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Analysis of the Impact of Household Income on Clothing, Footwear and Housing Consumption in Bosnia and Herzegovina

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Contents

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Abstract

In studying individual consumption behavior, an important issue is the analysis of the relation between commodity expenditure and income. The subject of this paper is the analysis of clothing, footwear and housing consumption of households in Bosnia and Herzegovina. The aim of this paper is to quantify the impact of income on household expenditure for clothing, footwear and housing, with a focus on examining the validity of Second Engel's law in Bosnia and Herzegovina. Empirical research is based on the econometric modeling of Engel curves applying single equation modeling, using microdata from the Household Budget Surveys in Bosnia and Herzegovina, which are available for four years (2004, 2007, 2011, 2015). The surveys were carried out using the uniform methodology developed by the Statistical Office of the European Union (EUROSTAT). In order to achieve the research objective, six functional forms of Engel curves have been formulated and estimated. The intensity of the impact of income on relative changes in consumption was measured using income elasticities. Based on the estimated parameters and income elasticities derived from them, the hypothesis of unit elasticity of demand for the mentioned product groups in relation to household income was tested. Empirically estimated values of elasticities imply that the validity of the Second Engel's law in Bosnia and Herzegovina was partially confirmed: while clothing and footwear expenditures became elastic over time, expenditures for housing are inelastic in observed years. By comparing the estimated elasticities for different years in which the survey was conducted, it was revealed whether there were significant changes in the preferences of households in Bosnia and Herzegovina in the observed period.

Keywords: household consumption, Second Engel's law, single equation modeling, household budget survey, income elasticity

Introduction

Analysis of consumer demand is one of the most popular research areas in microeconomics. The empirical framework adopted in many studies for estimating household consumption is based on Engel curves. The estimation of Engel curves and income elasticities has occupied the central position in all family budget studies since the work of Ernst Engel (1857), a 19th century Prussian statistician who conducted one of the earliest studies of household expenditure patterns.

These curves basically indicate the relationship between household consumption expenditures and household income and show how the preferences between groups of goods change when there is an increase in the household income, while prices of the goods are fixed (Lewbel and College, 2006). The population with a low living standard will spend more money to cover their basic needs

(food, clothing, housing, etc.). As the income increases, the spending is directed to purchase goods for their comfort such as health, transport, recreation and culture, tourism, etc. (Neagu and Teodoru, 2017). Thus in the basis of the Engel curve, it is possible to say that households primarily tend to satisfy their most basic needs and that the welfare level increases as the expenditure share allocated for necessary goods within the consumption expenditure decreases.

Expenditures for all consumer products do not grow linearly (in the same proportion) as income increases. Engel formulated empirical laws stating the relation between income and expenditure on a particular consumption item. In a series of budget studies, he theorized that food expenditures take a steadily declining share of income as income of the family becomes larger (Stigler, 1954). He also posited that clothing and housing take a constant share of the income regardless of its size, while education, health, transportation, recreation and saving take larger percentage allocation as income of the family increases. These empirical regularities came to be known in the literature as the classical Engel's Laws, and the mathematical equation linking income (or spending) to the budget share of a good is called Engel curve of the good.

Engel curves are estimated in empirical studies with the aim of establishing an empirical relationship between household income and consumption on a particular good. In a family budget, there are as many Engel curves as there are goods in the family's market basket (Rufino, 2013). Functional forms of Engel curves can be different–linear, quadratic, inverse, etc. (Hanić, 1981). In the consumer demand analysis, a very important place belongs to the choice of the most appropriate functional form of the Engel curves (Haque, 2005).

In its most basic form, an Engel curve represents a mathematical relationship of the proportion of the budget allocated for a good (budget share) as a function of the household income, while the income elasticity of a good measures the percentage change in expenditure of the good of interest relative to a percentage change in income. The traditional approach of estimating income elasticities is to select an appropriate functional form for each good, estimate it and use the estimated parameters to obtain the income elasticities (Chung et al, 2002).

Engel curves are also used to classify goods as luxuries, necessities and inferior goods. Normal goods, having a positive elasticity of income (E>0), can be either a luxury (E>1), necessary (0<E<1) or relatively necessary goods (E=1). For inferior goods, the case is different. The income elasticity is negative (E<0), and quantity demanded decreases as income increases.

Second Engel's law states that, with a given set of tastes and preferences, as income increases, the proportion of income spent on clothing, footwear and housing stays unchanged, even as actual expenditure on these products rises. In terms of the income elasticity, clothing, footwear and housing are relatively necessary goods and the income elasticities of demand for these product groups are equal one (E=1). Obtaining estimates for these coefficients may reveal important insight into how the households in different countries consider mentioned product groups.

Since income varies across individuals and income elasticities vary across goods, the study of the relationship between expenditure and income (the Engel

curve) has been the object of many applied microeconomic works (Deaton and Muellbauer, 1980b).

This paper focuses on estimating Engel curves for groups clothing, footwear and housing using a single equation methodology and a six functional forms of Engel curves which are most frequently used in empirical studies. The aim of this paper is to quantify the impact of income on clothing, footwear and housing consumption and to test the validity of Second Engel's law in Bosnia and Herzegovina, using data from Household budget surveys (HBS) which are available for 2004, 2007, 2011 and 2015. The hypothesis of unit elasticity of demand for the mentioned product groups in relation to household income was tested.

Based on the estimated income elasticities for the product groups clothing, footwear and housing an empirical verification of the validity of Second Engel's law was conducted. And thus, it is enabled to determine if groups clothing, footwear and housing in Bosnia and Herzegovina claim the status of necessary, relatively necessary or luxury goods. In other words, the aim of this paper is to ascertain to which elasticity category the denoted groups of products belong, i.e., to ascertain whether the demand for this groups of products is non–elastic (E<1), unit elastic (E=1) or elastic (E>1). By comparing the estimated values of the parameters of Engel curves for different years, conclusions about the changes in consumer preferences in the observed period were reached.

Although empirical studies on consumer demand analysis are common, yet studies on consumption patterns in Bosnia and Herzegovina are very limited. The issue of household consumption in the last three decades has not been the subject of analysis of any comprehensive study, except for research recently conducted by Dacić and Hanić (2019), when it comes to food consumption in Bosnia and Herzegovina. The contribution of this paper is reflected in the verification of theoretically assumed patterns of consumption arising from the Second Engel's law in Bosnia and Herzegovina, and in the analysis of the stability of consumer preferences in the 2004–2015 period.

The paper is organized as follows: after the literature review, the data and methodology of the study is exposed, the fourth section describes the results of the research and the last section is dedicated to conclusions and limitations.

Literature review

Consumer demand analysis based on Engel curves was conducted in large number of countries, using different econometric methods for various groups of goods. Over the last few decades, the literature on consumer demand theory and its linkage with econometric methods have stimulated much empirical analysis of consumer behavior. There are different approaches to estimating Engel curves in order to examine income elasticities and the validity of Engel's laws. One approach is based on econometric models formulated as single demand equation models. The earliest studies were based on models formulated as single regression equations. The modern approach to estimating Engel curves is based on the application of complete systems of demand equations. This approach for the representation of consumer preferences has been proposed and applied by

many econometricians (Stone, 1954; Jorgenson et al, 1982; Deaton and Muellbauer, 1980a; Banks et al, 1997; etc.).

In a large number of consumer demand studies, income elasticities are estimated with the aim of testing the validity of Engel's laws and classifying goods into necessary and luxurious. Empirical research carried out so far has confirmed Second Engel's law in a relatively small number of countries. Siami–Namini (2017) conducted research in the United States using a time series of data from 1989–2015. The estimated income elasticities show that the demand for the group of products related to housing is unit elastic. In a large number of studies, the unit elasticity of housing expenditures has not been confirmed. Gostkowski (2018) found that the income elasticity of housing expenditures in Poland is less than one (E<1). Rufino (2013) estimated Engel curves to compute the income elasticities for the population of Philippines and found that housing groups have the low elasticities of well below one, implying that these are necessities. Elasticity estimates in Taiwan computed by Chung et al (2002) also implies that housing are necessities. On the other hand, in Netherlands, housing is classified as a luxury good (Kalwij and Salverda, 2007). Also, Al–Habashneh and Al–Majali (2014), who carried out research on consumption in Jordan, found that the income elasticity for this product group is greater than one (E>1).

