European Economic Review 56 (2012) 792–813

Contents lists available at SciVerse ScienceDirect

European Economic Review

journal homepage: www.elsevier.com/locate/eer

Expenditure on children: A Rothbarth-type method consistent with scale economies and parents' bargaining ☆

Olivier Bargain [a,b,c], Olivier Donni [d,b,*]

[a] Aix-Marseille School of Economics, France
[b] IZA, Germany
[c] CHILD, Italy
[d] THEMA, University of Cergy-Pontoise, France

ARTICLE INFO

Article history:
Received 16 March 2011
Accepted 2 February 2012
Available online 14 February 2012

JEL classification:
D11
D12
D36
I31
J12

Keywords:
Consumer demand
Collective model
Rothbarth method
Expenditure on children
Scale economies
Equivalence scales
Indifference scales

ABSTRACT

We suggest a new methodology to estimate the share of household income accruing to children. The household behavior is represented according to the collective approach. That is, each household member is characterized by specific preferences. Following the principle of the Rothbarth approach, the identification of the children's share requires the observation of adult-specific goods. Our method differs from this traditional approach in that it is compatible with economies of scale as well as with parents' bargaining. We illustrate the method with an application to the French Household Budget Survey.

1. Introduction

Evaluating what parents spend on children is an essential prerequisite for inferring individual living standards from income data. Among the well-known methods suggested in the economic literature, the Rothbarth method is certainly one of the most theoretically sounds. It consists of imputing the same level of aggregate consumption, whatever the demographic composition of the household in which they live, to adults that have the same level of consumption of some adult-specific goods, and deriving from this the fraction of total household expenditure devoted to children.[1] We can

☆ This paper is a revised version of IZA Working Paper No. 4654 (2009), entitled "The measurement of child costs: a Rothbarth-like method consistent with economies of scale".

* Corresponding author at: Université de Cergy-Pontoise, 33 Boulevard du Port, 95011 Cergy-Pontoise Cedex, France.
E-mail address: olivier.donni@u-cergy.fr (O. Donni).

[1] See Deaton et al. (1989), Gronau (1991) and Lazear and Michael (1988) on the Rothbarth approach. See Browning (1992) and Lewbel (1997) for a survey of the various techniques used to assess the economic impact of children on households.

0014-2921/$ - see front matter © 2012 Elsevier B.V. All rights reserved.
doi:10.1016/j.euroecorev.2012.02.003

illustrate this method with the simple specification proposed by Gronau (1988, 1991), assuming that all goods are private. We denote total household expenditure by X and expenditures specifically devoted to children by Θ. From total expenditure on adults, $X-\Theta$, a quantity q_a corresponds to purchases of adult-specific goods. Assuming that the demand for adult goods in households with children can be represented by an affine function:

$$q_a = A + B(X-\Theta), \tag{1}$$

so that $\Theta = X + (A-q_a)/B$, with parameters A and B, then it comes clear that children have a simple wealth effect on the demand for adult goods, i.e., a Θ-translation of the resources available for the adults. The fundamental identifying idea of the Rothbarth–Gronau method is that parameters A and B are the same whatever the demographic composition of the household, and may be obtained by estimating the demand for adult goods in a household without children, written as

$$q_a = A + BX. \tag{2}$$

Estimating (1) from information on total expenditures X and adult-specific consumption q_a for households with children, we can obtain a measure Θ of expenditure on children.

This method is remarkably simple. However, we can distinguish at least two serious problems that might invalidate the estimations obtained with it. Firstly, economies of scale due, in particular, to the possibility of joint consumption in multi-person households may generate a wealth effect that will generally modify the structure of consumption. Perhaps more importantly, scale economies may affect the consumption of adult goods not only via a wealth effect but also via substitution effects. For instance, adult-specific goods which are typically private goods may appear as more costly in a multi-person household than other goods with a large public component (such as heating).[2] Secondly, another important problem that may affect the validity of the Rothbarth method is concerned with the lack of individualistic foundations. The adults of the household are described by some constant parameters A and B (in the example above), the provenance of which is unknown. However, recent literature on collective models suggests that individuals in households, in particular, men and women, may differ in terms of objectives (see Chiappori and Donni, 2011; Donni, 2008, for a survey of this literature). The decisions are often the result of a compromise between spouses, and a shift of the bargaining power from the father to the mother (due, say, to an exogenous modification of their respective earnings) may change the expenditure devoted to children.[3] To understand how resources are allocated to children, it is necessary to be able to disentangle what belongs to the mother's and to the father's preferences in an equation such as (2).

To fill the gap, we suggest an extension of the Rothbarth method which is consistent with economies of scale and with parental bargaining. Our approach is closely related to the most recent developments of the literature on collective models. In particular, Browning et al. (2008) and Lewbel and Pendakur (2008) consider a model where each individual is characterized by a specific utility function and suggest the complete identification of (a) the sharing rule of household resources (which summarizes the bargaining process) and (b) the economies of scale, exploiting data on couples and single-person households simultaneously. Browning et al. (2008) account for economies of scale using a (price) transformation à la Barten while Lewbel and Pendakur (2008) adopt an 'independence of base' (IB) technology of production, i.e., they suppose that there exists a single function, which is independent of total expenditure, that scales the expenditure of each individual in the household and represents the economies from joint consumption. While these authors focus on childless couples, our contribution is to extend the approach to families with children and to suggest a measure of household expenditure on children which takes into account economies of scale.

We use the same basic behavioral identifying assumptions as in Lewbel and Pendakur (2008), namely the existence of some private, assignable goods, the fact that individual preferences do not change across household compositions, and the IB assumption. The assumption of assignable goods is fundamental in the traditional Rothbarth method, i.e., that the demand for some adult-specific goods is observed. We require here that each spouse in the household must exclusively consume at least one adult-specific good. The IB assumption allows us to recover the consumption technology and the sharing of resources between wife, husband and children without price variation, which makes the estimation much more tractable and is also very convenient when using data in which spatial or time variation in prices is limited.

Our theoretical results are implemented using the 2000 French Household Budget Survey (INSEE). We suppose that household expenditures on certain pieces of clothing can be seen as male-specific and female-specific, respectively, and consider the case of couples with only one child. We first estimate the budget share equations for the two adult-specific goods in order to measure the child's share of household resources and the economies of scale, then generalize our approach and estimate a system of ten budget share equations. Our evaluation of what parents spend for the child is comprised between 20% and 27% of the total household expenditure, which conforms to intuition much more than evaluations based on the traditional Rothbarth method. Once economies of scale are taken into account, it turns out that what is actually supported by parents is notably lower. Finally, from economies of scale and the sharing of resources, we

[2] Another traditional argument is that goods that are consumed by both adults and children become more expensive to the adult than goods that are consumed by adults only (Deaton and Muellbauer, 1986). To quote Deaton (1997): "on a visit to a restaurant, the father who prefers a soft drink and who would order it were he alone, finds that in the company of a child his soft drink is twice as expensive but that a beer costs the same, and so is encouraged to substitute towards the latter".

[3] Numerous studies show that the source of exogenous income (Lundberg et al., 1997, for instance) influences the structure of consumption and, in particular, expenses on children.