p} = \{1, p^a, p^c\}$ and $\mathbf{x} = \{o, e^a, e^c\}$. Hence, the available information set is $\{e^a, e^c, o; p^a, p^c; y\}$ and the individual decision problem is

$$\begin{aligned} &\max U^k(e^k, o) \\ &s.t. \quad p^k e^k + o \leq \phi^k(p^a, p^c, y) \\ &e^k \geq 0, o \geq 0, \quad k = a, c; \end{aligned} \tag{1}$$

[4]If not differently specified, when we talk about consumption goods or vectors we always refer to quantities. In general, superscripts indicate the household member, in our case adult and child, subscripts indicate a specific good.

[5]In this study, we do not take into account public household goods, as housing, traveling costs and so on. The reason is that the inclusion of such goods implies the adoption of a household production function, possibly whit economies of scale which, in absence of the proper information in the data, would cause identification issues for the sharing rule.

where ϕ^k amount of resources devoted to member k, or, in other words, the sharing rule governing the intra-household allocation of resources.

In this framework, the sharing rule can be viewed as a sort of contracting tool through which household members decide how to distribute resources between them and represents the link between the household and individual level of the decision process. Once each member's resources are assigned he/she will maximize his/her utility subject to its own budget constraint. Thanks to this link, and provided that we are able to properly estimate the sharing rule, we can recover individual preferences, and hence individual welfare measures, from household data.

For the econometric identification of the sharing rule, we use a technique borrowed from Pollak and Wales (1981) and Lewbel (1985), commonly used to incorporate demographic variables or exogenous factors into demand functions, and from Bollino et al. (2000), used to estimate household technologies.

In general, demographic functions interact with exogenous prices or income and can be identified provided that there is sufficient information and variability in the data. The analogy steams from the use of an interaction term with income *a la* Barten (Barten, 1964) for the identification of the sharing rule, where the estimation problem is similar to that of estimating a regression containing unobservable independent variables.

In the next section we define the demand system specification and provide a theoretical evidence of the identification of the sharing rule.

2.2 Model specification and identification of the sharing rule

To derive the chosen specification of collective demand system we start from a quadratic extension of the Almost Ideal Demand System (Deaton and Muellbauer, 1980) proposed by Banks et al. (1997).

Budget shares for a Quadratic Almost Ideal Demand System (QAIDS) are specified as

$$w_i(y, \mathbf{p}; \theta_\mathbf{i}) = \alpha_i + \sum\nolimits_j \gamma_{ji} \ln p_j + \beta_i \left(\ln y - \ln a(\mathbf{p})\right) + \frac{\lambda_i}{b(\mathbf{p})} \left(\ln y - \ln a(\mathbf{p})\right)^2, \quad (2)$$

where $w_i(y, \mathbf{p}; \theta_\mathbf{i})$ is the good i budget share, $\theta_\mathbf{i} = \{\alpha_i, \gamma_{ij}, \beta_i, \lambda_i\}$ 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

$$\ln a(\mathbf{p}) = \alpha_0 + \sum\nolimits_i \alpha_i \ln p_i + \frac{1}{2} \sum\nolimits_i \sum\nolimits_j \gamma_{ij} \ln p_i \ln p_j \quad (3)$$

$$b(\mathbf{p}) = \prod\nolimits_i p_i^{\beta_i}. \quad (4)$$

When demographic modifications *a la* Gorman are introduced (Gorman, 1976), demographic characteristics interact multiplicatively with income in a theoretically plausible way (Lewbel, 1985; Perali, 2003). Budget shares are modified as follows

$$w_i(y, \mathbf{p}; \theta_\mathbf{i}) \Rightarrow w_i(y, \mathbf{d}, \mathbf{p}; \theta_\mathbf{i}) = w_i(t_i(y, \mathbf{d}), \mathbf{p}; \theta_\mathbf{i}), \tag{5}$$

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

Applying this transformation to equation (2), we obtain the following demographically modified budget share equation

$$w_i(y, \mathbf{p}, \mathbf{d}) = \alpha_i + t_i(\mathbf{d}) + \sum\nolimits_j \gamma_{ji} \ln p_j + \beta_i \left(\ln y^* - \ln a(\mathbf{p})\right) + \frac{\lambda_i}{b(\mathbf{p})} \left(\ln y^* - \ln a(\mathbf{p})\right)^2, \tag{6}$$

where

$$t_i(\mathbf{d}) = \sum\nolimits_r \tau_{ir} d_r, \tag{7}$$

$$\ln y^* = \ln y - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i. \tag{8}$$

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

$$\sum\nolimits_i \alpha_i = 1; \quad \sum\nolimits_i \beta_i = 0; \quad \sum\nolimits_i \lambda_i = 0; \quad \sum\nolimits_i \gamma_{ij} = 0; \quad \sum\nolimits_j \gamma_{ij} = 0; \quad \gamma_{ij} = \gamma_{ji}, \tag{9}$$

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

$$\sum\nolimits_i \tau_{ir} = 0. \tag{10}$$

To next step to obtain the collective QAIDS introducing the sharing rule. The maximization problem in (1) 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

$$w_i^k(y,\mathbf{d},\mathbf{p};\theta_\mathbf{i}) = \alpha_i^k + t_i^k(\mathbf{d}) + \sum\nolimits_j \gamma_{ji}^k \ln p_j + \beta_i^k \left(\ln y^{k*} - \ln a(\mathbf{p})\right) + \frac{\lambda_i^k}{b^k(\mathbf{p})}\left(\ln y^{k*} - \ln a(\mathbf{p})\right)^2, \quad k = a, c. \tag{11}$$