Numerous empirical papers can be found in the literature showing that unit elasticity of expenditure on footwear and clothing have been verified in some countries, such as the study of Yusof and Dusasa (2010) for Malaysia. On the other hand, in a number of studies, the obtained income elasticities of this product group are greater than one (E>1). Regarding the estimates drawn from Engel curves, Janský (2014) showed that clothing and footwear were found to be luxury goods in Czech Republic. Formally said, the elasticity was found to be greater than one (E>1). Similar to Janský (2014), a study by Siami–Namini (2017) classified clothing and footwear as luxuries, according to data from United States. Chung et al (2002) showed same results for Taiwan, Beneito (2003) for Spain, Hanić et al (2020) for Serbia and Kim (2012) found that clothing was income elastic in Korean households. Unlike them, Li et al (1999) showed that expenditures for clothing were inelastic in China. Same results are obtained by Blanciforti et al (1986) who found that clothing demand was inelastic with respect to income.

Methodology and data

Methodology

The theoretical framework for modeling Engel curves is consumer's ordinary demand function which gives the quantity of a certain product that consumer will buy and can be expressed as a function of income, price of observed product and prices of all other products that participate in the overall consumer demand (substitutes, complementary and independent goods):

$$qi = f(p1, \ldots, pN, M, X), \; i = 1, \ldots, N,$$

where q_i is the quantity of the ith commodity, $p1,...,pN$ are the prices of commodities, M is income, and X is the vector of control variables of dimensions k.

Consumer demand analysis attempts to explain variations in consumer expenditure, using time–series and cross–sectional data on income and prices (Haque, 2005). Cross–section Engel curves have been a major subject of research in applied demand analysis. The use of cross–sections from survey data in the estimation of demand simplifies demand analysis as it assumes constant prices $p1=p2=...=pn=C$, where C is the constant. Hence, the previous model can be reduced to:

$qi=f(M)$

a model known as the Engel demand model, while the graphic representation of the function $qi=f(M)$ is consequently known as the Engel curve. So, the relationship between consumption, income and prices is transformed into the well–known consumption–income relationship.

Functional forms–shapes of the Engel curves used to examine the impact of income on household expenditure using a single regression equation may be different, depending on the nature of the need that the product satisfies, the characteristics of the product, the possibility of substitution, etc. (Hanić, 1981).

The most often used forms of functional dependence of consumption and income in modeling Engel curves, as stated by Haque (2005), are:

a) Linear form

$qi=ai+bi\,M+ui$

b)Quadratic form

$qi=ai+b1i\,M+b2i\,M2+ui$

c) Inverse form

$qi=ai+bi/M+ui$

d) Semi–logarithmic form

$qi=ai+bi\log M+ui$

e) Double–logarithmic form

$\log qi=ai+bi\log M+ui$

f) Logarithmic–inverse form

$\log qi=ai+bi/M+ui$

where qi is demand for the ith product group, M is income, ai, bi are the parameters to be estimated, and ui is a random (stochastic) component.

The procedure of Engel curves estimation in this study was carried out in the form of the following steps:

a) Estimating the Engel curves for clothing, footwear and housing groups using the previously mentioned typical functional forms for each year of available data

(2004, 2007, 2011, 2015). Data on income and expenditures for particular goods are given on a monthly basis.

b) Calculation of the numerical value of the validation criteria for each model, i.e., the adjusted coefficient of determination.

c) Selection of a representative model that has the highest exploratory power.

d) Estimation of income elasticities, as well as the value of corresponding Wald F test statistics .

Income elasticites

Among the most important parameters of economic relationships essential in research is the concept of elasticity, which is applied in this paper. Elasticity is a measure of the sensitivity of one variable to changes in another variable. In budget studies like Engel curve analysis, income elasticities may be used as a basis of categorizing the various items of consumption into necessity, relatively necessary, luxury or inferior goods. The income elasticity informs us about the percentage change in demand in response to a one percent change in consumer income.

The numerical value of the coefficient of income elasticity depends on the type of product. A purchase is considered to be a necessity if the elasticity is between 0 and 1. If the elasticity is greater than one, it is considered a luxury (Barnett and Serletis, 2008). The income elasticity of inferior goods is negative ($E<0$). In terms of the income elasticity, clothing, footwear and housing are relatively necessary goods and the income elasticities of demand for these product groups are equal one (E=1).

The specific functional form of income elasticity depends on the functional form of the Engel curve that describes the relationship between income and consumption. So, income elasticity is a variable and depends on the level of household income. From a practical aspect, the double–logarithmic specification has advantage over other functional forms because income elasticity is constant for each income level (E=b). By estimating the parameters of this function, in fact, information about income elasticities is obtained at the same time, as a constant value instead of a function. In all other specific functional forms of Engel curves, the income elasticity is a function of income, so it can only be approximated by using means.

In order to test specified hypothesis of unit elasticity of demand for observed product groups in this study, income elasticites have been estimated. Obtaining estimates may reveal important insight into how the households in Bosnia and Herzegovina consider the various product groups.

Data

The empirical analysis of this paper is based on household microeconomic data collected by Agency for Statistics of Bosnia and Herzegovina. The data comes

from Household Budget Surveys (HBS) that are conducted in 2004, 2007, 2011 and 2015. These surveys were carried out using the uniform methodology developed by the Statistical Office of the European Union (EUROSTAT), which enables comparability of results with the results obtained by the researchers from other countries. HBS are considered a basic information source according to income and expenditure.

Data collected on the basis of HBS represent a unique collection of microdata that contains very detailed characteristics of household expenditures. In addition, the surveys contain detailed information on the level and structure of expenditure, the level and sources of income, the demographic structure of households (the number of household members, their age, gender, education, disability and economic activity, etc.).

Household expenditures were divided into 12 categories according to the classification of expenditure based on The Classification of Individual Consumption by Purpose (COICOP). The COICOP has a hierarchical structure consisting of four levels with the number of categories. According to the COICOP, expenditures on clothing, footwear and housing belong to the third and fourth division, respectively. Broad structure of third and fourth divisions of COICOP are shown in table 1:

Table 1. The Classification of Individual Consumption by Purpose–Division 03 and 04

Group of expenditure	Subgroups
3. Clothing anf footwear	3.1. Clothing
	3.2. Footwear
4. Housing, water, electricity, gas and other energy sources	4.1. Actual rentals for housing
	4.2 Imputed rentals for housing
	4.3. Maintenance, repair and security of the dwelling
	4.4. Water supply and miscellaneous services relating to the dwelling
	4.5. Electricity, gas and other fuels

Source: Department of Economic and Social Affairs-Statistics Division, 2018

The number of households surveyed in all years was approximately 7,500. Territorial participation of households varies within ± 5%, with the average participation of the Federation of Bosnia and Herzegovina (FBIH) of about 60%, Republic Srpska (RS) about 35% and Brčko District (BD) about 5% percent. Table 2 shows the geographical structure of household samples from Bosnia and Herzegovina in conducted surveys.

Table 2. Geographical structure of household samples from HBS conducted in Bosnia and Herzegovina

| | Year | | | | | | | |
| | 2004 | | 2007 | | 2011 | | 2015 | |
	Number of households	%	Number of households	%	Number of households	%	Number of households	%
FBIH	4,343	58	4,504	60	4,611	62	4,64:	60
RS	2,765	37	2,622	35	2,437	33	2,60'	34
BD	367	5	342	4	352	5	452	6
B&H	7,475	100	7,468	100	7,400	10	7,70:	10

Source: Agency for Statistics of Bosnia and Herzegovina

Table 3 shows the average household size by years and geographical areas. There is a noticeable trend of declining average household size by years, from 3.3 in 2004 to 2.9 in 2015. This trend is present in the FBIH, RS and BD, and it is most expressed in RS, where in 2015 the average household size was only 2.7 members.

