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## Article

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# Identification of affluent households in Poland by the structure of consumption expenditures

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**Abstract:** The aim of the article was an attempt at identifying various levels of affluence of Polish households by their consumption structure as well as description of the volume, structure, and disparities in expenditures of the identified classes of affluence. A two-step procedure was conducted to determine relative affluence lines of 150%, 230%, and 450% of the median expenditures defining three classes labelled as affluent, wealthy, and rich. Comprising respectively 16%, 6%, and 1% of the population, these classes showed very diverse consumption structure.

**Keywords:** affluence lines, consumption structure  
**JEL codes:** D12, C38

## 1. Introduction

Despite continuous attention received in economic studies, affluence research frequently poses a most basic difficulty, the lack of a cohesive and commonly agreed upon definition. The concept of affluence is sometimes linked to that of prosperity, or being comfortably out of the reach of poverty (Szopa, 2012: 104-105), and sometimes identified with the very narrow class of the most affluent high income economic elites (Słaby, 2007: 20). Of two dimensions of affluence, income

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and wealth, the Polish studies focus on the first (Słaby, 2007: 20; Zagórski et al., 2009: 24-25), though some authors emphasize the need to broaden the analysis by including amassed assets (Kalbarczyk, 2006: 86; Słaby, 2006: 31). Furthermore, income as a flow measure of affluence is sometimes argued to suffer from several shortcomings, most notably from the underreporting of income from underground economy, or from fluctuations in highly volatile types of income, which in some socio-economic groups, such as farmers, becomes endemic. The magnitude of this phenomenon in Poland warrants the use of expenditures instead of income in measuring monetary affluence (Kot, 2008: 72-73; Szopa, 2012: 112).

Whether based on income or wealth, identification of affluent households employs affluence lines, which mirror poverty lines in their function of identifying poor households. These lines are typically defined by setting an absolute or relative threshold as a given single value, or a multiple of the population mean or median, or a share of the population (Medeiros and Souza, 2014: 10-15). No matter how defined the affluence lines, the methods that determine the thresholds are often completely arbitrary. When they are not, the justification comes in the form of socially acceptable level of satisfaction of needs (Drewnowski, 1978: 264), amount of transfers necessary to eradicate poverty (Medeiros, 2006: 1-18), scale of subjective perception of affluence (Słaby, 2007: 21), or goodness of fit of the empirical to theoretical distribution (Włodarczyk, 2013: 76-87). Given abundance of proposals and lack of a common definition some authors simultaneously consider several lines which correspond to varying degrees of affluence (Brzeziński, 2010: 297; Zagórski et al., 2009: 23-27). This article attempts to provide a consumption based form of justification for constructed affluence lines, namely, the differences in the structure of household expenditures. The households adjust their consumption structure according to the means and resources placed at their disposal, and the affluent households dispose of their means differently than the average or poor ones. Following Engel's law, the budgets of the less privileged are to a greater extent burdened by the essential expenditures on food and housing, while the better off spend more of their income discretionarily (Radziukiewicz, 2012: 101). Consequently, not only does the level but also the structure of consumption of affluent households differ from that of non-affluent ones (Zalega, 2011: 187, Szopa, 2012: 112-113) and this difference can help classify households by varying degree of their affluence.

The aim of this article is an attempt at using consumption structure of to identify affluent

households and classify them according to the extent of their affluence and to provide description of the level and structure of expenditures of the resultant affluence classes. All the computations in the paper were performed using Statistica and R programs.

## 2. Material and Methods

The analysis was based on unpublished microdata from Household Budget Survey (HBS) conducted by Central Statistical Office in 2010. The 37 412 surveyed households had been sampled to be representative for the whole population of Polish households. However, the very rich households may still have been underrepresented due to a high refusal rate in that segment, a fact well-known in household surveys and discussed in some detail by Słaby (2007: 21) and by Medeiros and Souza (2014: 10-15). The problem seems to be sufficiently persistent as to call for much caution in conclusions about the consumption behavior of the richest of the surveyed households (Szopa, 2012: 104).

