

CHANGES IN HOUSEHOLDS EXPENDITURES STRUCTURES IN THE EUROPEAN UNION – IS THERE CONVERGENCE?

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Słowa kluczowe: struktura wydatków gospodarstw domowych, β -konwergencja, σ -konwergencja

A b s t r a c t. The aim of the paper is to answer the question whether convergence between households expenditures structures in the European Union exists. In order to study the phenomenon concepts of β - and σ -convergences are applied. The research is based on data on households expenditures in the period from 1995 through 2011 provided by EUROSTAT. It covers 27 countries and 12 groups of goods and services according to the COICOP classification. The analysis of results obtained allows to record convergence of both types for majority of structure components.

INTRODUCTION

According to Gerstberger and Yaneva [2013] consumption is a key indicator of citizens' well-being. It may be considered as ultimate purpose of economic behavior. It also plays an important role in economic theory and research on household expenditures and consumption is popular among economists. In Noll's opinion [Noll 2007], studying patterns, disparities and determinants of household expenditures and their changes across time by making use of large scale population surveys seems to be promising in various aspects. At the most general level it may provide insights into general consumption behavior as a major source of human well-being and respective choices, and restrictions. Then, investigating household expenditures and consumption patterns is considered to be key for monitoring and explanation of inequalities and changes in material living standards and general welfare. Finally, studying expenditures and consumption behavior of private households seems to be an important and promising strategy to extend mainstream approaches to studying inequality as a key topic of sociological and economic research.

Although there is a long history of research on patterns of household expenditures and their changes across time, those studies usually focus on single countries. International comparative studies on household expenditure patterns are rather rare. Noll [2007] reports one of the earliest works in this field by Houthakker [1957]. He also mentions a comprehensive EUROSTAT Report by Hagenars et al. [1994] that presents for the first time results of detailed comparative micro-data-analyses for the by then 12 EC-countries using incomes and expenditures, and later papers by Dufour et al. [1999], and Kalwij and Machin [2004].

As there is a shortage of comparative research on changes in household consumption expenditure structures in the European Union, this study is an attempt to fill the gap. Therefore, convergence of new member states of the EU to the old ones in households consumption structures is examined. An analysis of households expenditures structures allows to reveal similarities and differences in standards of their livings, and more generally, to assess the living standard of the whole society. Problems of people living standards are becoming key in a policy and strategy of social development. For testing the occurrence of this phenomenon a variety of convergence concepts are applied. The most straightforward version of the concept is σ -convergence, which denotes diminishing differences between units over time. The subject of the analysis is to discover potential convergence among the EU countries in this field. This issue is important in relation to the problem of economic and social cohesion among the EU Member States.

DATA

Total household consumption expenditures were broken down into twelve categories by a system known as Classification of Individual Consumption by Purpose (COICOP). The Council regulation for the European system of accounts provides the underlying basis for the collection of data on household consumption expenditure referred to within this section. The data is provided by EUROSTAT. COICOP categories are the following 12 consumption areas:

- food and non-alcoholic beverages,
- alcoholic beverages, tobacco and narcotics,
- clothing and footwear,
- housing, water, electricity, gas and other fuels,
- furnishings, household equipment and routine household maintenance,
- health,
- transport,
- communications,
- recreation and culture,
- education,
- restaurants and hotels,
- miscellaneous goods and services.

The available data for 27 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, the United Kingdom, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria and Romania) covers the period from 1995 through 2011.

METHODOLOGY

Recently, many economists try to explain the crucial issue of whether different countries or regions become similar to each other over time. Convergence between economies (i.e. countries or regions) is defined as the tendency for the levels of chosen indicator to equalise over time which will happen only if a catching-up process takes place. Usually, the Gross

Domestic Product (GDP) per capita is taken as the indicator. However, as highlighted in the 2009 “Report on the measurement of economic performance and social progress” by Stiglitz, Sen, and Fitoussi, actual individual consumption (AIC) per capita is an alternative indicator better suited to describe the material welfare situation of households as it takes account of widespread differences across countries in the shares of public financing for provision of education and health services to individuals [Gerstberger and Yaneva 2013]. In the research presented here, shares of each of 12 categories of consumption expenditures in total households consumption expenditures are taken into account. This is an important departure from other studies of the subject.