Table 3. Average household size in the observed years

	2004	2007	2011	2015
FBIH	3,37	3,36	3,1	3,0
RS	3,17	3,11	2,9	2,7
BD	3,06	3,07	3,0	3,0
Bosnia and Herzegovina	3,29	3,27	3,1	2,9

Source: Agency for Statistics of Bosnia and Herzegovina

Based on the conducted surveys, the Agency for Statistics of Bosnia and Herzegovina calculates and publishes in its announcements the average monthly expenditures by COICOP product groups. Table 4 compares the absolute values and percentages of expenditures for clothing, footwear and housing for the entire

territory of Bosnia and Herzegovina and all years in which the surveys were conducted.

Observed by years, the average monthly consumption per household increased in total from 1,301 Bosnian Convertible Mark (BAM) in 2004 to 1,569 BAM in 2011, and then recorded a significant decline, and in 2015 was 1,419 BAM.

Table 4. Average values of monthly expenditure on clothing, footwear and housing per household in Bosnia and Herzegovina for the observed years

	2004		2007		2011		2015	
	BAM	%	BAM	%	BAM	%	BAM	%
Average monthly consumption, total	1,301	100	1,541	100	1,569	100	1,419	100
Clothing and footwear	66	5	81	5	73	5	69,6	4
Housing, water, electricity, gas and other energy sources	308	23	341	22	376	24	384	27

Source: Agency for Statistics of Bosnia and Herzegovina

This tendency in the change of total average monthly expenditures was also reflected in the absolute values of expenditures by product groups, and their percentage shares in total expenditures by years did not change significantly. Compared to other items of individual consumption, housing expenditures have an expected large share, for on average around 24% of total household expenditures. Expenditures on housing increased, compared to other product groups, while expenditures on clothing and footwear varied by year and doesn't have a large share in total household expenditure.

Results

The results of the empirical analysis contain indicators of the impact of income on clothing, footwear and housing expenditures, estimates of the significance of the impact of income, estimated values of income elasticities and results of the Wald F test statistics to test the initial hypothesis of unit elasticity of expenditures for observed product groups.

By analysing the residual, using autocorrelation tests (Durbin–Watson test) and normality tests (Jarque–Bera test), it is found that correlation and residual normality do not represent a methodological problem, which was expected bearing in mind that residual correlation is a problem which, as a rule, occurs in time series analyses, while the residual normality of the regression estimated on the basis of a large sample was also expected in line with the Central Limit Theorem. On the other hand, residual diagnostics has indicated that the estimated residuals are heteroscedastic, regardless of the used form of Engel curve. Bearing in mind the fact that residual heteroscedasticity cannot be eliminated, the testing of statistical hypotheses was done by using Huber–White variant–covariant matrix.

Based on the estimated regressions, functional forms that for each individual year and product group show the highest explanatory power, measured by the adjusted coefficient of determination, as the basic criterion for validation of the evaluated model, were analysed. Table 5 gives a comparative overview of Engel curves with the best characteristics by years, on the basis of which the selection of a representative functional form for a given group of products was made.

Table 5. Functional forms of Engel curves with the best explanatory characteristics in observed years

Group od expenditure	2004	2007	2011	2015	Representative model
Clothing and Footwear	Quadratic	Linear, Quadratic	Linear, Quadratic	Quadratic	Quadratic
Housing, water, electricity, gas and other energy sources	Double–logarithmic	Double–logarithmic	Double–logarithmic	Double–logarithmic	Double–logarithmic

Source: Author

Based on the presented table, we see that the double–logarithmic model best represents the dependence of income on expenditures for the product group housing, while the representative functional form for the product group clothing and footwear is a quadratic model.

Tables 6 and 7 give a summary of the estimated Engel curves for representative functional forms by years. For each year and product group, the following are shown:

1. Estimated Engel curve with constant term and regression coefficient.

2. Result of *t–test* for regression coefficient describing the impact of income on expenditure for clothing, footwear and housing. The corresponding p–values are not shown because in all cases the regression coefficient is statistically significantly different from zero.

3. Adjusted coefficient of determination R^2 that shows the explanatory power of the model, i.e., in what percentage the variation of income explain the variations of expenditures for clothing, footwear and housing.

The coefficient of determination for group clothing and footwear that are shown in table 6 ranged from 0.32 to 0.39, which means that variations in income explained 32% to 39% of the variability of household expenditure on this product group.

Table 6. Estimates of representative Engel curves for the group clothing and footwear with appropriate statistics–overview by years

Year	Indicator	
2004	Equation	y=-35.9614+0.0834*x
	t stat	10.17
	$R2$	0.35
2007	Equation	y=-36.0649+0.0742*x
	t stat	13.02
	$R2$	0.39
2011	Equation	y=-35.4383+0.0693*x
	t stat	6.54
	$R2$	0.32
2015	Equation	y=-24.3782+0.0564*x
	t stat	6.50
	$R2$	0.34

Source: Author

The range of explained variability for the housing group is slightly larger and varies from 39% to 43%, as shown in table 7.

Table 7. Estimates of representative Engel curves for the group housing with appropriate statistics–overview by years

Year	Indicator	
2004	Equation	ln(y)=2.0329+0.5099*ln(x)
	t stat	67.99
	$R2$	0.39
2007	Equation	ln(y)=1.8186+0.5415*ln(x)
	t stat	75.21
	$R2$	0.42
2011	Equation	ln(y)=1.5774+0.5837*ln(x)
	t stat	76.80
	$R2$	0.43
2015	Equation	ln(y)=1.5515+0.5968*ln(x)
	t stat	77.51
	$R2$	0.43

Source: Autor

Testing the hypothesis of unit elasticity

One of the primary aims of the paper is to estimate income elasticities in order to test the hypothesis of unit elasticity. Income elasticities of demand for clothing, footwear and housing are estimated, so these group of goods can be classified on the basis of their income elasticities into three major categories.

For illustration purposes, table 8 shows the estimated values of income elasticities for observed groups in 2015, in Bosnia and Herzegovina. The estimated values of income elasticities are presented separately for each functional form of the Engel curve, where in all cases, except in the case of the double–logarithmic form, appropriate approximations of elasticity variable were made by using means, as the income elasticity is a function of income.

Table 8. Estimated values of income elasticities by product groups and functional forms of Engel curves in 2015

Group of expenditure	Linear	Quadratic	Inverse	Semi–logarithmic	Double–logarithmic	Logarithmic–inverse	Average
Clothing and footwear	1.6360	1.4214	0.5323	1.4814	1.0325	0.8105	1.1524
Housing, water, electricity, gas and other energy sources	0.5793	0.6401	0.2517	0.6014	0.5968	0.2902	0.4933

Source: Author

Based on the average values of income elasticities for individual functional form from table 8 and calculated values by groups and functional forms for other years that are not shown in table 8, it is possible to draw conclusions regarding the observed product groups. Housing, water, electricity, gas and other energy sources (interval 0.4–0.5) are products characterized by inelastic change in expenditures in relation to changes in income ($E < 1$). The share of housing consumption evolves in an inverse relationship with income, suggesting that at an increase of 1% of income, the increase of consumption will be lower than 1%. Higher income elasticities were calculated for the clothing and footwear group (interval 1.0–1.1), so products from this group are characterized by proportional change in expenditure relative to change in income (E is close to 1).

The obtained results suggest that clothing and footwear in Bosnia and Herzegovina have the status of a relatively necessary goods with an elasticity close to one, while products from housing group can be interpreted as a necessary goods.

In order to test the hypothesis of the unit elasticity of expenditures on clothing, footwear and housing, i.e., the validity of Second Engel's Law,

$$H0: E=1,$$

$$H1: E \neq 1$$

WALD F significance test is used, applying it with the double–logarithmic form. A double–logarithmic form was used because the parameter with the logX variable represents the income elasticity of household expenditure.

The estimated income elasticities within the modeled expenditures for clothing, footwear and housing groups based on the double–logarithmic form, together with the corresponding Wald test statistics, are presented in table 9.