Note that, as stated before, the two 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 we cannot identify two constants in the same equation, or because of data construction, for instance prices and demographic characteristics are recorded at household level and are likely to be same for all household members (in our case they are). Hence, summing up the demand equations for the adult and the children results in

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

We could say that here household expenditure has been divided into the adult and the child expenditure. In particular, in equation (12), $\ln y^{a*}$ and $\ln y^{c*}$ are defined as

$$\begin{aligned} \ln y^{a*} &= \ln \phi^a(p^a, p^c; y; \mathbf{s}) - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i, \\ \ln y^{c*} &= \ln \phi^f(p^a, p^c; y; \mathbf{s}) - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i. \end{aligned} \tag{13}$$

where $\ln \phi^k(p^a, p^c; y; \mathbf{s})$ is the sharing rule of the k^{th} household member, p^a and p^c 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 resources 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 for this heterogeneity, we define the sharing rule as a function

of observed individual expenditure y^k, price of the exclusive goods p^a and p^c, and a vector of other exogenous characteristics $\mathbf{s}$, managed in analogy with Barten's scaling, obtaining a demographically scaled income, i.e.

$$\phi^k(p^a, p^c; y; \mathbf{s}) = y^k \cdot m^k(p^a, p^c; \mathbf{s}), \tag{14}$$

which in natural logarithms becomes

$$\ln \phi^k(p^a, p^c; y; \mathbf{s}) = \ln y^k + \ln m^k(p^a, p^c; \mathbf{s}). \tag{15}$$

In equation (15), $m^k(p^a, p^c; \mathbf{s})$ 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, r^k. If we assume that adult's expenditure is defined as the expenditure on his exclusive good e^a plus half of expenditure in ordinary goods o, and the same holds for the child, this is equivalent to write

$$\ln y^k = r^k \ln y, \tag{16}$$

where r_i defined as

$$r^k = \frac{1}{y}\left(p^k e^k + \frac{1}{2}o\right). \tag{17}$$

From equations (15) and (17) it follows that we can write the sharing rules as functions of household income, individual prices, distribution factors and the ratio of expenditure in exclusive goods, i.e.

$$\begin{aligned} \ln \phi^a(p^a, p^c; y; \mathbf{s}) &= r^a \ln y + \ln m^a(p^a, p^c; \mathbf{s}) \\ \ln \phi^f(p^a, p^c; y; \mathbf{s}) &= r^c \ln y + \ln m^c(p^c, p^c; \mathbf{s}). \end{aligned} \tag{18}$$

Since $\ln \phi^a(p^a, p^c; y; \mathbf{s}) + \ln \phi^c(p^a, p^c; y; \mathbf{s}) = \ln y$, by definition and $r^a \ln y + r^c \ln y = \ln y$ by construction, given equations (18), the following constraint must hold

$$\ln m^a(p^a, p^c; \mathbf{s}) = -\ln m^c(p^a, p^c; \mathbf{s}). \tag{19}$$

To save on notation, let us set $\ln m^a(p^a, p^c; \mathbf{s}) = \ln m(\cdot)$ and $\ln m^c(p^a, p^c \mathbf{s}) = -\ln m(\cdot)$. Substituting (18) into (13) we obtain

$$\ln y^{a*} = r^a \ln y + \ln m(\cdot) - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i \tag{20}$$

$$\ln y^{c*} = r^c \ln y - \ln m(\cdot) - \sum\nolimits_i t_i(\mathbf{d}) \ln p_i. \tag{21}$$

In analogy to function $t_i(\mathbf{d})$, function $m(\cdot)$ is identified provided that there is enough variation in distribution factors $\mathbf{s}$ and prices p^a and p^c, 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, for which we suggest to refer to Gorman (1976), Lewbel (1985).

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

$$\ln m(p^a, p^c; \mathbf{s}) = \phi_0 \ln p + \phi_1 \ln s_1 + \phi_2 \ln s_2 + ... \tag{22}$$

The resulting model is similar to that proposed by Menon et al. (2008) with a different target: in their work the analysis was focused on couples without children, while we clearly aim at determining children welfare.

In the following section we report the econometric tools employed in the estimation of the collective demand system (12).

3 Empirical strategy

3.1 The econometric specification

Econometricians working with household micro-data often are faced to the zero expenditures problem, especially when working with disaggregate goods. Coefficient estimates can be biased when only observed positive purchase data are used, hence it is necessary to apply the proper correction technique. There are several econometric methods to correct for zero expenditures which differ in the assumptions related to the source of zeros. For example the tobit model (Maddala, 1983; Amemiya, 1985) captures the corner solutions for the utility maximization problem, which imply that the observation is zero just because the household decided to consume zero on the basis of disposable income, prices and its preferences. This could be the case for some goods, but for some other not. For example semi-durable goods (as clothing) may not be purchased in the reference period simply because they give utility for more than one period and a household may need to buy them only once in, say, 3 months. This situation is called infrequency of purchases, and cannot be properly captured by a tobit model.

The Double-Hurdle model (Yen, 1993), on the other side, assumes that zero expenditures are explained by a decision process that arise from unobserved latent variables which drive consumer choice. The model allows a separate estimation of participation and expenditure parameters. This is the case of alcohol, which may

be not consumed because of moral conviction or health problems, which are not observable in the survey. Again this model is not suitable when we consider semi-durable goods, as clothing.

An alternative to the double-hurdle model is the Heckman correction model, which assumes that zero expenditures are due to sample selection bias (Heckman, 1979) and are treated as a misspecification error. This purely statistical approach allows to obtain different estimates for participation and expenditure parameters, with the participation choice is assumed to dependent on partially different observable variable with respect to the consumption equation.