During the first step of the analysis each household's total expenditures<sup>1</sup> were divided by the median of the expenditure distribution of all households and subsequently grouped into left-closed subclasses of width of 10% of the median. The exceptions were two penultimate subclasses, which due to a decreasing number of households were 50% median wide, and the ultimate open subclass with expenditures no smaller than 450% of the median. The subclasses that had expenditures lower than 90% of the median were deemed poor<sup>2</sup> and consequently excluded from further considerations. In each of the remaining non-poor subclasses the shares in overall consumption of 9 main expenditure categories were calculated. The categories were derived from the COICOP division used by the Polish HBS, which distinguishes 12 expenditure categories (*Metodologia*, 2011: 46): food and non-alcoholic beverages (X1), alcoholic beverages, tobacco, and narcotics (X2), clothing and footwear (X3), housing, water, electricity, gas and other fuels (X4), furnishing, household equipment and routine maintenance of the house (X5),

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<sup>1</sup> All calculations were made for equivalent expenditures. The concept of equivalence allows to compare expenditures of households of different size and demographic composition. The article uses equivalence scale adopted by EUROSTAT in the late 1990s and called OECD-modified scale. This scale assigns the weight of 1 to the household's head, 0.5 to each additional adult, and 0.3 to each child. The sum of these weights is the number of equivalent persons in the household, and the quotient of total expenditures by this number is referred to as equivalent expenditures.

<sup>2</sup> Those subclasses correspond to the households whose expenditures do not exceed the threshold of social exclusion published by the Institute of Labor and Social Studies in 2010.

health (X6), education (X7), transport, communication, recreation and culture, restaurants and hotels, and miscellaneous goods and services. In the paper, due to sparsely reported (in some subclasses) expenditures on the latter categories, transport and communication were combined into one category (X8), as well as recreation and culture, and restaurants and hotels (X9). The very last category of miscellaneous goods and services was omitted<sup>3</sup>. The resultant expenditure categories were adopted as decision variables for further analysis<sup>4</sup>.

In order to establish classes of households homogenous in consumption structure and thereby construct affluence lines as multipliers of the total expenditure median the methods of agglomerative hierarchical clustering were employed. The objective of hierarchical agglomeration is partitioning of a multidimensional data set in such a way that elements in the same class are as similar and at the same time as different from elements in other classes as possible. The method first considers each element as a single cluster and then proceeds to calculate distance matrix between all pairs of clusters. The closest clusters are then merged and the distance matrix is updated. The procedure is repeated until only one cluster remains. Different procedures of agglomerative hierarchical clustering use differently defined distance matrices and differently determined smallest distance between clusters (Wysocki, 2010: 62-64). The method implemented in the article used Euclidean distance and Ward's method of clustering, which minimizes the total within cluster variance. Subsequent steps of this procedure were illustrated by a dendrogram. Optimum number of classes of similar consumption structure (the cut-off point of the dendrogram) was determined by the analysis of the intra-cluster variance increments during the clustering process. Relatively large increments suggest the best cut-offs (Wysocki, 2010: 128-129). The resultant partition was the basis for typology of different affluence classes of households. Description of the classes included inequality in total expenditure distribution within each class, measured by the Gini index. The values of this index vary between 0, which reflects complete equality and 1, which indicates complete inequality, i.e. when no household in a given class, except one, reports any expenditures (Panek, 2011: 71-72).