Table 9. Results of WALD significance test for income elasticities

Year/ Group of expenditure		Clothing and footwear	Housing, water, electricity, gas and other energy sources	
2004	Income elasticity	1.1208	0.5099
	Wald F test	21.77	4369.22
	p–value	0.0000	0.0000
2007	Income elasticity	1.1133	0.5415
	Wald F test	20.04	3826.21
	p–value	0.0000	0.0000
2011	Income elasticity	1.0529	0.5837
	Wald F test	4.11	2847.34
	p–value	0.0427	0.0000
2015	Income elasticity	1.0325	0.5968
	Wald F test	1.70	2635.84
	p–value	0.1928	0.0000

Source: Author

Based on the numerical values of estimated income elasticities and relevant statistics, a conclusion regarding the testing of the validity of the Second Engel's law in Bosnia and Herzegovina can be made.

Hypothesis of unit elasticity is partially confirmed. The estimated value of income elasticity for clothing and footwear expenditures shows a tendency to approach the unit elasticity since the estimated value of elasticity during the observed period decreased from 1.12, as it was in 2004, to 1.03 in 2015. Consequently, with the change in the estimated elasticity coefficients, there were also changes in the statistical implications of the Wald test results. In the first three years of the survey the Wald test implied that the estimated elasticities were differed from 1, while in 2015 the same test implied a unit elasticity of demand for clothing and footwear. The obtained results suggest that clothing and footwear in Bosnia and Herzegovina have the status of a relatively necessary goods, as also concluded on the basis of average elasticity values. Numerous empirical

papers can be found in the literature showing that unit elasticities of expenditure on footwear and clothing have been verified in some countries, such as the study of Yusof and Dusasa (2010) for Malaysia. On the other hand, in a number of studies the obtained income elasticities of this product group are greater than one. These results are shown in studies conducted by Siami–Namini (2017), Jansky (2014), Chung et al (2002), Kim (2002), etc.

On the other hand, the estimated value of income elasticity for housing expenditures is low, which implies that housing expenditures are extremely inelastic, contrary to the initial assumption that they change proportionally with the change in income. Based on the WALD F test, income elasticities are smaller than one and statistically significantly different from one (p =0.0000 for all observed years), which is contrary to the expectations that arise from Second Engel's law. Therefore, products from this group can be interpreted as necessary goods. In a number of studies for different countries, the unit elasticity of housing expenditures has also not been confirmed. Gostkowski (2018), Rufino (2013) and Chung et al (2002) also presented results showing that products from housing group are necessities.

Testing the stability of consumer preferences

In order to test the stability of consumer preferences, i.e., the existence of significant differences in the estimated parameters of Engel curves in relation to the years in which the models were estimated (2004, 2007, 2011 and 2015), z tests were used to compare regression coefficients from regressions on independent samples. Specifically, for each pair of years in which the survey was conducted and each product group, the hypothesis of equality of regression coefficients with the income variable was tested. Regression coefficients from Engel curves estimated by double–logarithmic functional form are used (the parameter with the logX variable), so that they represent income elasticity coefficients. A total of 12 hypotheses were tested. The test results are shown in table 10.

Table 10. Results from z tests on the equality of regression coefficients with income, by pairs of years

H0	Clothing and footwear	Housing, water, electricity, gas and other energy sources	Total No	Total Yes
b_04=b_07	Yes	No	1	1
b_04=b_11	Yes	No	1	1
b_04=b_15	No	No	2	
b_07=b_11	Yes	No	1	1
b_07=b_15	No	No	2	
b_11=b_15	Yes	Yes		2
Total No	2	5	7	
Total Yes	4	1		5

Source: Author

18

Column H0 shows the specified hypothesis to be tested,, e.g. b_04 = b_07 shows whether the estimated income elasticity for a given product group in 2004 is equal to the estimated elasticity in 2007. Cases in which the hypothesis of equality of coefficients was confirmed with the z test are marked with 'yes', while cases in which it was rejected with 'no'. The last two columns give a summary showing the tendency of equality of coefficients in the observed period.

In summary, the hypothesis was rejected in 7 cases and not rejected in five cases. Changes in consumption patterns were expressed for the housing group, while changes were not expressed for the clothing and footwear group. From the point of view of the stability of consumer preferences analysis, a direct comparison of 2004–2015 and 2007–2015 is important, where for both groups the hypothesis of equality of income elasticities was rejected, which implies that in the observed years there were changes in consumer preferences in demand for both product groups.

Taking into account these results, we can conclude that this hypothesis has not been fully confirmed for both product groups. The obtained results imply that for the housing group there was a tendency of volatility of income elasticity in the observed period, which means that there were changes in consumer preferences.

Conclusions

The results of the econometric estimation of Engel curves confirmed the significance of income as a key determinant of consumption, but also provided a deeper insight into the different explanatory power of income in explaining variations in household expenditures for observed product groups. The findings of this study indicate that clothing, footwear and housing expenditures were positively affected by household income. The explanatory power of income in explaining variations in expenditures ranges from 39% to 43% for group housing, depending on the year of survey. For the clothing and footwear product group, 32 to 39 percent of the variability of expenditures was explained by changes in income.

Of all the functional forms of Engel curves that have been estimated in this paper, the double–logarithmic form is one that best represents the nature of income–consumption relationship for group housing, while quadratic Engel curves stand out as representative for group clothing and footwear.

The validity of Second Engel's law, which implies the unit elasticity of clothing, footwear and housing expenditures was partially empirically verified on the data of household consumption in Bosnia and Herzegovina. The estimated value of income elasticity for clothing and footwear expenditures converged towards the one during the observed period, while the unit elasticity of expenditure on clothing and footwear for 2015 was formally confirmed by the Wald test. So, it can be concluded that unit elasticity of demand for clothing and footwear arisen from Second Engel's law in Bosnia and Herzegovina was confirmed. The obtained result suggest that clothing and footwear have the status of a relatively necessary goods. Similar results were obtained by some other empirical researchers.

On the other hand, the estimated value of income elasticity of housing expenditures is very low (E less than 1), which is a robust result of empirical analysis in all observed years. Running the WALD F test, it is shown that income elasticities were statistically

significantly different from 1, i.e., that the demand for housing was inelastic. Therefore, products from this group can be interpreted as necessary goods. The validity of Second Engel's law regarding income elasticitiy of expenditures for housing has not been confirmed in Bosnia and Herzegovina, neither in numerous empirical studies that have been done for different countries in different periods.

The obtained results imply that for the housing group in the period from 2004 to 2015 there was a tendency of volatility of income elasticity, which indicates that there were significant changes in consumer preferences during the observed period. For the group of clothing and footwear products, changes in consumer preferences were not so expressed, with the exception of period 2004–2015 and 2007–2015.

The results of the research can be used by economic policy makers for the scenario of analysis of the considered economic policy measures that affects the determinants of consumption (primarily income), e.g. quantification of expected changes in consumption in the case of a change in social transfer policy or tax rates.

In this paper, the subject of analysis are two groups of products on which household income is spent and the approach of modeling Engel curves by single equation methodology is applied. Future analyses can be focused on estimating Engel curves for other product groups or on more disaggregated consumption category groups. Also, future studies of household consumption in Bosnia and Herzegovina should be focused on the application of more complex econometric models, i.e., complete systems of regression equations and estimation of income elasticities of all groups of products on which income is spent.

The limitation is considered to be the insufficient number of statistical data from the HBS in Bosnia and Herzegovina, due to the fact that surveys according to the EUROSTAT methodology have been conducted since 2004, and not every year, which is reason why the time dimension is exempted from econometric modeling and the stability of consumer preferences analysed indirectly, by comparing the values of parameters estimated in the years for which data are available. Other limitations regarding the data arise from the missing or incorrect answers of the respondents to certain questions in the survey, which is expected when it comes to this type of survey research.

Bearing in mind that in the last few decades in Bosnia and Herzegovina no extensive research has been conducted on the impact of income on demand for these product groups, I expect this paper to encourage further empirical research in this area of economics.