In the original model, the first stage determines the participation probability using a probit regression, and in the second stage, a specification for the omitted variable can be used to correct, if present, sample selection bias. The omitted variable is known as the inverse Mill's ratio, which is the ratio between density and cumulative probability function of the standard normal distribution of the probability to observe a positive consumption.

In this paper we use a generalization of the Heckman correction model which overcomes the issues observed by Amemiya (1978, 1979). In particular, we refer to the work of Shonkwiler and Yen (1999), which shows the inconsistency of the Heckman estimator and proposes a consistent, though still simple, two-stages estimator for a system of censored equations.

In choosing the proper estimator, we have to keep in mind that we have zero expenditures for all the goods except for food. Hence, we decided to use the Shonkwiler-Yen estimator which is well suited for a rather large source of zero expenditures, and is still consistent with a two-stages decision process (similar to that of the double-hurdle).

Following the authors, consider the following general limited dependent variables system of equations

$$
\begin{aligned}
& w_{it}^{*} = w(y, \mathbf{d}, \mathbf{p}; \theta_{\mathbf{i}}) + \epsilon_{it}, \quad c_{it}^{*} = z_{it}' \delta_i + \upsilon_{it}, \\
& c_{it} = \begin{cases} 1 & \text{if } c_{it}^{*} > 0 \\ 0 & \text{if } c_{it}^{*} \leq 0 \end{cases} \qquad w_{it} = c_{it} w_{it}^{*}, \\
& (i = 1, 2, ..., m; t = 1, 2, ..., T),
\end{aligned}
\tag{23}
$$

where i represents the i^{th} demand equation and t the t^{th} observation, w_{it} and c_{it} are the observed dependent variables, w_{it}^{*} and c_{it}^{*} are the latent variables, $w(y, \mathbf{d}, \mathbf{p}; \theta_{\mathbf{i}})$ is the demand function, z_{it} is vectors of exogenous variables, δ_i are parameters, and ϵ_{it} and υ_{it} are random errors. Without entering into details, system (23) can be

written as

$$w_{it} = \Psi(z'_{it}\delta_i)w(y, \mathbf{d}, \mathbf{p}; \theta_\mathbf{i}) + \eta_i \quad (z'_{it}\delta_i) + \xi_{it}, \tag{24}$$

where $\Psi(z'_{it}\delta_i)$ and $(z'_{it}\delta_i)$ are univariate standard normal cumulative distribution function and probability density function respectively. The system can be estimated by means of a two-step procedure, where δ_i are are estimated using a Maximum Likelihood probit estimator, and used to predict $\Psi(z'_{it}\delta_i)$ and $(z'_{it}\delta_i)$. Successively, estimates of θ_i and η_i in the system

$$w_{it} = \Psi(z'_{it}\hat{\delta}_i)w(y, \mathbf{d}, \mathbf{p}; \theta_\mathbf{i}) + \eta_i \quad (z'_{it}\hat{\delta}_i) + \xi_{it} \tag{25}$$

are obtained by Full Information Maximum Likelihood.

Besides that of zero expenditures, another problem arises: we lack information on prices and/or unit values. Since the World Bank survey records only expenditure information, the lack of information about quantities purchased precludes the possibility to derive household specific unit values. On the other hand, World Bank's price indexes have an aggregation level similar to that of the survey but are not sufficient to provide plausible elasticities. For this reason, we use a procedure, originally proposed by Lewbel (1989) to construct pseudo unit values. Without entering into details, we estimate the pseudo unit values by means of

$$\hat{p}_i = \quad \frac{1}{k_i^*} \prod_{j=1}^{n_i} w_{ij}^{-w_{ij}} \Bigg) ex_i, \tag{26}$$

where ex_i is expenditure on the i-th good, w_{ij} is the subgroup budget share. Good i is a good of the demand system, which is the aggregation of j subgroup goods (for example food is the aggregation of vegetables, meat, ..., and so on). k_i^* is a scaling factor defined as

$$k_i^* = \prod_{j=1}^{n_i} k_{ij}^{-k_{ij}} \tag{27}$$

where $k_{ij} = mean(w_{ij})$ is the mean subgroup budget share.

3.2 Data

The data used in this paper are draw from the World Bank Living Standard Measurement Survey collected in Albania in 2002.[6] These data contain information on

[6]We do not use 2005 data because it was not possible to reconstruct the consumption categories from the row data as we 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.

household consumption, socio-economic conditions of the household and individual variables related to education, labor market and health. The original sample covers 3,599 households, but we selected households with only under-five children remaining with a sample of 511 households.

The decision to drop families with children older than five is due to several reasons. First, we are interested most in studying 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, we identified pre-schooling as a relevant in-kind public transfer which is likely to affect child welfare. Second, under-five children are not affected by the phenomenon of child labor which can influence the children's bargaining power, representing an unobservable factor difficult to treat in our study. Other reasons are related to the implemented empirical strategy. We estimate the sharing rule of an equivalent household composed by one adult and one child and look at the proportions of individual expenditures as a source of identification for the sharing rule, controlling for household composition at the household level. However, the presence of children of very different age would severely affect both the sharing rule and the overall demand of goods causing an identification issue for the sharing rule (Chiappori and Ekeland, 2009b).[7]

The estimation of the demand system is conducted over 5 categories of goods:Food, Alcohol and Tobacco, Clothing, Meat, Housing and Other goods.[8]. Household-specific prices, or pseudo unit values, of these goods are assigned following the procedure described in section 3.1.

As proved in Section 2.2, the identification of the sharing rule comes from two observed individual expenditure. In this dataset, we have more than that. Both clothing and footwear are recorded for males, females and children. Moreover, taking into account that we only have children under five, it is sufficiently safe to assume that consumption of alcoholic beverages and tobacco is exclusive to the adults. We also assume that the expenditure in education is exclusive to the children (we control that only expenditures strictly related to pre-school are included). Finally, in order to take into account for family composition we compute per-capita individual consumption. In this way, within each household, we compute the individual expenditures equivalent to an hypothetical household composed by one adult and one child.