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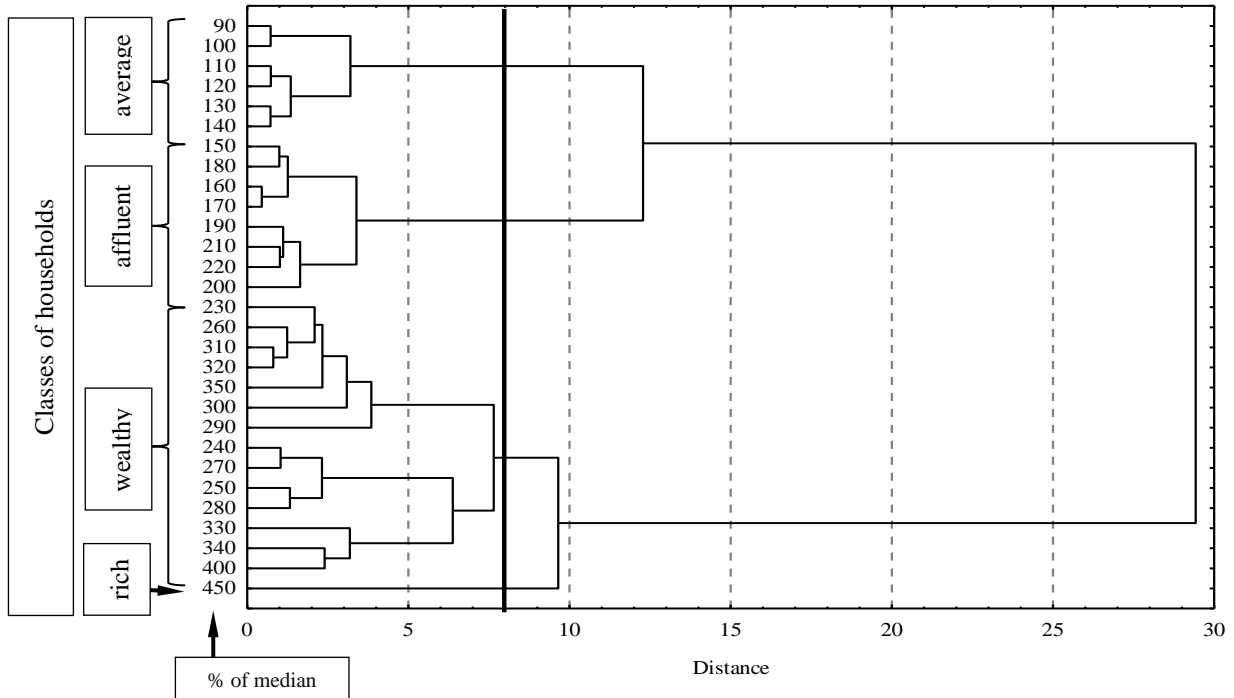
<sup>3</sup> Due to the omission of this category shares the of adopted nine expenditure categories do not add up to 1.

<sup>4</sup> Prior to subsequent calculations the decision variables were standardized.

### 3. Results

The results of the classification procedure of the household subclasses with respect to the shares of the nine expenditure categories are presented in Figure 1.

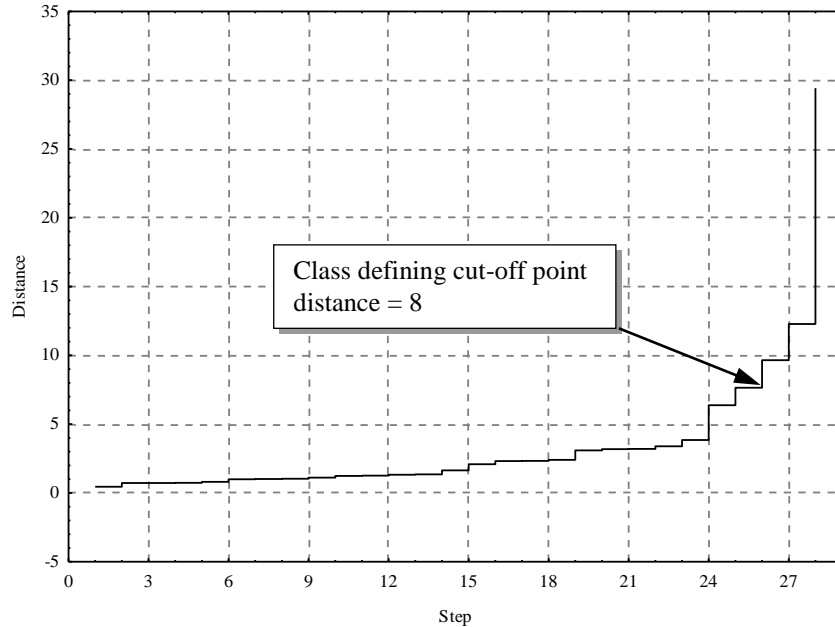
**Figure 1. Dendrogram of hierarchical classification of subclasses of households based on 9 decision variables of the consumption structure. Ward method with Euclidean distance**