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The link between human capital and entrepreneurial perceptions: Insights from Vietnam

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Abstract

Previous studies on entrepreneurship tended to support the existence of a positive relationship between human capital and entrepreneurial activity. However, studies examining this relationship have not yielded consistently strong results. Hence, this study tries to help close this research gap by focusing on the impact of human capital on entrepreneurial perceptions. We draw our analyses on a sample of 2018 general adult population from GEM Vietnam 2017-2018. We found a positive relationship between specific human capital (knowledge, skills and experience related to starting a new business) and perception of business opportunities and feasibility. Meanwhile, general human capital (education level) does not have a meaningful relationship with perception of feasibility but helps individuals realize better business opportunities. From these results, some recommendations have been suggested in the article.

Keywords: Human capital, entrepreneurial perceptions, feasibility, opportunities, Vietnam

Introduction

Human capital is seen as the important competitive advantage of individuals, organizations and the society (Gimeno et al., 1997). Human capital reflects an individual' knowledge and skills, which he/she obtained through studying and practical experience. These knowledge and skills not only can become the important motivation to perform a particular behaviour of each individual but they also play the crucial role in explaining economic activities (Becker, 1964). Mincer (1974) state that knowledge can provide us thinking ability and lead to the validity and productivity of activities.

In entrepreneurship field, many researchers take account into the question "what role does human capital play in shaping entrepreneurial perception?" and they tend to support the hypothesis regarding the positive relationship between human capital and entrepreneurial activities. However, empirical studies are still not certainly proved this relationship and the study results are sometimes contradictory (Davidsson & Honig, 2003). Davidsson & Hognig (2003) argued that over-investment on human capital leading to high levels of certification and qualification can discourage risk-taking, while under-investment can encourage it. Thus, human capital is perceived as entrepreneurs' important resource to achieve success (Unger et al, 2011). However, these relationship is not proved clearly. Unger et al (2011) carried out a meta-analysis from previous empirical researches to test the link between human capital and nascent entrepreneurs'

success but they only investigate the insignificant correlation between these variables. So, this issue should be considered in the further researches.

Entrepreneurship can be perceived as a career choice of each person- finding a secure job or self-employment (Kolvereid, 1996). This choice is depended on some demographic and economic factors such as educational background, ages, personal finance, experience… Arenious & Triniti (2005) suggest that further studies should focus on some other personal perception variables, including entrepreneurial feasibility, risk-taking ability, perception of business opportunity and role models. For adults, entrepreneurial perceptions can pay the important roles on the way to become entrepreneurs since these perceptions may contribute on shaping the entrepreneurial intention and behaviour (Bird, 1988; Krueger, 1993; Arenious & Minniti, 2005).

For these reasons, we investigate the relationship between human capital and entrepreneurial perceptions in our research. The main question of this research is "How do human capital influences on entrepreneurial perception". Particularly whether people, who have high level of education and entrepreneurial knowledge and skills, can perceive better on business opportunities and entrepreneurial feasibility than others? We employ the data from GEM report 2017-2018 in order to answers these questions.

Literature review and hypotheses

Human capital

First, human capital theory was developed to estimate the relationship between investment into human capital (training, education, experience…) and employee's salary (Becker, 1964). The theory of human capital had been applied broadly in entrepreneurship researches (Davidsson & Honig, 2003; Rauch et al., 2005; Unger et al., 2011). Human capital had been defined as the knowledge and skills, which an individual obtained through investing on being educated at schools, studying at workplace and other experiences (Becker, 1964). Similarly, Davidsson & Honig (2003) state that human capital is accumulated through formal education (studying at universities), informal education (experiences at workplace) and non-formal education (short courses). So, human capital is only the outcome of formal education, but it also includes experience and practical learning that take place on the job, and non-formal education and specific training courses as well (Davidsson & Honig, 2003). Becker (1964) also suggest that we should distinguish the different attribute of human capital. Firstly, there are the difference between human capital investments and outcomes of human capital. Human capital investment consists of training activities and working experience, but some of them does not totally lead to accumulate knowledge and skills. Secondly, the difference between general human capital and task-related capital should be considered. Indeed, some knowledge and skills is related to a specific task, entrepreneurial knowledge and skills for example. This difference indicates the link of cause and results of characteristics of human capital, it also shows the effects of human capital on entrepreneurial perceptions and nascent entrepreneurs' success (Unger et al., 2011).

The relationship between human capital and entrepreneurship

Human capital theory assumes that people attempt to receive a compensation for their investments in human capital (Becker, 1964). Thus, individuals try to maximize their

economic benefits given their human capital (Urger et al. 2011). Human capital theory also maintains that knowledge furnishes individuals with the improvement in their cognitive abilities, leading to more productive and efficient potential activities (Becker, 1964; Schultz, 1959). Thus, people, who have the high level of certificate, might do not run a business if they have much more opportunities to find a secure job with better salary (Cassar, 2006). Moreover, individuals, who invest much more in educational process, can be afraid to risk-taking than others. For example, migrants are frequently involved in entrepreneurial activities because they live and work in a new social structure that may not reward their formal human capital investments (Davidsson & Honig, 2003).

In entrepreneurship field, previous empirical researches often try to investigate the positive relationship between human capital and entrepreneurial activities ((Davidsson & Honig, 2003) or the positive influence of human capital on nascent entrepreneurs' success (Unger et al., 2011). Arenius & De Clercq (2005) find that educational background has the positive impact on feasibility of business opportunities. After Unger et al. (2011) summarized 70 previous empirical studies and perform meta-analysis and concluded that there was an overall positive relationship between human capital and entrepreneurial success. However, this influence is low given the high amount of attention. They also stated that this relationship is depended on different concepts of human capital, context and different measures of success.

However, how do human capital influence on entrepreneurial activities or entrepreneurial success? Unger et al (2011) indicate that there are three principal mode of effects. Firstly, human capital (knowledge and skills) increase the personal ability to perform special task in the entrepreneurial process, recognizing and catching business opportunities (Shane & Venkatraman, 2000). Secondly, human capital provides individuals abilities to mobilize necessary resources, including financial and material resources. Finally, human capital pays the important role on encouraging people to accumulate new knowledge and skills. When individuals own a certain human capital, they tend to obtain knowledge and skills faster and better. Thus, human capital can help individuals become more effective and productive in entrepreneurial activities.

Hypotheses

As discussed above, individuals who have high human capital can be perceived of entrepreneurial feasibility by their own higher than others. In terms of entrepreneurial perceptions, there are important things, including perceived feasibility and perception of business opportunities. In our study, we would investigate the effects of human capital, including general human capital (educational background) and task-related human capital (knowledge, skills and entrepreneurial experience), on perceptions of feasibility and business opportunities.

Based on literature review, some hypotheses are proposed as following:

H1: General human capital is positively related to perception of entrepreneurial feasibility

In other words, individuals with higher educational background can have better perceptions of entrepreneurial feasibility than others.

H2: Task-related human capital is positively related to perception of entrepreneurial feasibility

In other words, people with entrepreneurial knowledge, skills and experience can have better perceptions of entrepreneurial feasibility than others.

H3: General human capital is positively related to perceptions of business opportunities

Hypothesis H3 also understand that individuals with higher educational background can have better perceptions of business opportunities than others.

H4: Task-related human capital is positively related to perceptions of business opportunities

In other words, individuals with entrepreneurial knowledge, skills and experience can have better perceptions of business opportunities than others.

Method

Data

Our study employs the data from GEM Report 2017-2018, which is conducted by VCCI (Vietnam Chamber of Commerce and Industry). GEM Vietnam report 2017-2018 surveyed 2118 Vietnamese adults and provided the general insight of entrepreneurial characteristics in Vietnam following each period in startup process, from nascent entrepreneurs to run a business and sustainable development. The variables in our study are represented in the following table:

Table 1. Variables employed in the research

Variables	Descriptions
Dependent variables	
Perception of entrepreneurial feasibility	In Vietnam, there are easy to start an own business (Yes =1; No =0)
Perception of business opportunities	In the next 6 months, are there any new business opportunities in the area where you live? (Yes = 1; No = 0)
Independent variables	
- Educational background (general human capital)	1= primary school; 2= secondary school; 3=high school; 4= college; 5= university; 6= Master; 7= Ph.D
- Entrepreneurial knowledge, skills and experience (task-related human capital)	Do you have necessary knowledge, skills and experiences to run an own business? Yes= 1; No=0

Analyses

In order to test the relationship between independent and dependent variables, the binary regression analysis is employed. For the yes/no questions, the binary regression analysis is suitable. This analysis also allows us to estimate the effects of independent

variables (educational background, entrepreneurial knowledge, skills, experiences) on dependent variables (perceptions of entrepreneurial feasibility and perceived business opportunities).