With the set of demographic variables that we use in the demand system, $\mathbf{d}$,

[7]We plan to deal with this problem in a future paper, where we plan to extend the collective model to take into account of resources distribution among males, females and children simultaneously.

[8]To avoid unnecessary complications we consider only non durable goods.

we partially try to recover the gender dimension which has been neglected in our model because of the choice of an adults/children sharing rule.[9] These variables are: a dummy variable indicating that females are more than males in the household, a dummy indicating high level of education of household's head, dummies capturing if head or the spouse are chronically ill or disable, variables on family composition (number of children, number of adults and number of elderly), a variable indicating multiple couples within the family (enlarged families), a subjective self declaration of the basic needs income, a subjective declaration of socio-economic status, a dummy taking "1" if the household is bigger than 100 squared meters, a dummy for telephone owner and a dummy indicating that al least a member has emigrated abroad after the pyramids crisis (1997).

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) or not religious, a child is chronically ill, both partner employed (bi-active couple), age ratio defined as female age divided by the sum of couple's ages, education ratio defined as wife's years of schooling divided by the sum of the couple's years of schooling, Ndihme Ekonomike participation (meaning to be beneficial of a means testing anti-poverty cash program (for an extensive study on the welfare effects of the NE program in Albania, see Mangiavacchi and Verme, 2009)), and attending early-childhood programs delivered by the public sector (the variable takes "0" if no child attends pre-school in the family, "1" if at least one child currently attends and "2" if all children are in early childhood public programs). These last two variables are introduced to test the possibly different impact of cash and in-kind transfers. In fact, Ndihme Ekonomike is a sort of minimum income cash program, while pre-schooling can be considered as the most important in-kind transfer from winch a child is recipient.

As regards the variables used in the first stage probit estimates of the zero correction estimator,**z**, we use a larger set of variables than **d**, which we do not report here to save on space, but is available upon request together with the tables of estimates of all probit regressions.

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

4 Results

4.1 Estimatates

This section presents the results of the two-steps estimation of model (25). When zero expenditure are observed for one good in the data, the first step estimates the probability of observing a positive consumption as a probit via Maximum Likelihood, while the second stage uses the predicted Mill's ratios to estimate the demand system via Full Information Maximum Likelihood, imposing a-priori parameters' restrictions.[10]

In Table 1 we present the estimates of the collective QAIDS demand system.[11] In general, income and price parameters are significant, with some exceptions, as housing income parameter for adults and alcohol parameter for children, which are all non significant. Among demographic variables, the general trend is towards small parameters values, even if many are still significantly different from 0 in particular the interaction of higher education of the household head with income has a positive influence on goods consumption, even if to be more educated do not determine more alcohol and tobacco consumption. The number of children in the family influence positively the household consumption of clothing and food, as expected, and to be an enlarged family has a positive effect on food consumption. The consumption of alcohol and tobacco has been influenced by having members emigrated abroad and by the number of adults in the family. Other good is mostly composed by education and cultural expenditures which is influenced positively by the education of household head and by the self-reported socio-economic status.

Table 2 shows income income and price elasticities. Signs are consistent with consumption theory, with negative own price elasticities. The relevant exception is alcohol and tobacco price elasticity which is positive: this means that for this very particular category of goods. This good suffers of two different effects on our estimates: first, alcohol and tobacco is not consumed by the child, but he/she could still influence household consumption in a way that may not be properly captured by our model; second, Balkan countries have a strong smoking tradition and a huge traditional consumption of *raki*.[12]; third, alcohol and tobacco are addictive goods

[10]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 (19).

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

[12]Raki is a very strong liquor typical of Balkans.

thus their consumption may not be much affected by their market prices.

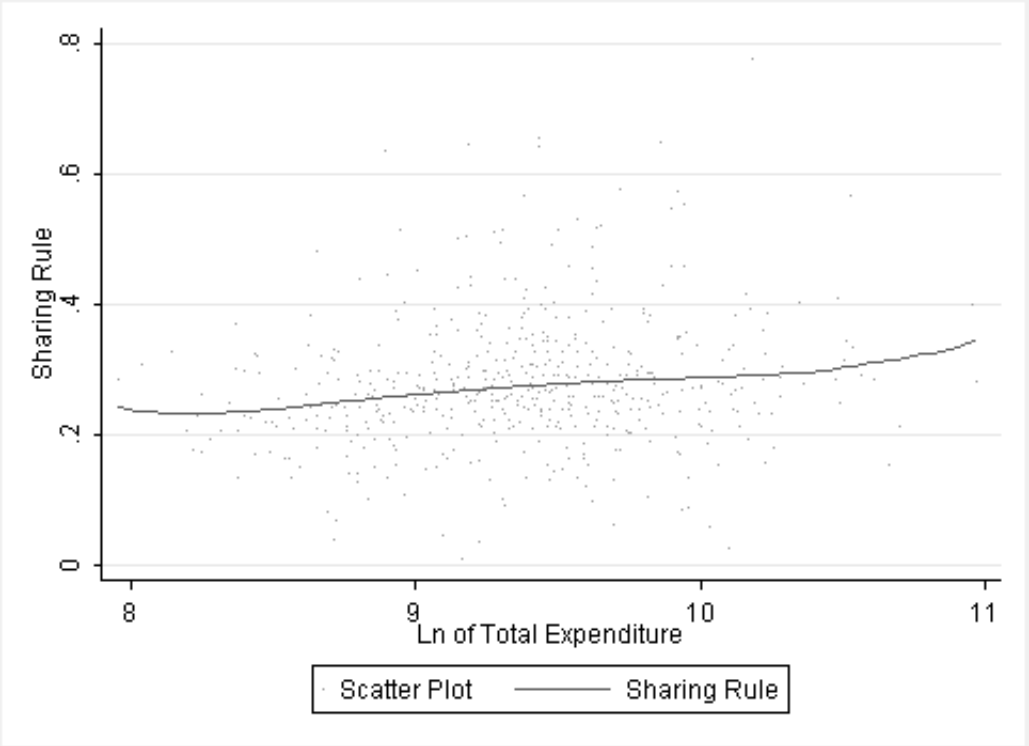
According to their size, clothing and housing are the most elastic good to price changes, while meat and food are the less elastic (we avoid commenting further the price elasticity of alcohol and tobacco). As for income elasticities, since we could estimate individual income parameters, we could also estimate individual elasticities. 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 belong to other goods, which contains also educational and recreational expenses, hence this result is expected. From a policy perspective this is an important result since it means that more resources devoted to children in the household would end in human capital investment. 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 remember 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. Estimates of the parameters of the sharing function are reported in Table 3 and tell us that the ratio between the prices of adult and child clothing influences positively the propensity to allocate resources in favor 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) influence negatively child welfare: small difference in age between the partners may indicated a balanced couple with more caring for their son/daughter. Even if to receive a monetary support (Ndihme Economike) has not influence on children well-being, attending a pre-school programs influence the distribution of resources within the family in favor of child. This evidence seems to favor in-kind benefits rather than cash transfers for the welfare of children, at least from an intra-household perspective. We should say that the NE cash transfer, while generally believed to be well targeted thanks to a decentralized management, proved to quite non-effective in alleviating poverty (WB, 2009; **?**).

