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ABSTRACT

This paper has examined the relationships between insurance and economic growth across the European Union countries which belong to the European Insurance Federation. Using annual data over the period of 2004–2015, the authors have done this by applying descriptive statistics analysis and econometric methods as well. This research has contributed to understanding the importance of the insurance–growth nexus and combined different approaches prevailing in the recent scientific literature. The research has led to the following broad conclusions: (1) descriptive statistics analysis has shown that the insurance sector development is higher in economically rich countries, such as the UK, Denmark, Finland, Ireland, France and The Netherlands; (2) a positive statistically significant relationship between insurance penetration and economic growth has been detected in Luxembourg, Denmark, The Netherlands and Finland. Besides, a negative statistically significant relationship has been identified in Austria, Belgium, Malta, Estonia and Slovakia; (3) Granger test has shown unidirectional causality running from GDP to insurance in Luxembourg and Finland; and unidirectional causality from insurance to GDP in The Netherlands, Malta and Estonia. The case of Austria has shown bidirectional causality between the variables. The analysis has presented the absence of causality between insurance and economic growth in Slovakia.

1. Introduction

Over the last decade considerable attention has been paid to evaluating the relationship between financial development and economic growth. Most of studies have related to the banking sector and securities markets. The insurance sector has not received exceptional mention. According to Brainard (2008), although banking,

insurance, and securities markets are closely related, insurance performs somewhat different economic functions. In this light, it requires particular attention and analysis. The relationship between the insurance sector and economic growth has received increasing interest among scholars in recent studies. The research of the insurance–growth nexus has held an inconclusive explanation about the association between these variables. Researchers have debated over the nature of causality, whether insurance development causes economic growth or economic growth leads insurance sector or both variables cause each other. There are a number of questions to be answered about how the growth of economy associates with the insurance industry. According to Cristea, Marcu, and Carstina (2014), insurance becomes a major component in certain countries. The contribution of insurance to GDP of the economies being over 10% in some European countries, such as The Netherlands, the UK and Finland, has shown that it is even higher as the economic development is higher.

Fair evaluation of density and penetration of insurance services in the context of economic growth provides grounds for consideration of choosing the appropriate market strategy. Lack of dedicated methodology to measures of insurance sector development provoked researchers to develop a new innovative approach by elaborating methodology previously used for other purposes. Recently, researchers have elaborated such common insurance indicators as penetration and density to enable the market potential assessment. Even though the potential contribution of the insurance sector on economic growth has been recognised, the assessment of the insurance–growth nexus has not been studied as much as that of the banking sector (Cristea et al., 2014). Moreover, the results of insurance–growth studies have varied across the countries due to the levels of socio-economic development, nature of economic structures, financial markets development, and the period analysed and methodology applied. What is more important, studies examining the relationship between insurance and economic growth have been scarce. This research has attempted to solve this issue.

1.1. Object of the research

Insurance sector development–economic growth nexus in the European Union countries.

1.2. Aim of the research

This research attempts to provide more reliable estimates of the relationship between insurance development and economic growth in the EU during the period of 2004–2015.

1.3. Limitations of the research

This research has examined only the associations between two indicators for insurance development (density, i.e., total premiums per insured and penetration, i.e., total premiums to GDP) and one indicator for economic growth (GDP per capita).

Moreover, this research has used annual data from 2004 to 2015, i.e., available data of insurance sector development presented by Insurance Europe. The period under review is short and the results of the study may not be quite accurate. Despite the limitations, the authors believe that the research provides general insights and a better understanding to formulate the directions for sustainable economic development.

The research consists of four parts. Introduction presents theoretical background of insurance development–economic growth nexus. Section 2 reviews recent studies and research methodology. The investigation of the EU countries are summarised and the main insights are provided. Section 3 estimates relationships between indicators across the countries observed. Section 4 concludes summarising the main insights.