Research results

Descriptive statistics of sample

Descriptive statistics of sample (N=2118) of 4 variables in the research model is represented in the table 2.

Table 2: The results of descriptive statistics of sample

	Variables	Frequency	Percent (%)
1	Educational background - Primary school - Secondary school - High school - College - University - Master - PhD Total	177 332 533 359 664 45 1 2111	8.4 15.7 25.2 16.9 31.4 2.1 0.0 99.7
2	Do you have necessary knowledge, skills and experiences to run an own business? - Yes - No Total	1115 987 2102	52.6 46.6 99.2
3	In Vietnam, there are easy to start an own business - Yes - No Total	979 1104 2083	46.2 52.1 98.3
4	In the next 6 months, are there any new business opportunities in the area where you live? - Yes - No Total	973 1092 2065	45,9% 51,6% 97,5

The table indicates that those with university, college and high school degree accounts for the highest proportion. 46.6% people believe that they have entrepreneurial knowledge, skills and experiences. Moreover, the percentage of adults, who consider that there are easy to start a new business in Vietnam, make up to 46.2% while 45.9% people believe that there are business opportunities in the area where they live in the next 6 months.

The relationship between human capital and perceived feasibility of entrepreneurship

The results of binary regression analysis in the relationship between educational background (general human capital), entrepreneurial knowledge, skills and experience (task-related human capital) and perception of entrepreneurial feasibility are illustrated in table 3,4 and 5.

Table 3: Omnibus Tests of Model Coefficients		Chi-square	df	Sig.	
Step 1	Step	33.647	2	0.000	
	Block	33.647	2	0.000	
	Model	33.647	2	0.000	

Table 4: Model Summary				
Step		-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
	1	2822.251[a]	0.016	0.022
a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.				

Table 5: Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp(B)	
Step 1[a]	Knowledge, skills and experience	0.51	0.08	32.7	1	0.00	1.66	
	Educational background	0.02	0.03	0.54	1	0.46	1.02	
	Constant	-0.4	0.13	13.0	1	0.00	0.61	
a. Variable(s) entered on step 1: SpeCapital, Education.								

Table 5 shows that "entrepreneurial knowledge, skills and experience" has the positive effect on perception of feasibility (B=0,511; p < 0,000) but there is no relationship between educational background and perception of feasibility (p > 0.05).

The relationship between human capital and perception of business opportunities

The results of binary regression analysis in the relationship between educational background (general human capital); entrepreneurial knowledge, skills and experience (task-related human capital) and perception of business opportunities is indicated in the table 6,7,8.

Table 6: Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	79.330	2	0.000
	Block	79.330	2	0.000
	Model	79.330	2	0.000

Table 7: Model Summary				
Step		-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
	1	2748.714a	0.038	0.051
a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.				

Table 8: Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Knowledge, skills and experiences	0.52	0.09	33.4	1	0.00	1.69
	Educational background	0.22	0.03	44.6	1	0.00	1.25
	Constant	-1.2	0.14	74.2	1	0.00	0.29
a. Variable(s) entered on step 1: SpeCapital, Education.							

Table 8 show that both 'entrepreneurial knowledge, skills and experiences' and 'educational background' have positive effects on perception of business opportunities (B=0,525; p < 0,000 and B=0,227; p < 0,000 respectively). However, the effect of 'entrepreneurial knowledge, skills and experiences' on perceived business opportunities is stronger than that of 'educational background'.

The summary of examining the hypotheses is represented in the table 9.

Table 9. The test of research hypotheses

Hypotheses	Results
H1: General human capital is positively related to perception of entrepreneurial feasibility	Rejected
H2: Task-related human capital is positively related to perception of entrepreneurial feasibility	Supported
H3: General human capital is positively related to perceptions of business opportunities	Supported
H4: Task-related human capital is positively related to perceptions of business opportunities	Supported

Thus, our research result indicates that individuals' educational background (general human capital) does not influence on their perceptions of entrepreneurial feasibility while entrepreneurial knowledge, skills and experiences (task-related human capital) affect significantly on entrepreneurial feasibility. One more time, this results confirmed the statement of Unger et al. (2011): "Only task-related human capital is strongly related to the entrepreneurial success".

Moreover, people with high levels of certification and qualification and entrepreneurial knowledge, skills, and experiences can have better perceptions of business opportunities than others whereas task-related human capital can help individuals recognizing business opportunities better than general human capital.

The research results also allow us providing some recommendations for entrepreneurial training and education in order to promote entrepreneurial activities in Vietnam.

Firstly, colleges, universities, institutions and entrepreneurship support organizations should organize the training courses on start-up in order to help learners can have positive perception of entrepreneurial feasibility and business opportunities. Indeed, people who have high level of certification and qualification can still be not enough necessary knowledge and skills if they are not trained specifically. Moreover, universities should implement the positive teaching method through practical experience in order to equip learners with essential knowledge and skills for running a business. Since if only teaching general knowledge, students cannot enhance their perceptions of entrepreneurship.

Secondly, people, who intent to start a new business in the future, should participate in entrepreneurship short-courses or entrepreneurship training program. Moreover, nascent entrepreneurs also should take part in entrepreneurial activities of others or start a small business in order to accumulate entrepreneurial experiences and recognize the new business opportunities.

Our research mentioned the link between human capital (general and task-related human capital) and perceptions of entrepreneurial feasibility and business opportunities. By employing the data from GEM Report 2017/2018 (N= 2218) authors investigate the positive relationship between task-related human capital (entrepreneurial knowledge, skills, and experiences), perceptions of business opportunities and perceptions of start-up feasibility. Although general human capital (educational background) does not influence on perceptions of entrepreneurial feasibility, it has dramatic effect on perceived business opportunities.

However, the limitations of our research is related to measures of variables from GEM report while each variable in GEM report only estimate through 'yes' or 'no' question. Thus, it is difficult to perform deeper research. Further researches should extent the research model by estimating the link between human capital and nascent entrepreneurs or the relationship between human capital and the success of entrepreneurs.

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Comparative analysis of the sector compatibility of the economy of Bosnia and Herzegovina and the European Union in the function of the convergence of Bosnia and Herzegovina according to the EU

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Abstract

The problem encountered by transition countries or developing countries, such as Bosnia and Herzegovina, in the process of European integration, requires a certain degree of sectoral harmonization of its economy with the European Union economy in the function of convergence towards the EU at the macroeconomic level.

The aim of this research is to problematize the importance of meeting the conditions and criteria of convergence for joining the European Union, by analyzing the sectoral compatibility of the economy of Bosnia and Herzegovina with the economy of the European Union, using the comparative analysis method. In the continuation of the paper a comparative analysis of the economic structure of Bosnia and Herzegovina and the economy of the European Union will be presented, with a view to determining their structural coherence.

The application of the Krugman specialization index and the Balassin specialization index will result in a clearer and more transparent comparative analysis of the structural coherence of the B&H economy with respect to the European Union's economy.

Key words: comparative analysis, economic policies, macroeconomic indicators, Krugman specialization index, Balassin index of specialization, Bosnia and Herzegovina, EU

Introduction

The problem of European integration faced by developing countries, such as Bosnia and Herzegovina, results in a reduction in the dynamics of the sector's approach to European integration. The internal functioning of countries through improper management of economic policies, insufficient independence in the direction of management and decision-making, failure to meet deadlines, leads to negative consequences in the integration process for individual countries. Bosnia and Herzegovina's entry into European integration requires meeting the convergence criteria, with the aim of reducing disparities between economies, i.e. it is necessary to determine the degree of relative specialization of relations between economies at the bilateral level. The aim of the research on sectoral harmonization of economies at the bilateral level of Bosnia and Herzegovina and the EU 28 and EU 15 is to investigate in which field of sectoral harmonization, and by applying comparative analysis of Balassa index and Krugman index of specialization, we can answer the question of is Bosnia and Herzegovin „keeping pace", in parallel with the development of individual

sectors of the EU 28 and EU 15. Balassa index and Krugman index as measures of relative specialization, make the result simpler and more transparent compared to other specialization indices.