Source: own work based on microdata from HBS conducted by Central Statistical Office in 2010.

The analysis of the dendrogram (Figure 1) and of the agglomeration sequence (Figure 2) was used for the optimal number of classes. The increments of intra-cluster variance were examined with the provision that the ensuing number of classes be neither too large nor too small. The first relatively large increase in the variance was observed at linkage distance 5, a cut-off point that would yield 6 non-poor classes. That number, however, was deemed too large to succinctly analyze the issue of household affluence. The next large increase occurred at linkage distance 8 yielding 4 non-poor classes, and this cut-off threshold was finally adopted despite the fact that the greatest possible increase followed the merging of 2 clusters into 1. Nonetheless, two classes of affluence with a cut-off at 230% of the median would have been too general for an informative classification of affluent households.

**Figure 2. Chart of linkage distance over the clustering steps in the agglomeration sequence**



Source: own work based on microdata from HBS conducted by Central Statistical Office in 2010.

The resultant four non-poor classes were the following:

1. Households with expenditures between 90% and 150% of the median were dubbed average. This class constituted 35.2% of all Polish households and their pooled expenditures – 33.4% of all expenditures incurred by Polish households.
2. Households with expenditures between 150% and 230% of the median were called affluent. The class comprised 15.6% of all households and concentrated 23.7% of total expenditures.
3. Households with expenditures between 230% and 450%, called wealthy, represented 6.3% of all households and 16.0% of all expenditures.
4. Households with expenditures of 450% of the median or more were defined as the rich class. It constituted only 1% of all households and concentrated 5.4% of all expenditures.

Identification procedure of the affluent, wealthy, and rich classes, which combined 23% of population share, showed certain coincidence with the results obtained by Zagórski et al. (2009: 23-27), who singled out two upper classes described as relatively affluent and relatively wealthy, together comprising 21% of Polish households. Moreover, despite using completely different methods, their affluence lines were strikingly similar to the affluence lines established by the procedure of this paper: 150% of the income median was the lower bound of the relatively

affluent class, and 225% was the lower bound of the relatively wealthy class of the Zagórski study.

**Table 1. Selected characteristics of four non-poor classes of Polish households together with the poor class**

Classes of households		Total expenditures as % of the median (left-closed, right-open)	Population share [%]	Income share [%]	Per capita expenditures (PLN)	Gini index
Poor <sup>5</sup>		0-90	41.8	21.5	511	0.65
Non-poor	Average	90-150	35.2	33.4	940	0.23
	Affluent	150-230	15.6	23.7	1 503	0.28
	Wealthy	230-450	6.3	16.0	2 492	0.35
	Rich	450 and more	1.0	5.4	5 537	0.71
Poland			100.0	100.0	991	0.32

Source: own work based on microdata from HBS conducted by Central Statistical Office in 2010.

In the non-poor classes the level of expenditures was concomitant with that of inequality, measured by Gini index. In the average households expenditures were 5% smaller than in the entire population and inequality was very low – about 0.23 (Table 1). The affluent households spent 50% more than the national average and inequality in this class was still rather low, 0.28. The wealthy class spent 1.5 times more than the national average and the rich class – 4.5 times more. Inequality was 0.35 in the former class, close to 0.32 for the whole country, and 0.71 in the latter – an astoundingly high value attesting to considerable heterogeneity of this class.