2. Empirical studies and research methodology

2.1. The overview of recent studies

Recently, the role of the insurance sector in the economies has grown. Insurance sector development is an important determinant of economic growth. There is plenty of research on the relationship between financial sector development and economic growth (Ductor & Grechyna, 2015; Gokmenoglu, Amin, & Taspinar, 2015; Hsueh, Hu, & Tu, 2013; Komal & Abbas, 2015; Menyah, Nazlioglu, & Wolde-Rufael, 2014; Pradhan, Arvin, Hall, & Bahmani, 2014; Samargandi, Fidrmuc, & Ghosh, 2015; Seven & Yetkiner, 2016; Simion, Stanciu, & Armăşelu, 2015; Uddin, Sjo, & Shahbaz, 2013; Zhang, Wang, & Wang, 2012; Zhuang et al., 2012). In this respect, the insurance sector has not received exceptional attention. However, there are a certain number of recent studies (Akinlo & Apanisile, 2014; Ndalu, 2016; Olayungbo & Akinlo, 2016; Richterkova & Korab, 2013; Yinusa & Akinlo, 2013; Zouhaier, 2014) seeking to assess the nexus between insurance and economic growth. Since 1964, the importance of insurance for the economic performance has been fully recognised in the context of the UNCTAD conferences (Cristea et al., 2014). The study of the European Committee in the field of insurance and previous scientific studies pointed out that the insurance industry promotes economic growth through the channels as follows: (1) offering protection to firms and relieving pressure to covering large damages; (2) facilitating commercial transactions and the provision of credit by mitigating losses; (3) promoting entrepreneurial attitude, encouraging innovations, investment, the vitality of the market and of the competition; (4) increasing financial intermediation through life insurance products; and (5) enabling risk averse individuals and entrepreneurs to undertake higher return activities (Brainard, 2008; Cristea et al., 2014).

Despite the differences of research results across the countries, some important findings have been revealed in recent studies on insurance–growth nexus. The study of Haiss and Sumegi (2008) investigated both the impact of insurance investment and premiums on economic growth in Europe. The authors have conducted a cross-country panel data analysis from 1992 to 2005 for 29 European countries. The results have indicated a positive impact of life insurance on economic growth in the EU-15 countries, also Switzerland, Norway and Iceland. For the new EU Member States from

Central and Eastern Europe, the researchers have found a larger impact for liability insurance. Moreover, the findings have emphasised the impact of the real interest rates and the level of economic development on the insurance–growth nexus. To sum up, the researchers have argued that the insurance sector needs to be paid more attention in financial sector analysis and macroeconomic policy as well (Haiss & Sumegi, 2008). Richterkova and Korab (2013) studied the causal relationship of insurance premium on economic growth using 10 published and unpublished studies. The results have confirmed a positive impact of insurance activity on economic growth. According to the authors, this insight is particularly important for policy-makers who set the policy towards insurance markets. The paper of Yinusa and Akinlo (2013) analysed both the long-run and short-run relationships between insurance and economic growth in Nigeria over the period from 1986–2010. The study has found that insurance development cointegrates with economic performance. Moreover, the results have shown that both physical capital and interest rates have significant positive impact on economic growth in the short-run, while physical capital and inflation have a negative long-run relationship with economic growth. Verma and Bala (2013) examined the relationship between the life insurance and economic growth in India for the time period from 1990–1991 to 2010–2011. The findings of the study have shown that life insurance significantly influences the economic growth in India. Zouhaier (2014) did research on the insurance–economic growth nexus of 23 OECD countries over the period of 1990–2011, using a static panel data model. The key findings have shown a positive impact of non-life insurance, as measured by the penetration rate on economic growth and a negative effect of the total insurance and non-life insurance, as measured by the density on economic growth. The author has concluded without confirmation that this research has allowed us, even in part, to detect the relationship between the insurance sector and the economic growth of developing countries. The mixed results have shown that a clear link between the insurance and economic development is far from being found. Akinlo and Apanisile (2014) investigated the relationship between insurance and economic growth in sub-Saharan Africa over the period of 1986–2011. The estimations have shown that insurance has a positive and significant impact on economic growth. Furthermore, this has indicated that premium contributes to economic growth in sub-Saharan Africa. The authors have concluded that a well-developed insurance sector is necessary for the economic performance, as it provides long-term investments for economic growth and strengthens risk-taking abilities. The study also has revealed that openness and interest rate have a negative and significant impact on economic growth. Cristea et al. (2014) analysed the relationship between insurance and economic growth in Romania between 1997 and 2012. The authors have used the Pearson correlation coefficient and the linear regression equation. The results have shown an important relationship with direct influence between the variables. The paper of Olayungbo and Akinlo (2016) investigated the dynamic interactions between insurance and economic growth in eight African countries for the period of 1970–2013. Using insurance penetration as a measure of insurance to economic growth, the researchers have detected a positive relationship for Egypt, while short-run negative and long-run positive effects have been found for Kenya, Mauritius and South Africa. Moreover, negative effects