CONVERGENCE CRITERIA

The convergence criteria defined and established by the Maastricht Treaty aim to approximate and harmonize the monetary and fiscal policies of individual countries to the European Union. The Maastricht Treaty defines the criteria of convergence, and we know that the term convergence means mutual convergence, the approximation of the variables of individual countries to a particular goal. The purpose of the convergence criteria is to harmonize the monetary and fiscal criteria of individual countries, according to the criteria set out in the Maastricht Treaty. In order for a country to be part of the European Union, ie the European Monetary Union (EMU), it must meet the convergence criteria in order to be ready for the euro. Many countries, especially developing countries, have a problem maintaining the convergence criteria, e.g. Greece, Italy and Portugal have trouble maintaining convergence, although they have managed to meet nominal criteria. (Kandžija, Cvečić, 2008: 195) The third phase of accession to the European Monetary Union obliges future members to meet the following criteria of nominal convergence before the introduction of the euro:

1. High degree of price stability; the inflation rate must not exceed 1.5% of the inflation rate of the three most stable EU Member States;

2. The budget deficit may not exceed 3% of GDP and the public debt may not exceed 60% of GDP;

3. Participation in the European Monetary System for at least two years; nominal long-term interest rates may not exceed 2% of the interest rates of the three EU Member States with the lowest inflation rate (Directorate for European Integration: 2019).

The convergence criteria known as the Maastricht **nominal convergence criteria** include both monetary and fiscal policy criteria. Monetary criteria price stability and interest rates and fiscal criteria public debt and budget deficit. Many theorists believe that nominal convergence is not enough to enter the eurozone, but also real convergence. In addition to the criteria of nominal convergence, the country is obliged to meet the criteria of **real convergence**, which simultaneously encourages economic development, approaching the level of development of transition countries to developed countries of the European Union. Unlike nominal convergence, which can be achieved in an administrative way in the short term, real economic convergence is achieved in the long run through the process of implementing appropriate economic policy, structural reform and economic institutionalization. This is monitored by indicators such as GDP per capita, average wage level, purchasing power parity, income distribution, unemployment rate, labor productivity, real exchange rate and price ratio of domestic and foreign goods, share of agriculture in GDP, employment structure, balance and structure of foreign trade, etc. (Marić, 129). Meeting the criteria of nominal and real convergence for joining the euro area are not fully sufficient, so the country is obliged to meet the criteria of structural convergence in addition to the criteria of real and nominal convergence. **Structural convergence criteria** include:

1. Real and financial openness

2. Mobility of factors of production

3. High share of mutual trade (between EU countries and transition countries)

4. Similarities of economic structures of countries (Bilas: 224)

The structural convergence established by the Maastricht Treaty sets out the convergence criteria, which apply to all countries of the European Union but also to future members of the European Union. The criteria refer to the openness of the economy, but also to the approximation of the economic structure to the European Union, in order to reduce disparities and approximate variables to the European Union. Bosnia and Herzegovina, as a country in transition, largely does not meet the criteria of structural convergence. According to the mobility of capital and labor production factors, Bosnia and Herzegovina lags behind highly developed countries. It records a large outflow of labor, measured by the migration coefficient, the share of foreign direct investment in GDP is not satisfactory, and funds are used for non-purpose purposes, which in the long run reflects the slowdown in economic growth and economic development.

COMPARATIVE ANALYSIS OF SECTORAL COMPLIANCE OF THE ECONOMY OF BOSNIA AND HERZEGOVINA AND THE EUROPEAN UNION

After the previous part of the paper presents the convergence criteria, which aim to reduce the diversity of economies within the European Union, ie reduce sectoral (in) harmonization of economies and thus contribute to reducing disparities, in order to determine the level of specialization and comparative analysis of sectoral harmonization of Bosnia and Herzegovina and the European Union, two specialization indices will be used, namely the Krugman and Balassin specialization index. Specialization indices will use data for the analysis of sectoral compliance, which are publicly available on the website of the Agency for Statistics of Bosnia and Herzegovina and Eurostat for the European Union for the period 2015.- 2017. year.

Determining the structure of the sector in order to determine the index of specialization takes into account the qualification of activities in B&H 2010 and NACE 2. The goal of qualifying activities through NACE, as a statistical qualification of activities within the EU is the basis for collecting a large number of statistics, at the level of the world economy.

The development of NACE dates back to the 1970s, during which, as a certain statistical qualification, it was upgraded and in parallel followed the process of globalization. In relation to the EU area, there are various other qualifications, both at the international (world) and national level, as shown in Figure 1. Statistics Division of the United Nations Qualifications.

Picture 1. United Nations Statistics Qualifications Division
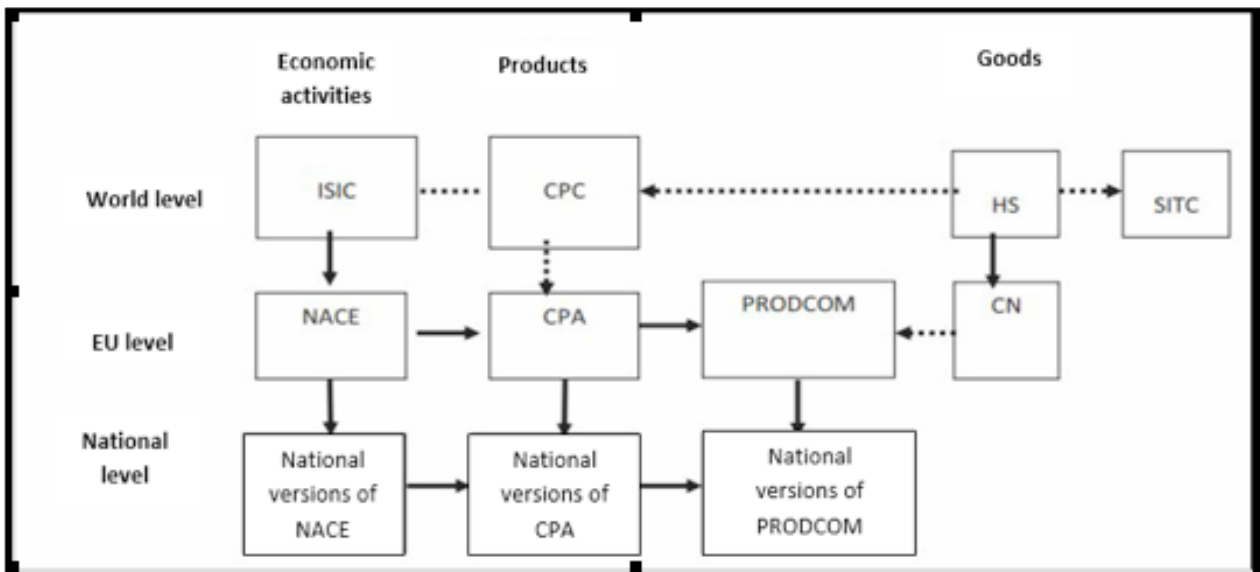
Krugman specialization index

The new economic geography links the time of the beginning of the development of the study and the expansion of activities to the beginning of the 1990s. Paul Krugmann appears as one of the main pioneers of the new economic geography. The two main assumptions of the new economic geography model on which the mission rests are the freedom of choice of consumers and the aspiration of economies of scale.

Specialization index according to Paul Krugmann formulated by calculating the percentage of sector A in the total gross value added of country "**x**" presented in Table 1 and the percentage of activity A, in the total gross value added of country "**y**" presented in Table 1 .

By the sum of the absolute value of the difference of all sectors, we come to the distance of the sector of country "**x**" in relation to the sectors of country "**y**". The value of the calculated coefficient 0 means that country "**x**" has a similar sector structure in relation to country "**y**", country "**x**" tends to converge the sector in relation to country "**y**", while higher values indicate the degree of divergence, country "**x**" in the structure sector and ultimately output..