To detail further our analysis, we report figures 1 and 2, which represent the relative sharing rule, expressed as the ratio between children expenditure 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 if we look at figure 2 it

Figure 1: Children Relative Sharing Rule

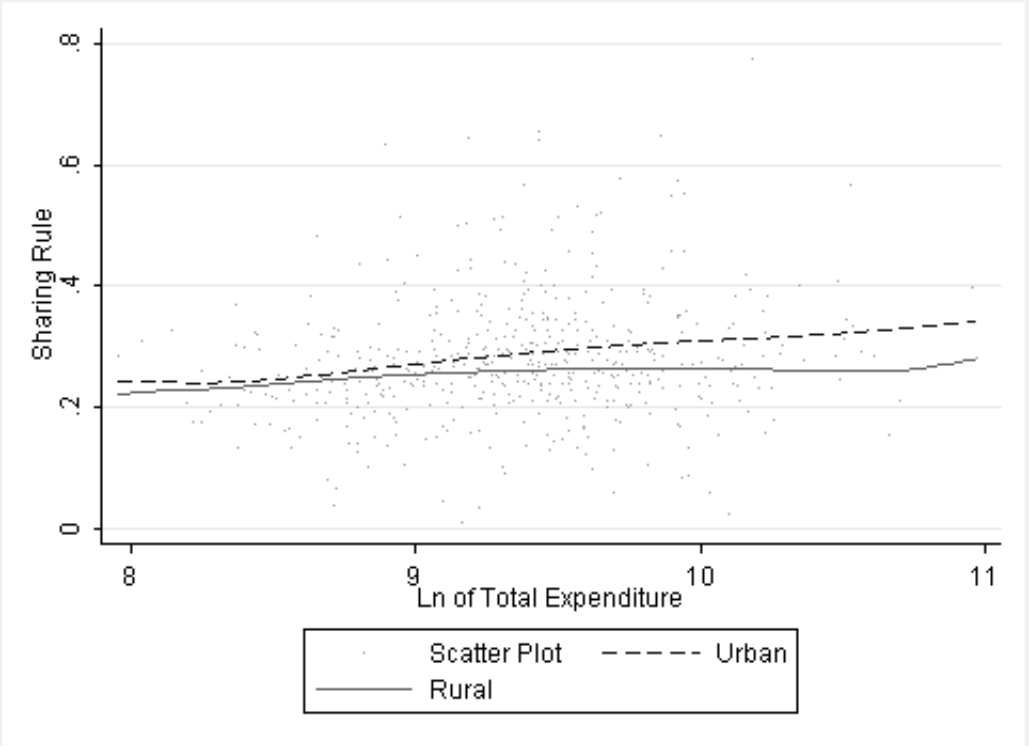


is clear that the urban children in richest deciles have the highest income shares. The socio-economic status influences positively the attitude toward children for the households living in the cities. While in rural area distribution of resources within the family are constant along households welfare distribution. This could be driven by the scarce development of rural areas in Albania: even if the household is rich there may not much to do for children with that money because of the absence of toy-shops, recreational and cultural activity centers, fashion shops, and so on.

4.2 Child welfare, inequality and the effects of public transfers on young children

The estimated sharing rule values refer to an hypothetical equivalent household composed by two members: one adult and one child. In other words individual consumption of adults and children, the source of sharing rule identification, are rescaled to take account number of adults and children. If we want to say something more general regarding children welfare and the effects on intra-household inequality, it is

Figure 2: Children Relative Sharing Rule - Area



necessary to recover the real individual expenditure of each child in the family, given the sharing rule that have been estimated.