have been detected for Algeria, Nigeria, Tunisia and Zimbabwe. Referring to the results, the authors have proposed recommendations for insurance development in the selected African countries. The study of Ndalu (2016) was set out to examine the relationship between insurance penetration and economic growth in Kenya, employing a causal study design and covering 6 years from 2003–2008. The results of the study have shown a positive impact of insurance penetration on economic performance of the country.

To conclude, although banking, insurance and securities markets are closely related, the insurance sector has not received exceptional attention in recent studies. However, researchers have argued that insurance performs somewhat different economic functions than banking and securities markets and it requires particular attention and analysis. Despite the fact that the role of the insurance sector has been fully recognised in the context of economic growth, the overview of recent studies has shown that there is a lack of research on insurance–economic growth nexus, especially for the EU countries.

2.2. Data and research methodology

This research methodology has been based on the indicators that show the size of the insurance market and economic growth in the European Union countries. The most used indicators in the recent studies and international statistics (Akinlo & Apanisile, 2014; Cristea et al., 2014; Insurance Europe, 2016; Ndalu, 2016; Olayungbo & Akinlo, 2016; Zouhaier, 2014) in the field of insurance have been the following: total premiums to GDP, known as the insurance penetration degree, and total premiums per insured, known as the degree of density. Economic growth has been estimated using GDP per capita indicator (Hassan, Sanchez, & Yu, 2011; Ohlan, 2017; Olayungbo & Akinlo, 2016). The research has used Eurostat and European Insurance Industry annual data over the period of 2004–2015. The information from international databases has provided a possibility to compare the countries observed by insurance and economic growth indicators. The study on the relationship between insurance and economic growth in the EU countries has been organised as follows:

> Stage 1: The analysis of the descriptive statistics of insurance and economic growth indicators across the EU countries, except Lithuania. The European Insurance Federation has not provided insurance data for Lithuania.

> Stage 2: The investigation of the relationships between insurance sector and economic growth across the EU countries.

2.2.1. Research methods

There have been used descriptive statistics analysis, which has allowed assessing the dynamics of insurance development and economic growth indicators over the period analysed. It has shown the main differences of the EU countries. Correlation analysis has been applied to detect relationships between insurance and economic growth across the countries. As the correlation analysis says nothing about the causality, Granger (1969, 1980) causality test has been applied for this purpose. Overviewing

the recent studies on financial–growth nexus, it can be concluded that the Granger test has usually been used in the majority of research.

The Granger test has estimated two regression equations as follows (Gokmenoglu et al., 2015; Jiranyakul 2007; Stern 2011):

$$y_t = \beta_{1,0} + \sum_{i=1}^{p} \beta_{1,i} y_{t-i} + \sum_{j=1}^{p} \beta_{1,p+j} x_{t-j} + \varepsilon_{1t} \qquad (1)$$

$$x_t = \beta_{2,0} + \sum_{i=1}^{p} \beta_{2,i} y_{t-i} + \sum_{j=1}^{p} \beta_{2,p+j} x_{t-j} + \varepsilon_{1t} \qquad (2)$$

where p is the number of lags, β is the parameter and ε is the error.