According to the presented data in Table 2, it is evident that the economy of Bosnia and Herzegovina, according to the criterion of specialization Krugman index, using the method of comparative analysis of B&H, EU 28 and EU 15, results in divergence and heterogeneity within the economy at higher levels of aggregation..

Table 1. Share of individual sector of the economy (%) in total gross value added for the period 2015-2017.

Numbr.	ISIC Rev. 4/ NACE Rev. 2 Areas		2015	2016	2017
B&H					
1	A	Agriculture, fisheries and forestry	6,24	6,37	5,61
2	B -E	Mining, manufacturing, production and supply of electricity, water supply	18,6	19,23	19,9
2a.	C	Manufacturing	11,67	12,37	13,12
3	F	Construction	3,93	3,94	4,04
4	G - I	Wholesale and retail trade, transport and storage, accommodation and food service activities	18,98	19,06	19,77
5	J	Information and communication	4,60	4,38	4,24
6	K	Financial and insurance activities	3,75	3,74	3,88
7	L	Real estate business*	5,02	4,92	5,12
8	M,N	Professional, scientific, technical, administrative and support service activities	3,61	3,73	3,58
9	O -Q	Public administration, defense, education, health care and social work	17,99	17,16	16,54
10	R - U	Other services	2,29	2,49	2,6
EU 28					
1	A	Agriculture, fisheries and forestry	1,6	1,6	1,7
2	B -E	Mining, manufacturing, production and supply of electricity, water supply	19,4	19,5	19,6
2a.	C	Manufacturing	16,0	16,3	16,4
3	F	Construction	5,3	5,3	5,4
4	G - I	Wholesale and retail trade, transport and storage, accommodation and food service activities	18,9	18,9	19,1

5	J	Information and communication	5,0	5,0	5,0
6	K	Financial and insurance activities	5,3	5,2	4,9
7	L	Real estate business*	11,5	11,3	11,2
8	M,N	Professional, scientific, technical, administrative and support service activities	10,9	11,0	11,1
9	O -Q	Public administration, defense, education, health care and social work	18,7	18,7	18,5
10	R - U	Other services	3,5	3,5	3,5
EU 15					
1	A	Agriculture, fisheries and forestry	1,4	1,4	1,5
2	B -E	Mining, manufacturing, production and supply of electricity, water supply	18,8	19,0	19,1
2a.	C	Manufacturing	15,6	15,8	16,0
3	F	Construction	5,2	5,2	5,3
4	G - I	Wholesale and retail trade, transport and storage, accommodation and food service activities	18,6	18,6	18,8
5	J	Information and communication	5,0	5,0	5,0
6	K	Financial and insurance activities	5,4	5,2	5,0
7	L	Real estate business*	11,8	11,7	11,6
8	M,N	Professional, scientific, technical, administrative and support service activities	11,2	11,3	11,4
9	O -Q	Public administration, defense, education, health care and social work	19,1	19,1	18,9
10	R - U	Other services	3,6	3,6	3,6

Source: Author's processing according to:http://www.bhas.ba ; https://ec.europa.eu/eurostat?　　　(accessed 10.02.2021.)

Table 2. Distance of the economy of Bosnia and Herzegovina using the Krugman specialization index

D I S T A N CE :	2015	2016	2017
B & H / EU 28	19,34	18,91	17,87
B & H / EU 15	18,99	18,61	18,20

Source: Author's processing

Ballasin Specialization Index

Ballasin Ballasin's indices of specialization originate and develop back to 1965 and the founder of Bela Balass, whose purpose is to determine the comparative advantage of country "**x**" over country "**y**". Over time, the development of economics in practice, the Balassa coefficient has, over time, depending on the subject of research, defined a different area of application but with the purpose of determining comparative advantages. Putting the percentage of sector **A** in the total gross value added of country "**x**" in relation to the percentage of sector **A** in the total gross value added of country "**y**". The value of index 1 implies the same share of value added of the sector in total value added, a value greater than 1, indicates the specialization of the sector of country "**x**" in relation to country "**y**", and ultimately a value less than 1 indicates a lack of specialization in each sector, and which results in the divergence of the country sector "**x**" in relation to country "**y**". According to Table 3, the Balassin index of specialization of BiH in relation to the EU 28 and EU 15 countries, reflect higher values of the coefficient in the agricultural sectors, which is shown in sectors **A**. What stands out looking at the ratio B&H / EU28 and B&H / EU 15 is higher coefficient of specialization in sectors A-agriculture, fisheries and forestry, and in sectors **GI** - wholesale and retail trade, transport and storage, accommodation and food preparation and serving activities, and looking at a smaller area of research, ie B&H in relation to the EU 15 .The sectors that record the growth of specialization and comparative advantage also record the largest number of employees in total value added in the observed period, which is recorded as one of the main criteria of **structural convergence**.

Table 3. Ballasin Specialization Index

B&H / EU 28		2015		2016	2017		
1	A		Agriculture, fisheries and forestry	3,90	3,98	3,30	
2	B -E		Mining, manufacturing, production and supply of electricity, water supply	0,95	0,98	1,01	
2a.	C		Manufacturing	0,73	0,75	0,80	
3	F		Construction	0,74	0,74	0,74	
4	G - I		Wholesale and retail trade, transport and storage, accommodation and food service activities	1,00	1,00	1,03	
5	J		Information and communication	0,92	0,87	0,84	
6	K		Financial and insurance activities	0,70	0,72	0,79	
7	L		Real estate business*	0,43	0,43	0,45	
8	M,N		Professional, scientific, technical, administrative and support service activities	0,33	0,33	0,32	
9	O – Q		Public administration, defense, education, health care and social work	0,96	0,91	0,89	
10	R - U		Other services	0,65	0,71	0,74	
B&H / EU 15		**2015**		**2016**	**2017**		
1	A		Agriculture, fisheries and forestry	4,45	4,55	3,74	
2	B -E		Mining, manufacturing, production and supply of electricity, water supply	0,99	1,01	1,04	
2a.	C		Manufacturing	0,74	0,78	0,82	
3	F		Construction	0,75	0,75	0,76	
4	G - I		Wholesale and retail trade, transport and storage, accommodation and food service activities	1,02	1,02	1,05	
5	J		Information and communication	0,92	0,87	0,84	
6	K		Financial and insurance activities	0,69	0,72	0,77	

7	L	Real estate business*	0,42	0,42	0,44
8	M,N	Professional, scientific, technical, administrative and support service activities	0,32	0,33	0,31
9	O -Q	Public administration, defense, education, health care and social work	0,94	0,89	0,87
10	R - U	Other services	0,63	0,69	0,72

Source: Author's processing

CONCLUSION

According to the presented results, when observing the evolution of the distance of the economy of Bosnia and Herzegovina in relation to the economy of EU 28 and EU 15, is the degree of divergence of the economy of Bosnia and Herzegovina in relation to other economies. Krugman's index of specialization shows that there is a great deal of diversity in the economy. In the total GDP and according to the number of employees in certain sectors, the processing industry and wholesale and retail trade occupy the largest item, which in relation to other sectors of the economy records a larger share in the total GDP, and which ultimately differs from the structure the economy of the European Union, as one of the indicators of structural convergence.

The structure of the representation of each sector in the total GDP differs greatly in the European Union in relation to developing countries such as Bosnia and Herzegovina, which results in a lower degree of specialization, divergence of variables of individual economies, and ultimately a review of whether and to which the way a country's economy works, and whether the country is moving in the right direction (EU integration) in the context of rethinking its mission and vision.

The importance of the functioning of countries in the process of integration towards the European Union, determines the direction and speed of countries moving towards EU integration. Consequently, legal and institutional arrangements with their characteristics and positive effects result in the functioning of an individual country in the process of integration. The harmonization of a country in the external domain is not possible without proper internal organization, which explicitly affects the external organization, and ultimately it is a crucial characteristic of a country in the process of structural and real convergence and integration with the European Union.

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