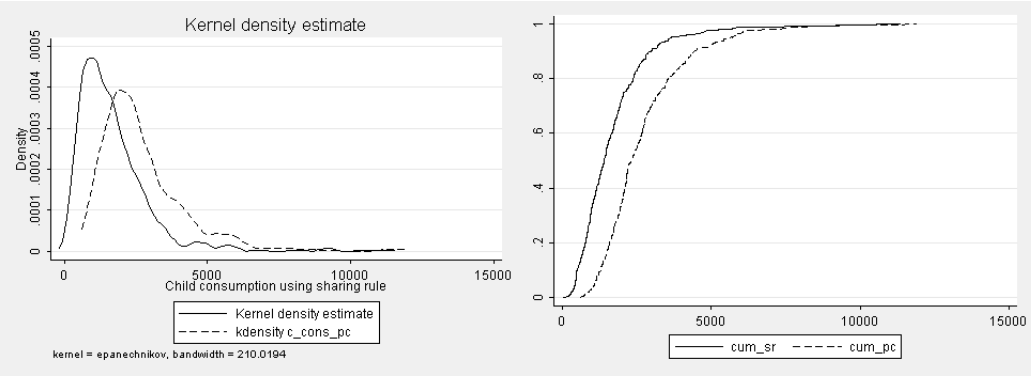
In order to have proper data about individual child welfare we use the following equation, which rescale back the true values of the income shares to the actual household:

$$S_c = \frac{\rho^c}{n_c\rho^c + n_a(1-\rho^c)}\, y \tag{28}$$

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 values are 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 resources distribution.

In the following analysis we concentrate only on child welfare, discarding what

Figure 3: Child Welfare using Intra-household Resources Allocation



happens to adults. Moreover, our sample is compose only by children under five, hence the results are very specific to this group of study and cannot be generalized to the whole country. A more general analysis with gender differentiation and a proper modeling of children of different ages is planned in a future paper.

Figure 3 shows the distribution of child welfare using the estimated share of children consumption (continuous line) and the per-capita consumption measure (dash line), computed assuming an equal distribution among household's members. The kernel density distribution reveals that child welfare is distributed more unequally if we consider also intra-household allocation and that the average level of child consumption is lower. We have plotted also Cumulative Distribution Functions of individual consumption shares and per-capita consumption to control for stochastic dominance of the welfare distribution: taking into account intra-household inequality child consumption is smaller both on average and along the whole distribution. Just to give a crude number, child welfare inequality measured by the Gini index shift from a 0.286 computed using per-capita consumption to 0.382 computed using the sharing rule. Intra-household inequality accounts for almost ten percentage point of the Gini index for young children in Albania. Despite the fact that our sample selection strategy may be discussed, we should say that our sample excludes very numerous households, because the maximum age of children is set to five, hence we could still underestimate child poverty and inequality.

Economists have traditionally been skeptical about in-kind measures, viewing cash transfers as superior in terms of recipient's utility. From our estimates of the sharing rule (Table 3), instead, we can see that family allowances have no effects in the proportion of resources allocated to young children while pre-school participation (an in-kind transfer) has a positive impact. To explore further the effects of public

transfers on child welfare, we have depicted again non parametric regressions of individual child sharing rule selecting the fact of being recipient of a public transfer.

Figure 4: Children Sharing Rule - Pre-Schooling

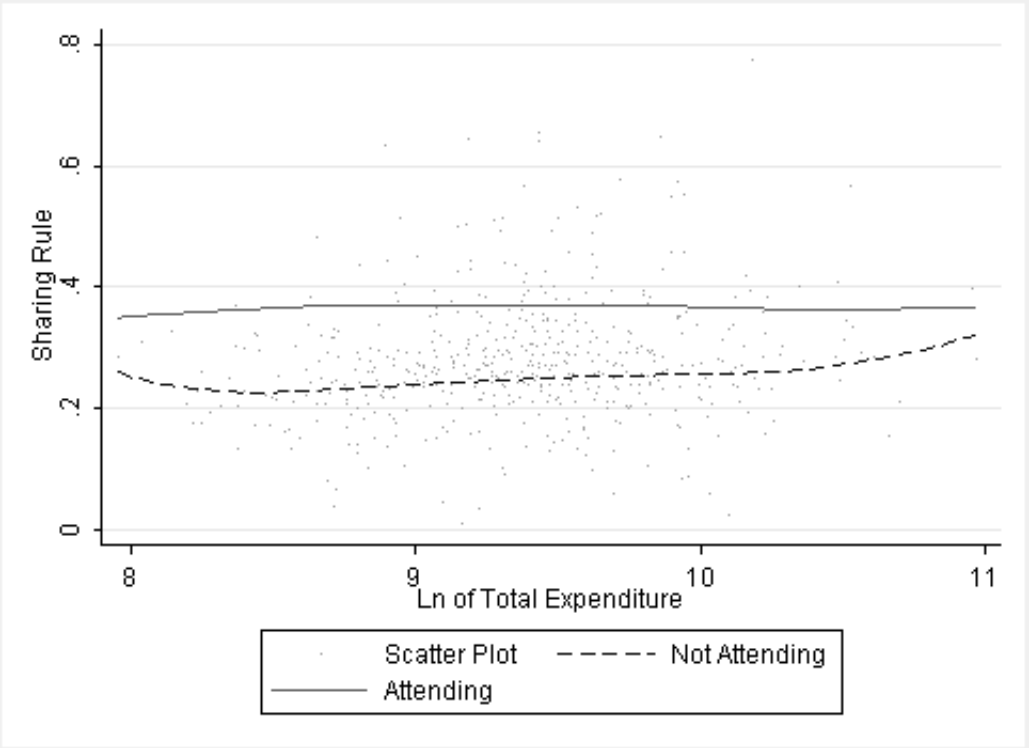
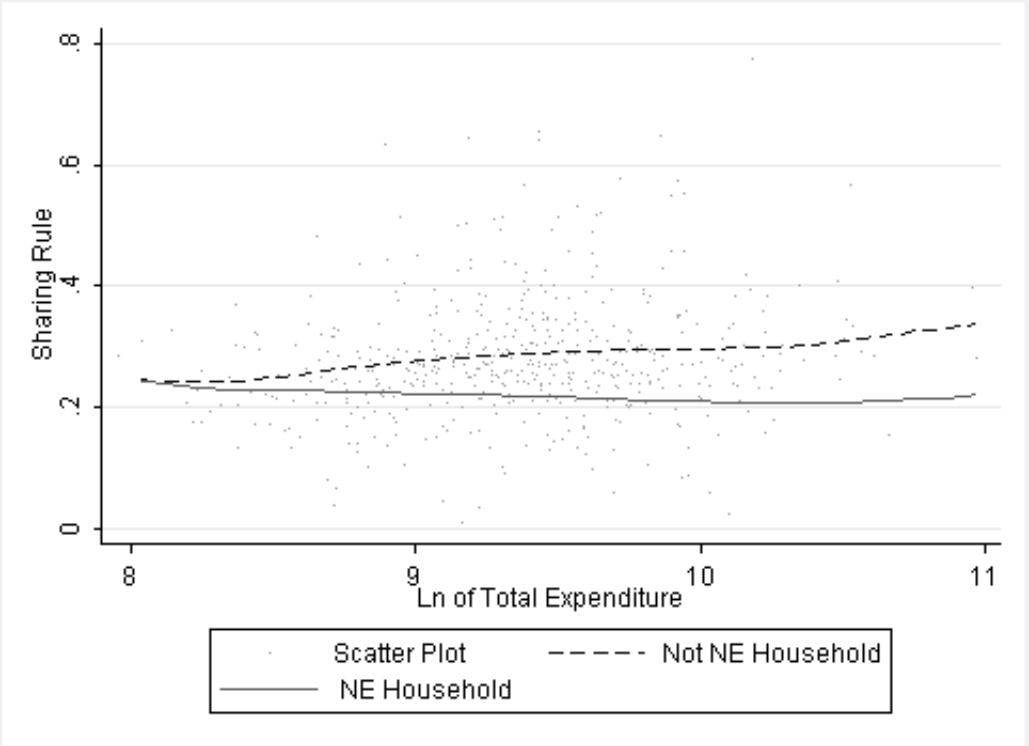