If the p parameters $\beta_{1,p+j}$ are jointly significant then the null hypothesis that x does not Granger cause y can be rejected. Similarly, if the p parameters $\beta_{2,i}$ are jointly significant then the null hypothesis that y does not Granger cause x can be rejected. The Granger causality test has referred on the concept of causal ordering and assumption as follows: a variable x is said to Granger cause another variable y if past values of x help predict the current level of y given all other appropriate information (Stern, 2011). Before using the Granger causality test we have to check whether time series data is stationary or non-stationary. The Augmented Dickey Fuller (ADF) unit root testing has been applied for this purpose (Fuller, 1976; Heij, De Boer, Franses, Kloek, & Dijk, 2004; Nielsen, 2005). There are three different conditions in the ADF test which could be applied to any time series. These conditions are as follows: (1) process includes intercept, but no trend; (2) process includes intercept and trend; (3) process includes no intercept and no trend.

$$\Delta y_t = a + \delta y_{t-1} + u_t, \text{(with intercept, no trend)} \qquad (3)$$

$$\Delta y_t = a + \delta y_{t-1} + \beta t + u_t, \text{(with intercept, with trend)}, \qquad (4)$$

$$\Delta y_t = \delta y_{t-1} + u_t, \text{(no intercept, no trend)}, \qquad (5)$$

where a is an intercept and δ and β are coefficients, u_t is white noise and t is a time variable. The number of lagged differenced terms is often determined empirically, but, in practice, the appropriate lag may be based on the Akaike Information Criterion or Schwarz Info Criterion.

After applying ADF, if particular variables appear non-stationary, the first differencing and, if necessary, the second one should be used.

2.2.2. Data

The analysis has focused on a sample of the 27 EU countries which belong to the European Insurance Federation. Taking into consideration that the UK Brexit referendum took place in 2016 and the research period involved the data from 2004 to

2015, the UK has been included in the sample. Lithuania is not in the sample of countries observed due to non-participation as a member in the European Insurance Federation and the statistical data of insurance sector development availability. Analysing the tendencies and the relationships between insurance and economic growth in the EU countries, there have been two indicators of insurance used, such as total premiums per insured, known as the degree of density and total premiums to GDP, known as a degree of penetration, and one indicator of economic growth, such as GDP per capita.

The statistical empirical data processing has been performed applying Windows-based econometric software E-views v. 8.0 and Microsoft Excel software packages.

The next section has examined the situation on insurance sector development and economic growth in the EU countries.

3. The analysis of relations between insurance and economic growth

3.1. The examination of the main tendencies

In this section, the authors have investigated the main tendencies of insurance and economic growth in the EU countries. Over the period of 2004–2015 GDP per capita and total premiums per insured have increased. By average data of GDP per capita, the EU countries have been grouped into six categories, such as countries with very high economic development level, high, upper middle, lower middle, low and very low (Table 1).

Using linkage analysis between groups, some interesting tendencies have been revealed. The Insurance sector has been best developed in the UK, The Netherlands, Denmark, Finland, Ireland and France. These countries belong to the groups of high and upper middle economic development countries. Romania, Bulgaria, Latvia and Estonia have at least developed insurance sectors. Moreover, these countries belong to the group of very low economic development. Generally, it should be noted, that richer countries have better developed insurance sectors. This statement has not been applied for Portugal which is an economically poor country with a well-developed insurance sector.

The descriptive statistics of the insurance and economic development level indicators across the EU countries groups is presented in Table 2. The results of descriptive statistics analysis have shown that the insurance sector development level is highest in the group of countries with a high level of economic development (Denmark, Ireland, Sweden and Netherlands). However, over the period from 2004 to 2015, maximum insurance indicators (density and penetration) have been detected in the UK, which belongs to the upper middle group of countries.

The standard deviation of the insurance and economic development indicators has shown that the most homogeneous group of the EU countries in terms of insurance has been the group of countries with a very low level of economic development and in terms of economic development – the group of countries with lower middle level. In order to assess the relationships between insurance and economic growth there have been applied correlation analysis that measures the strength of a relationship

Table 1. The groups of the EU countries by economic and insurance indicators.

Groups by the level of economic development/countries	Average, 2004–2015		
	GDP per capita, Eur.	Total premiums per insured, Eur.	Penetration, %
Very high level			
Luxembourg	77,333	3,263	4.11
High level			
Denmark	43,467	3,880	8.95
Ireland	41,292	3,055	7.47
Sweden	39,892	2,848	7.05
Netherlands	37,325	4,304	11.47
Upper middle level			
Austria	35,142	1,936	5.52
Finland	35,133	3,317	9.37
Belgium	33,183	2,670	8.12
UK	32,842	4,177	12.13
Germany	32,275	2,126	6.66
France	30,608	2,919	9.51
Lower middle level			
Italy	26,633	1,925	7.19
Spain	22,617	1,195	5.26
Cyprus	21,900	1,118	5.16
Low level			
Greece	18,758	399	2.12
Slovenia	17,125	926	5.40
Portugal	16,283	1,204	7.39
Malta	15,900	994	6.64
Czech Republic	13,892	472	3.42
Very low level			
Estonia	11,842	228	1.95
Slovakia	11,467	366	3.05
Croatia	9,958	265	2.74
Hungary	9,875	256	3.00
Latvia	9,492	142	1.56
Poland	8,900	302	3.53
Romania	6,050	74	1.34
Bulgaria	4,850	104	2.15