Analysis of consumption structure in non-poor classes (Table 2) showed that with increasing affluence shares in overall consumption of the following expenditure categories were dropping: food and non-alcoholic beverages (X1), alcoholic beverages, tobacco, and narcotics (X2), housing, water, electricity, gas and other fuels (X4). Among all the Polish households the largest shares fell to food and non-alcoholic beverages (26.0%) and housing, water, electricity, gas and other fuels (21.1%). Among non-poor classes only the average class spent on those two expenditure categories proportionally more than the national average (by 2.6 and 1.4 p.p., respectively). In the other non-poor classes the shares of these two categories were considerably smaller: in the affluent class by 3.8 and 0.5 p.p., in the wealthy class by 10.4 and 1.9 p.p., and in the rich class by 18.0 and 5.3, respectively. The observed trend of falling shares of the first

<sup>5</sup> The table shows the poor class with expenditures of less than 90% of the median for comparison reasons. This class was not included in the identification procedure.



expenditure category is economically justifiable by Engel's law. It is also understandable in the case of housing, which is the other essential need that must be satisfied before any discretionary one. A similar declining trend was exhibited by shares of the alcoholic beverages, tobacco, and narcotics category. The share was the second smallest among all the shares of expenditure categories for all Polish households (2.8%) and only in the average and affluent classes was larger than the national average (by 0.3 and 0.1 p.p.), while in the wealthy and rich classes was smaller by 0.5 and 1.2 p.p., respectively. Though not negligent, the trend was not very pronounced.

**Table 2. Shares of nine expenditure categories in total consumption expenditures classified by their affluence measured by expenditure level**

Classes of households		Shares of 9 expenditure categories in total consumption expenditures [%]								
		X1	X2	X3	X4	X5	X6	X7	X8	X9
Poor <sup>5</sup>		37.8	3.2	3.5	22.5	3.3	4.7	0.6	9.6	2.5
Non-poor	Average	28.6	3.1	5.3	22.5	4.7	5.2	1.2	12.1	4.5
	Affluent	22.2	2.9	6.6	20.6	6.2	5.2	1.7	13.5	8.5
	Wealthy	15.6	2.3	7.2	19.2	7.4	5.1	2.1	15.9	13.5
	Rich	8.0	1.6	5.6	14.8	8.9	3.6	1.8	34.3	12.9
Total		26.0	2.8	5.5	21.1	5.4	5.0	1.3	13.6	6.8

Source: own work based on microdata from HBS conducted by Central Statistical Office in 2010.

Among the remaining six categories a clear rising trend was observed in the shares of furnishing, household equipment and routine maintenance of the house (X5) and of transport and communication (X8). The house with its furnishings, which satisfies various needs of its occupants, is one of the most visible manifestations of affluence, at least in Poland. With rising living standards the share of this type of expenditures rises as well, since the perception of these goods changes from price- to quality-oriented (Szopa, 2012: 113). In 2010 this share for all households of Poland was 5.4%. It was smaller for the average class by 0.7 p.p. and larger for the affluent, wealthy, and rich classes by 0.8, 2.0, and 3.5 p.p., respectively. The average share of expenditures on transport and communication was 13.6% in the whole country, smaller than this level in the average and affluent classes by 1.5 and 0.1 p.p., and larger in the wealthy and rich classes by 2.3 and an astounding 20.7 p.p., respectively. A deepened analysis of this category showed that such dramatic increase in the last class was closely related to the purchase of very expensive cars. Possession of luxury cars is an unmistakable signal of affluence and social position. As in the case of house expenditures, with growing prosperity, it is the quality, the

technological edge, the celebrated brand that count more than price in a vehicle (Szopa, 2012: 108).