There are many approaches to testing the occurrence of this phenomenon. The most common concepts of convergence are β -convergence and σ -convergence. The concept of β -convergence originated in the economic growth literature. Its application in economics is verification of the hypothesis that poorer economies will tend to grow faster than richer economies. It has been an active area of research in the last years due to the development of the economic growth theory literature. Most of convergence models have their roots in the neoclassical Solovian growth model [Sardavar 2011]. Since the time of Barro’s pioneering econometric proposals [Barro 1991], the phenomenon of economic convergence between countries has been empirically studied. It involves estimating the following regression [Próchniak and Rapacki 2009]:

$$\frac{1}{T}(\ln y_{iT} - \ln y_{i1}) = \alpha + \beta \ln y_{i,1} + \varepsilon_i, \quad (1)$$

where:

- y_{it} – value of indicator for i -th country and t -th year,
- $(\ln(y_{iT}) - \ln(y_{i,1}))/T$ – growth rate of indicator y ,
- ε_i – error term with finite variance σ^2 and mean equal zero,
- α and β are the parameters to be estimated,
- i – indicates country subscript ($i = 1, 2, \dots, 27$).

$\beta < 0$ implies negative correlation between growth rate and initial log level of y . If the parameter β is significantly negative, one can record unconditional β -convergence¹. That is, the growth rates of consumption depend upon the initial consumption levels only, and they are inversely correlated.

Another concept of convergence is σ -convergence concerning cross-sectional dispersion of given indicator. In this approach the standard deviation or the coefficient of variation² are taken into account. So, in our case: if the dispersion of expenditure share over the time diminishes, the presence of sigma convergence can be confirmed. Formally, for the coefficients of variation of each expenditure share trend models are estimated:

$$V_t = \alpha + \beta t + \xi_t, \quad (2)$$

where:

- V_t – coefficient of variation of expenditure shares in the t -th year,
- α, β – parameters to be estimated,
- ξ_t – error term ($t = 1, 2, \dots, T$).

¹ When consumption growth is related to initial consumption level only (other variables do not play significant roles at all), convergence is said to be unconditional or absolute.

² Coefficient of variation is defined as the ratio of the standard deviation to the mean.

If the coefficient of variation statistically significantly decreases, this is taken as evidence of σ -convergence.

β - and σ -convergences are more complementary than substitutable concepts, so both of them must be tracked concurrently in order to show convergence. On the other hand it should be mentioned that β -convergence is a necessary, but not a sufficient condition for σ -convergence to take place [Sala-i-Martin 1996]. Moreover, there is some statistical relationship between those two convergences. Maurer [1995] explains it in six lemmas:

- σ -convergence implies necessarily β -convergence;
- β -divergence implies necessarily σ -divergence;
- β -convergence is compatible with σ -convergence or σ -divergence;
- σ -divergence is compatible with β -divergence or β -convergence;
- β -constancy is compatible with σ -convergence or σ -constancy;
- σ -constancy is compatible with β -convergence or β -constancy.

Next section presents results of application of those two concepts (β - and σ -convergences) to analysis of changes in households expenditures structures in the European Union.

RESULTS

Various researches show considerable differentiation of expenditure structures in the European Union countries [see Liobikienė and Juknys 2012, Liobikienė and Mandravickaitė 2012, Dudek and Koszela 2013]. These differences can result (inter alia) from various levels of income being at disposal of households in analyzed countries. In Table 1, there are presented results of testing β -convergence.

Table 1. Results of estimation of unconditional β -convergence models (1)

Share of expenditures on	α	β	R ²
Food and non-alcoholic beverages	0.0380**	-0.0179**	0.5678 ^a
Alcoholic beverages, tobacco and narcotics	0.0218*	-0.0153**	0.1715
Clothing and footwear	0.0370*	-0.02869**	0.2345
Housing, water, electricity, gas and other fuels	0.0993***	-0.0308***	0.3969
Furnishings, household equipment and routine household maintenance	0.0796***	-0.0477***	0.6687
Health	0.2891***	-0.0124	0.0761
Transport	0.0940***	-0.0362***	0.4348
Communications	0.0529***	-0.0447***	0.3134
Recreation and culture	0.0756***	-0.0347***	0.6923
Education	0.0132**	-0.0308***	0.3833
Restaurants and hotels	0.0122	-0.0072**	0.1401
Miscellaneous goods and services	0.0535***	-0.0222***	0.3058

Note: * statistical significance at 0.10, ** statistical significance at 0.05, *** statistical significance at 0.01. ^a Relatively low values of coefficient of determination (R²) are typical for β -convergence models [see Marques and Soukiazis 1998 or Próchniak and Rapacki 2009].