Source: Authors' calculations based on Eurostat (2015).

between two variables, such as insurance penetration and GDP per capita. The results of correlation analysis across the EU countries have been presented in Table 3.

As Table 3 has presented, a positive statistically significant relationship between insurance penetration and economic growth has been detected in Luxembourg, Denmark, The Netherlands and Finland. It has been shown that, as the economy of a certain country grows, insurance penetration increases and vice versa. Besides, a negative statistically significant relationship between variables has been identified in Austria, Belgium, Malta, Estonia and Slovakia. The remaining countries have had a statistically insignificant correlation between insurance development and economic growth. These countries have been excluded from the further investigation. Summarising these results, it can be stated that a positive statistically significant relationship as well as a negative statistically significant relationship between insurance penetration and economic growth in the EU countries exists. However, correlation analysis has said nothing about the causality of a relationship between variables. To this end, the Granger causality test has been applied to a time series data set on insurance development and economic growth in nine EU countries having statistically significant relationships between variables.

Table 2. Descriptive statistics of insurance and economic growth variables.

Groups of countries by the level of economic development	Economic growth and insurance variables	Min	Max	Mean	SD
Very high level (Luxembourg)	GDP per capita, Eur.	60,300	89,900	77,333	9,211
	Total premiums per insured, Eur.	1,824	5225	3,263	995
	Penetration, %	3.00	5.87	4.11	0.91
High level (Denmark, Ireland, Sweden, Netherlands)	GDP per capita, Eur.	32,200	55,100	40,494	4,414
	Total premiums per insured, Eur.	2,112	4,786	3,521	787
	Penetration, %	6.14	12.71	8.73	1.94
Upper middle level (Austria, Finland, Belgium, UK, Germany, France)	GDP per capita, Eur.	27,300	39,600	33,197	3,109
	Total premiums per insured, Eur.	1,716	5,596	2,858	831
	Penetration, %	5.13	16.39	8.55	2.38
Lower middle level (Italy, Spain, Cyprus)	GDP per capita, Eur.	19,100	27,600	23,717	2,404
	Total premiums per insured, Eur.	862	2,417	1,413	425
	Penetration, %	4.10	8.98	5.87	1.33
Low level (Greece, Slovenia, Portugal, Malta, Czech Republic)	GDP per capita, Eur.	9,400	21,800	16,392	2,500
	Total premiums per insured, Eur.	326	1,814	799	363
	Penetration, %	1.87	12.78	4.99	2.47
Very low level (Estonia, Slovakia, Croatia, Hungary, Latvia, Poland, Romania, Bulgaria)	GDP per capita, Eur.	2,700	1,5400	9,054	2,919
	Total premiums per insured, Eur.	26	408	217	103
	Penetration, %	0.86	4.59	2.41	0.78

Source: Authors' calculations based on Eurostat (2015).

3.2. Unit root test

Time-series data is often found to be non-stationary, containing a unit root. Therefore, we start our analysis with unit root testing for all the time series variables. Augmented Dickey Fuller (ADF) method has been used (Fuller, 1976; Heij et al., 2004; Nielsen, 2005) for this purpose. Applying ADF, we have to check whether the particular variables have unit root or not. The hypotheses are as follows:

H_0: variables are not stationary or have unit root; alternative hypothesis H_1: variables are stationary.

ADF checks the hypothesis about the stationarity of the particular variables at significance levels of 1%, 5% and 10%. In addition, there are three types of different conditions in the ADF test which could be applied to any time series. First, process includes intercept, but no trend. Second, process includes intercept and trend. Third, process includes no intercept and no trend. All calculations have been made applying the econometric software Eviews v. 8.0.