Figure 4 shows the children sharing rule ρ^c of two groups of families: one with no child attending early-childhood programs and the other with at least one child currently attending to pre-school. The sharing rule of attending children is nearly constant along the consumption distribution and close to .4. On the other hand, the sharing rule for non-attending children is sort of U shaped trend, where the lowest and highest income families seems to have more care for their children. The difference of the two sharing rule is significant along the whole income distribution, confirming the correspondent sharing rule parameter.

Looking at the effects on intra-household inequality of public cash transfers (Figure 5 shows a families receiving or not the NE benefit) we find that households that receive a monetary benefit have a lower sharing rule manly if they are middle or higher income. 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

Figure 5: Children Sharing Rule - Ndhime Ekonomike



child is rather low, around .2. On the other hand, the leakage households (not poor but beneficiary) behave more egoistically toward their children respect to similar household not receiving the benefit.

These considerations are partial, both because the reference sample is not representative of the whole Albanian population and because the analysis is subject to further improvements. However, the evidence seems in favour of the use of collective models for welfare analysis. There are simply too many aspects that with an unitary approach cannot be taken into account.

5 Conclusions

In this paper we have applied the collective framework to the measurement of intra-household inequality and child welfare in Albania. Albanian households have been deeply affected by transition to market economy coming from a regime that revolutionized the previous patriarchical tradition. The effect of the transition seem to be

that of bringing back those traditional values, with a marginal roles for women and negligence toward childhood, very persistent especcially in rural area. At the same time, household structure is changing deeply in Tirana and migration have 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.

We have shown that intra-household inequality plays an important role in determining individual welfare and inequality, with a Gini index for children stepping up by 10 perchentage points when we compare child welfare computed using the sharing rule versus per-capita income. We have also tested whether receiving public transfers induces a modification of the sharing rule respect to similar households who do not benefit. We find that in-kind transfers are likely to improve the situation of children within the household for all income level. On the other hand, cash transfers seem not to ammeliorate the relative position of children within the household, suggesting that if properly conceived, in-kind transfers can be effective, both because well targeted and because they reply to precise needs. To properly analyze these questions we focus on Albanian households with children under five only, using consumption variables present in the Albanian Living Standard Measurement Survey.

To our knowledge, in the literature there are no other empirical studies on the link between public transfers programs (both cash and in-kind) in developing or transition countries and intra-household distribution of resources, but, even if we cannot compare our results with previous works, our findings seem rather clear. These findings seem to support those critical toward neo-classical theory of public transfers and the advantage of conditional transfers programs like those implemented in many Latin America countries. Attending pre-schooling for young children is on the contrary a variable favoring their share of resources within the family, suggesting the goodness of in-kind programs.