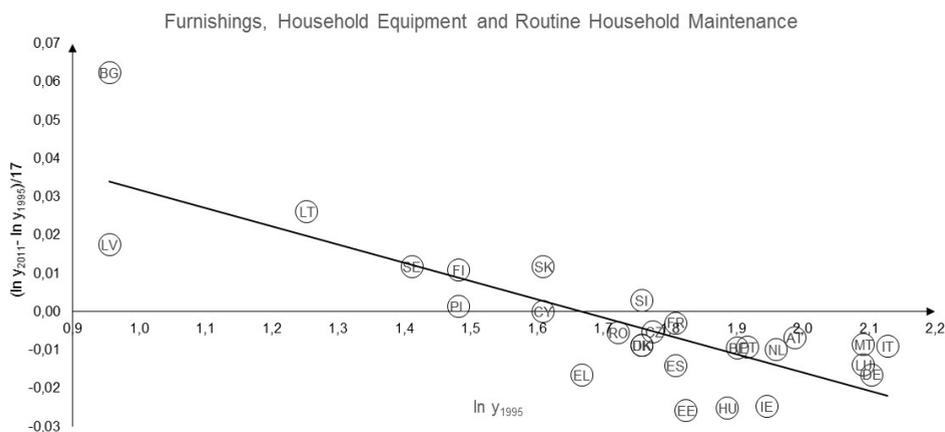
Source: own calculations.

On the base of information given in Table 1, one may record β -convergence for:

- food and non-alcoholic beverages,
- alcoholic beverages, tobacco and narcotics,
- clothing and footwear,
- housing, water, electricity, gas and other fuels,
- furnishings, household equipment and routine household maintenance,
- transport,
- communications,
- recreation and culture,
- education,
- restaurants and hotels,
- miscellaneous goods and services.

For those categories, values of β parameter are negative and statistically significant at 0.05 level. There is no β -convergence only in the case of share of expenditures on health. Figure 1 presents an exemplary graph of one of analyzed indicators – the share of expenditures on recreation and culture.

On the base of Figure 1 one may notice that rates of growth of shares of expenditures on recreation and culture are negatively correlated with the level of the shares in 1995. This means that in countries with low levels of the characteristic at the beginning of considered period, faster increase in recreation and culture budget shares occurs (for example in Lithuania, Latvia and Bulgaria those shares arose from almost 3% in 1995 to almost 7% in 2011). Whereas in countries with relatively high levels of the share, there were usually observable minor changes only (for example in the United Kingdom, Finland and Sweden the share was equal to 11%, both in 1995 and 2011).



Acronyms: AT – Austria, BE – Belgium, DK – Denmark, FI – Finland, FR – France, DE – Germany, GR – Greece, IR – Ireland, IT – Italy, LU – Luxembourg, NL – the Netherlands, PT – Portugal, ES – Spain, SE – Sweden, UK – the United Kingdom, CY – Cyprus, CZ – the Czech Republic, EE – Estonia, HU – Hungary, LV – Latvia, LT – Lithuania, MT – Malta, PL – Poland, SK – Slovakia, SL – Slovenia, BG – Bulgaria, RO – Romania

Figure 1. β -convergence evidence for the share of expenditures on recreation and culture
Source: own elaboration.

Table 2. Results of estimation of σ -convergence models (2)

Share of expenditures on	α	β	R ²
Food and non-alcoholic beverages	46.52 38**	-0.1132**	0.9674
Alcoholic beverages, tobacco and narcotics	41.4712***	-0.9266	0.0961
Clothing and footwear	19.9419***	0.1704**	0.3320
Housing, water, electricity, gas and other fuels	23.4048***	-0.3614**	0.9152
Furnishings, household equipment and routine household maintenance	29.0243***	-0.8524***	0.8509
Health	28.8355***	-5.9295	0.0007
Transport	18.7415***	-0.0859*	0.2129
Communications	22.2132***	0.3787**	0.2503
Recreation and culture	28.0031***	-0.5119***	0.8662
Education	57.4836***	-0.4274***	0.3667
Restaurants and hotels	53.1919***	-0.4710***	0.9048
Miscellaneous goods and services	37.7078***	-0.7311***	0.8051

Note: * statistical significance at 0.10, ** statistical significance at 0.05, *** statistical significance at 0.01.

Source: own calculations.

In the next step of the research, σ -convergence is tested. The results obtained are given in Table 2. On the base on information given in Table 2, one may conclude:

1. Differentiation of shares of expenditures on „clothing and footwear” and „communications” kept increasing in the period under consideration. This indicates divergence, whereas for both those consumption areas β -convergence was recorded.
2. There is no σ -convergence or σ -divergence for the following categories: “alcoholic beverages, tobacco and narcotics”, and “health”. This means that no significant changes (neither decrease, nor increase) were observed.
3. σ -convergence exists for such consumption areas as:
 - food and non-alcoholic beverages,
 - housing, water, electricity, gas and other fuels,
 - furnishings, household equipment and routine household maintenance,
 - transport,
 - recreation and culture,
 - education,
 - restaurants and hotels,
 - miscellaneous goods and services.