As usual, in this case the time series data turned out to be non-stationary. Therefore, we have used the first differencing and, if necessary, the second one. After taking first or second difference, non-stationary at level variables become stationary in all examined countries, except Denmark and Belgium. Taking into consideration that first and second differences have left the particular variables of Denmark and Belgium non-stationary, and the use of the third difference has been limited in the short-term, these countries have been excluded from the further research. Table 4 gives the results of ADF tests.

Table 3. Correlation between insurance development and economic growth.

Groups of countries	Correlation coefficient	t^{stat}	t^{cr}
Very high level			2.23
Luxembourg	0.65	2.70	
High level			
Denmark	0.79	4.05	
Ireland	0.30	1.00	
Sweden	−0.03	0.09	
Netherlands	0.58	2.26	
Upper middle level			
Austria	−0.92	7.52	
Finland	0.67	2.85	
Belgium	−0.90	6.53	
United Kingdom	0.14	0.45	
Germany	−0.52	1.92	
France	−0.41	1.42	
Lower middle level			
Italy	−0.18	0.58	
Spain	0.11	0.35	
Cyprus	−0.39	1.34	
Low level			
Greece	0.33	1.11	
Slovenia	0.04	0.13	
Portugal	0.08	0.25	
Malta	−0.69	3.02	
Czech Republic	0.03	0.09	
Very low level			
Estonia	−0.73	3.36	
Slovakia	−0.93	7.86	
Croatia	0.36	1.22	
Hungary	−0.30	1.00	
Latvia	−0.42	1.47	
Poland	0.22	0.71	
Romania	0.39	1.34	
Bulgaria	0.18	0.58	

Source: Authors' calculations based on Eurostat (2015).

Table 4. Augmented Dickey Fuller stationarity test.

		Difference		
Countries	Variables	Intercept	Intercept & Trend	None
Luxembourg	GDP	−3.704785**	−3.485192***	−1.959994**
	Insurance	−3.495966**	−5.438933*	−4.395891*
Netherlands	GDP	−3.962395**	−3.600438***	−4.168475*
	Insurance	−6.941737*	−6.166559*	−6.863189*
Finland	GDP	−3.748815**	−3.567421***	−3.964399*
	Insurance	−4.029123**	−−3.437584***	−3.632372*
Austria	GDP	−4.099784**	−3.828035***	−4.688928*
	Insurance	−5.112619*	−4.886873**	−3.412264*
Malta	GDP	−4.534867*	−6.295740*	−4.420776*
	Insurance	−3.594944**	−14.41855*	−3.631134*
Estonia	GDP	−3.647632**	−3.669123***	−3.832099*
	Insurance	−3.933993**	−3.616343***	−3.819477*
Slovakia	GDP	−2.893968***	−6.225203*	−3.820109*
	Insurance	−4.473847*	−5.331735**	−2.491515**

Note: *, ** and *** indicate significance at 1%, 5% and 10%, respectively.
Source: Calculations based on Eviews v. 8.0.

After converting the particular variables into stationary, we can use the Granger causality test in order to check the direction of causality between these variables. The next section estimates insurance–growth causality.

3.3. Granger causality test

The Granger causality test has been used in order to study the forerunner-lag relationship between insurance penetration and economic growth. A variable (insurance penetration) is said to Granger cause another variable (economic growth (GDP)) if past values of insurance help in predicting the current level of economic development. The Granger test is based on the concept of causal ordering. Moreover, if economic growth in fact causes the changes in insurance, then, given the past history of economic growth, the values of the insurance sector can be predicted. The results of the Granger causality tests for all the samples are summarised in Table 5 and are presented below.

