POSSIBILITIES OF APPLICATION FUZZY SETS IN ANALYSIS OF A CONSUMPTION STRUCTURE

Jadwiga Abtowa
Department of Mathematics, Academy of Economy,
ul. Marchlewskiego 146/150, 60-967 Poznań, Poland.

In previous studies the differentiation of consumption structure was considered according to the height of income social groups and number of persons in the household, without investigation of the demographic structure of the family. The mean values of the results obtained give only the possibility to make comparisons considering the number of family members height of affluence group and the family head's affiliation to an adequate social-proffesional group /a house hold-family head is a person with the higest income/. All that makes some individual features of household vanish, becouse it may happen that budgets of differest households will find themselves in the same affluence group with the some number of persons in a family, their structures differing significantly.

In this communication there have been presented possibilities of estimation changes in consumption structures as a consequence of changing demographic ecobomical and social situation of families throughout many years with application of fuzzy sets.

We would obtain the whole picture of changes if we would observe families' housekeeping starting the begining throughout next stages of evolution up to retiring by the founders. But it would conduce to uncomparability of the data resulting from many years observations. Trying to overcome those difficulties there has been constructed a quasi-dynamic model of family's changing consumption struoture basing on result of researches on households budgets of one year. We make proper classification of empirical data according to

established criterions and selected proper consumption structures of each individual family.

Let $B = \{b_i,\ i=1,2,\ldots,n\}$ be a set of researching households budgets. Then including individual household to X_j class can be describe by this characteristic function $w_j: B \to \{0,1\}$

$$(1) \qquad w_{ji} = w_j(b_i) = \begin{cases} 1 & \text{when} \quad b_i \in X_j \\ 0 & \text{when} \quad b_i \notin X_j \end{cases}$$

This given set B characterizes the matrix of information $\underline{w}$. To each household $b_i \in B$ $(i=1,2,\ldots,n)$ is ordered a quantity c_i which is equal of expense on distinguished consumer good or aggregated group of goods. We obtain the model approximating cumulated curves of group expenses of accordingly selected families in their different evolution stages and belonging to specified X_j class.

The continuous function $f(t, \vec{\alpha}_j)$, $j=1,2,\ldots,m$; $\vec{\alpha}_j \in R^m$. Applying the least squares method we receive dependence

$$(2) \qquad \sum_{j=1}^{p} \sum_{i=1}^{m} \left(w_{ji}\left(c_i - f(t_i, \vec{\alpha}_j)\right)\right)^2$$

Function $R^{p \cdot m} \to R^k$, where $p \cdot m \leqslant k + n$; p – number of classification; m – number of function's parameters $f(t_i, \vec{\alpha}_j)$; n – number of observations; k – number of conditions which must fulfil parameters $\vec{\alpha}_j$ $(j=1,\ldots,m)$.

The hard classification to the X_j class gives only some informations about the examined object. Fuzzy subset is suitable instrument to describe such situation.

Applying the classical definition of fuzzy subset in described problem it will be enough to change characteristic function (1) into to characteristic fuzzy function

$\mu_j : B \to [0,1]$

$\mu_j(b_i) = 1$, $1 \in [0,1]$, what means, that i-th budget in 1- degree fulfils the criteria of X_j class. The obtained in that way fuzzy matrix information $\underline{\mu}$ we place intu dependence (2) what gives us more adequate description of reality.

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