This is the characteristic of σ -convergence that it attempts to capture the cross-sectional volatility of a variable over time. The σ -convergence for selected shares of expenditures is displayed in Figure 2. Figure 2 reveals that in the period from 1995 through 2011 differentiation of shares of expenditures on such consumption areas as “food and non-alcoholic beverages”, “housing, water, electricity, gas and other fuels”, and “restaurants and hotels” kept decreasing. This phenomenon also occurs in the case of the following categories: “furnishings, household equipment and routine household maintenance”, “transport”, “recreation and culture”, “education”, “restaurants and hotels”, and “miscellaneous goods and services”. Therefore, for 8 of 12 consumption areas there was observed not only β -convergence, but σ -convergence as well.

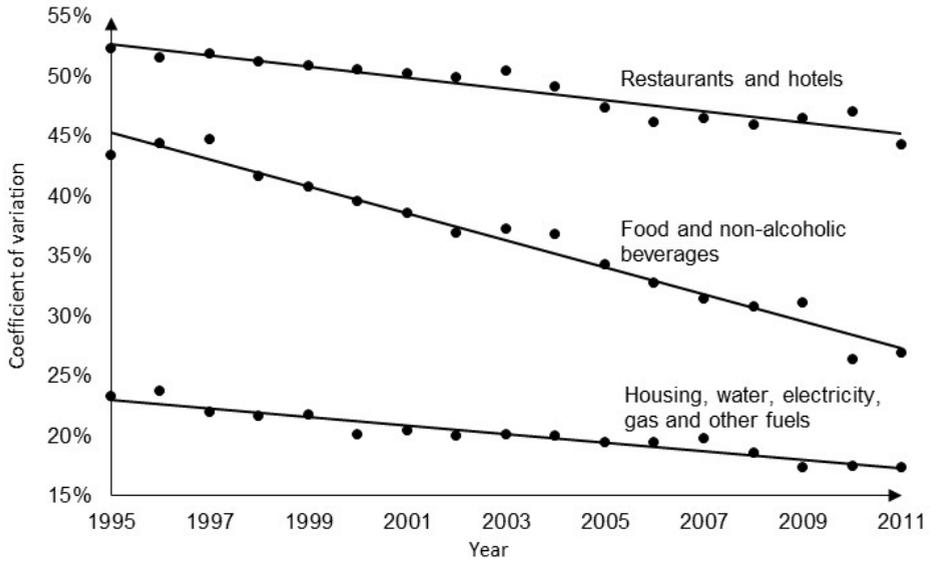


Figure 2. The σ -convergence for selected shares of expenditures
Source: own elaboration.

CONCLUDING REMARKS

A considerable part of research on expenditures and consumption is empirical in nature, but little comparative research has been done in this area, yet. The most of research has been carried out in the United States, whereas there is much less research addressing the issue in Europe [Noll 2007]. Nevertheless, problems connected with expenditures and consumption have attracted growing interest of scientists and researchers in recent years also in Europe. The European Union enlargement became the incentive for comparative studies.

This paper presents application of the concepts of β -convergence and σ -convergence to verify empirically the hypothesis of convergence between households expenditures structures in the European Union in the period from 1995 through 2011. The so-called β -convergence among a group of countries exists if the regression coefficient, β , in the model describing the dependence of growth rate of given indicator upon its initial level is statistically significantly less than zero. Testing for σ -convergence is based on the coefficient of variation of given indicator in the cross-section series. Usually, the Gross Domestic Product (GDP) per capita is taken as the indicator. In the research presented here, shares of each of 12 categories of consumption expenditures in total households consumption expenditures are taken into account. This differs the study from others of this type. The analysis of results obtained allows to record convergence of both types for majority of structure components.

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ZMIANY W STRUKTURZE WYDATKÓW GOSPODARSTW DOMOWYCH W UNII
EUROPEJSKIEJ – CZY MA MIEJSCE KONWERCENCJA?

Streszczenie

Celem pracy jest odpowiedź na pytanie, czy istnieje konwergencja między strukturami wydatków gospodarstw domowych w Unii Europejskiej. Do analizy tego zjawiska wykorzystano koncepcje β - oraz σ -konwergencji. Podstawę badania stanowią dane, udostępniane przez EUROSTAT, dotyczące wydatków gospodarstw domowych w latach 1995-2011. Obejmują one 27 krajów i 12 grup dóbr i usług według klasyfikacji COICOP. Wyniki badań wskazują na występowanie konwergencji obu typów dla większości składników struktury.

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