The null hypothesis has been rejected if probability associated to F-statistic is $\leq$ 0.1. Conversely, the null hypothesis has been accepted if the associated probability of F statistic is > 0.1. The results of the Granger causality test have provided new empirical insights into the relationship between insurance and economic growth. The analysis has shown unidirectional causality running from GDP to insurance in Luxembourg and Finland, with three and one lags delay, respectively. This means that the insurance sector does not play a significant role in the context of economic growth in these countries. It has supported a demand-following approach, that is the change of insurance follows economic growth. As the economy of these countries grows, the demand for insurance changes. This implies that policy-makers should focus on components of economic growth in order to support the changes in insurance development. Moreover, the Granger test has shown unidirectional causality from insurance to GDP in The Netherlands, Malta and Estonia, with three lags, one lag and two lags delay, respectively. It is obvious that in this case the insurance sector is supply-leading. It impacts on GDP by acting as a productive input. In addition, the case of Austria has shown bidirectional causality between insurance and growth with

Table 5. The results of the Granger causality test.

Null hypothesis	Observations/Lags	F-statistic	Probability	Test results
Luxembourg				
Insurance does not Granger cause of GDP	Obs.: 8	0.23890	0.8667	Accepted
GDP does not Granger cause of Insurance	Lags: 3	27.0746	0.1401	Rejected
Netherlands				
Insurance does not Granger cause of GDP	Obs.: 8	80.0460	0.0025	Rejected
GDP does not Granger cause of Insurance	Lags: 3	0.47281	0.6630	Accepted
Finland				
Insurance does not Granger cause of GDP	Obs.: 9	0.02268	0.8852	Accepted
GDP does not Granger cause of Insurance	Lags: 1	5.72106	0.0539	Rejected
Austria				
Insurance does not Granger cause of GDP	Obs.: 9	3.10223	0.1287	Rejected
GDP does not Granger cause of Insurance	Lags: 1	5.08925	0.0649	Rejected
Malta				
Insurance does not Granger cause of GDP	Obs.: 9	9.77877	0.0204	Rejected
GDP does not Granger cause of Insurance	Lags: 1	0.01962	0.8932	Accepted
Estonia				
Insurance does not Granger cause of GDP	Obs.: 8	8.41599	0.0588	Rejected
GDP does not Granger cause of Insurance	Lags: 2	1.75977	0.3121	Accepted
Slovakia				
Insurance does not Granger cause of GDP	Obs.: 9	1.35629	0.2884	Accepted
GDP does not Granger cause of Insurance	Lags: 1	1.37609	0.2852	Accepted

Source: authors' calculations based on Eviews v. 8.0.

one lag delay. This implies a mutual or two-way causal relationship between two variables. Referring to this, the development of the insurance sector is as a result of economic growth as well as economic growth being dependent on insurance. Finally, the analysis has presented the absence of causality between insurance and economic growth in Slovakia.

4. Conclusions

The main objective of this research is to examine the relationships between insurance and economic growth in the European Union countries. Over the last decade considerable attention has been paid to evaluating the relationship between financial development and economic growth. Most studies have related to the banking sector and securities markets. The insurance sector has not received exceptional attention. Although banking, insurance and securities markets are closely related, insurance performs somewhat different economic functions. In this light, it requires particular attention and analysis. The research of the insurance–growth nexus has held an inconclusive explanation about the association between the variables observed.

Descriptive statistics analysis has shown that the insurance sector development is higher in economically rich countries, such as the UK, The Netherlands, Denmark, Finland, Ireland and France. Romania, Bulgaria, Latvia and Estonia have the least developed insurance sectors. Moreover, these countries belong to the group of very low economic development.

A positive statistically significant relationship between insurance penetration and economic growth has been detected in Luxembourg, Denmark, The Netherlands and Finland. It has shown that, as the economy of a particular country grows, insurance penetration increases and vice versa. A negative statistically significant relationship between variables has been identified in Austria, Belgium, Malta, Estonia and Slovakia. The remaining countries have a statistically insignificant correlation between insurance and economic growth. The Granger causality test has shown unidirectional causality running from GDP to insurance in Luxembourg and Finland. It is obvious, that the insurance sector does not play a significant role in the context of economic growth in these countries. Moreover, unidirectional causality from insurance to GDP has been detected in The Netherlands, Malta and Estonia. In this case, the insurance sector impacts on GDP by acting as a productive input. Furthermore, the case of Austria has shown bidirectional causality between insurance and growth. This implies a mutual or two-way causal relationship between two variables. Finally, the analysis has presented the absence of causality in Slovakia.

The determination of the relationships between insurance and economic growth has provided policy-makers a better understanding to formulate directions for sustainable economic development in the EU countries.

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