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Table 1: Parameters and Demographic Variables of the Collective Demand System - 2002

	Meat	Clothing	Housing	Alcohol/Tobacco	Others	Food
Parameters						
α_i	0.0697	0.1619	0.0052	-0.0218	0.0890**	0.6959***
	(0.0671)	(0.1104)	(0.0316)	(0.0612)	(0.0399)	(0.1198)
γ_{ji}	0.0079	0.0033	-0.0003	-0.0067**	-0.0002	-0.0040
	(0.0054)	(0.0055)	(0.0018)	(0.0032)	(0.0021)	(0.0058)
		-0.0730***	0.0125***	-0.0085	0.0067	0.0590***
		(0.0111)	(0.0041)	(0.0067)	(0.0041)	(0.0084)
			-0.0241***	0.0083	0.0061**	-0.0024
			(0.0049)	(0.0051)	(0.0024)	(0.0033)
				0.0526***	-0.0139***	-0.0318***
				(0.0104)	(0.0040)	(0.0056)
					-0.0054*	0.0067**
					(0.0029)	(0.0032)
						-0.0276***
						(0.0101)
β_i^a	0.0141	0.0309***	-0.0018	-0.0290***	-0.0286***	0.0144
	(0.0099)	(0.0101)	(0.0033)	(0.0058)	(0.0060)	(0.0132)
β_i^c	-0.0025	0.0485***	-0.0008	-0.0333***	0.0167***	-0.0286
	(0.0082)	(0.0183)	(0.0039)	(0.0053)	(0.0057)	(0.0240)
λ_i^a	-0.0040**	0.0054***	-0.0002	0.0020**	0.0053***	-0.0086***
	(0.0018)	(0.0016)	(0.0005)	(0.0008)	(0.0008)	(0.0020)
λ_i^c	-0.0039**	0.0108***	0.0014**	0.0007	0.0028***	-0.0117***
	(0.0019)	(0.0023)	(0.0006)	(0.0009)	(0.0009)	(0.0033)
η_i	-0.0823	-0.2323***	0.0334	-0.0266	-0.0237	
	(0.0626)	(0.0549)	(0.0262)	(0.0177)	(0.0164)	
Demographic variables						
Females more than males in hh	0.0217*	-0.0165	-0.0045	0.0103	-0.0015	-0.0095
	(0.0121)	(0.0184)	(0.0039)	(0.0075)	(0.0049)	(0.0183)
Hh head has university or higher	0.0057	0.0687***	0.0225***	-0.0055	0.0171***	-0.1085***
	(0.0146)	(0.0203)	(0.0049)	(0.0087)	(0.0059)	(0.0213)
Hh head is in bad health	-0.0129	0.0103	0.0016	0.0057	0.0050	-0.0097
	(0.0096)	(0.0136)	(0.0032)	(0.0054)	(0.0041)	(0.0139)
Spouse is in bad health	-0.0332***	0.0275 **	0.0042	0.0017	-0.0049	0.0047
	(0.0093)	(0.0128)	(0.0031)	(0.0059)	(0.0041)	(0.0135)
Number of children under 5	-0.0014	-0.0234***	-0.0005	-0.0019	0.0031	0.0240***
	(0.0066)	(0.0088)	(0.0024)	(0.0039)	(0.0027)	(0.0087)
Number of adults	0.0073**	-0.0119**	0.0005	0.0047**	-0.0043**	0.0037
	(0.0037)	(0.0057)	(0.0013)	(0.0023)	(0.0017)	(0.0057)
Number of elderly	0.0255**	0.0064	-0.0034	0.0020	-0.0017	-0.0288*
	(0.0109)	(0.0153)	(0.0035)	(0.0061)	(0.0044)	(0.0166)
Multiple couple within the hh	-0.0192*	-0.0303*	0.0044	-0.0003	-0.0014	0.0468***
	(0.0114)	(0.0165)	(0.0038)	(0.0063)	(0.0045)	(0.0167)
Subjective basic needs income	0.0067	0.0185**	-0.0023	-0.0030	-0.0006	-0.0194**
	(0.0055)	(0.0085)	(0.0022)	(0.0039)	(0.0024)	(0.0089)
Subjective socio-economic status	0.0011	0.0034	0.0016*	-0.0027	0.0060***	-0.0093**
	(0.0027)	(0.0037)	(0.0009)	(0.0019)	(0.0011)	(0.0040)
Dummy house bigger than 100m	0.0091	0.0111	0.0033	0.0051	-0.0024	-0.0262*
	(0.0092)	(0.0128)	(0.0030)	(0.0057)	(0.0042)	(0.0137)
Dummy having a telephone	-0.0064	0.0260*	0.0055	0.0014	-0.0053	-0.0212
	(0.0113)	(0.0143)	(0.0038)	(0.0066)	(0.0044)	(0.0158)
Dummy member migrated	0.0039	-0.0175	-0.0030	0.0151***	0.0010	0.0004
	(0.0077)	(0.0110)	(0.0027)	(0.0049)	(0.0033)	(0.0116)

Table 2: Household's Income and Price Elasticities - 2002

	Meat	Clothing	Housing	Alcohol/Tobacco	Others	Food
Income (adult)	0.9756	1.6491	0.9041	0.4333	0.6318	0.9609
Income (children)	1.0613	1.1542	0.8104	-0.0077	1.6207	1.0163
Meat	-0.9558	0.0256	-0.0027	-0.0491	-0.0059	-0.0493
Clothing	-0.0977	-1.9339	0.1245	-0.1121	0.0201	0.1957
Housing	0.0410	0.4370	-1.8052	0.2914	0.2254	0.0960
Alcohol/Tobacco	0.0628	-0.1524	0.2739	0.5824	-0.2686	0.0764
Others	-0.0851	0.4330	0.5115	-1.0835	-1.4147	0.3858
Food	-0.0023	0.1009	-0.0036	-0.0536	0.0113	-1.0296

Table 3: Sharing Rule Parameters in $m(\cdot)$ - 2002

Price ratio	3.0117***
	(1.1644)
Dummy for other than Muslim or Orthodox	0.1549
	(0.1519)
Dummy for child ill	0.1085
	(0.1524)
Dummy for both parents employed	-0.0901
	(0.1454)
Age ratio	1.4597***
	(0.5478)
Education ratio	-0.1077
	(0.1911)
Dummy for Ndhime Ekonomike beneficiary	0.2022
	(0.1436)
Children attending pre-schooling	-0.6237***
	(0.1059)