The next three expenditure categories – clothing and footwear (X3), education (X7), and recreation, culture, restaurants and hotels (X9) – did not show such strong links between their share's increase and affluence level. In the three categories the shares of the average class were smaller than the national average of 5.5%, 1.3%, and 6.8% by 0.2, 0.1, and 2.3 p.p., respectively. In the affluent class the shares were larger by 1.1, 0.4, and 1.7 p.p. and in the wealthy class by 1.7, 0.8, and 6.7 p.p., respectively. The class where the otherwise undisturbed rising tendency broke down was the last, the richest class, with all three shares lower than in the wealthy class and the share of clothing and footwear even lower than in the affluent class, though admittedly the leisure share was still roughly twice that of the national average and considerably larger in wealthy and rich classes than in the poorer ones. One must not forget however, that the data on the richest class should be taken with a grain of salt (as was mentioned before) and unusually large shares of transport expenditures might have been the cause of the depressed shares of other categories in this class. On the other hand it might be that although leisure spending is, by and large, the lifestyle trademark of the privileged (Radziukiewicz, 2012: 109), at least some of the very rich prefer more passive forms of spending free time because they do not have much of it (Szopa, 2010: 125) or even choose money over leisure, which they still value little (Słaby, 2007: 28-29).

The last, health expenditure category share was least diverse across affluence classes and close to the national average of 5.0%, except in the rich class where it was smaller by 1.4 p.p. This singular exception may be indicative of data representativeness problem, but then again, may just as well evidence demand saturation occurring in this class.

#### **4. Conclusion**

Increasing prosperity of Polish households is an important economic and social phenomenon that necessitates comprehensive research on consumer behavior of the most affluent segments of society. The subject is challenging methodologically as there exists no uniform or cohesive terminology related to households' affluence, nor universally agreed upon methods to identify it.

The two-step procedure of defining affluence lines, presented in the article, allowed determining classes of households that represent different levels of affluence. The attempt undertaken in the article to distinguish these classes based on consumption structure requires further research, especially in the context of year to year changes that occur in consumption in general and in its structure in particular.

The conducted study showed that in 2010 almost 16% of Polish households, whose expenditures fell between 150% and 230% of the country's median, could be labelled as affluent, living comfortably above the social exclusion threshold. About 6%, termed as wealthy, had expenditures between 230% and 450% of the median, and only 1% of the households were styled rich, with expenditures above 450% of the median.

The three affluent classes exhibited marked differences in their consumption structure. The share of essential expenditures (on food and housing) in the rich class was half the share in the affluent class. Important expense items in the wealthy and rich classes were the positional goods belonging to the transport and communication category (mainly luxury cars) and the leisure goods and services (that comprised recreation, culture, restaurants and hotels). The combined shares of these expenditure categories in the two wealthiest classes were one and a half larger than in the affluent class.

However, much prudence is required in more detailed interpretation of the results, particularly in the case of the rich class, owing to the fact of underrepresentation of the very wealthy economic elites in household budget surveys.

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## IDENTIFICATION OF AFFLUENT HOUSEHOLDS IN POLAND BY THE STRUCTURE OF CONSUMPTION EXPENDITURES

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### ***Identyfikacja zamożnych gospodarstw domowych w Polsce na podstawie struktury wydatków konsumpcyjnych***

#### ***Streszczenie***

Celem pracy była próba identyfikacji różnych stopni zamożności gospodarstw domowych w Polsce na podstawie struktury wydatków konsumpcyjnych oraz charakterystyka poziomu, struktury i zróżnicowania wydatków w tak wyodrębnionych klasach gospodarstw domowych. Przedstawiona dwustopniowa procedura pozwoliła na ustalenie relatywnych granic zamożności na poziomie 150%, 230% i 450% mediany wydatków wyróżniając, obok niezamożnej, trzy klasy gospodarstw domowych nazwane dostatnią, zamożną i bogatą. Stanowiły one odpowiednio 16%, 6% i 1% gospodarstw domowych i prezentowały bardzo zróżnicowaną strukturę konsumpcji.

***Słowa kluczowe:*** granice zamożności, struktura wydatków konsumpcyjnych