DOI: https://doi.org/10.37075/EA.2022.4.05 Economic Alternatives, 2022, Issue 4, pp. 647-660

Macroeconomic Challenges for Life Insurance Market in the Baltic States

Received: 14.01.2022
Available online: 30.12.2022

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Abstract

The development of life insurance sector in the Baltic States is influenced by various opportunities and threats from the macroeconomic environment. In this context, the aim of this paper is to identify some macroeconomic factors that influence various indicators describing the life insurance market in Latvia, Estonia and Lithuania in the period 1993-2020 (direct premiums written, life insurance density, and life insurance penetration). The panel data approach suggests that economic growth, expenditure on tertiary education and income supports the development of the life insurance sector in these countries, while higher unemployment negatively affects the insurance market. These results have implications for the life insurance market forecasting in the new international context dominated by the Covid-19 pandemic.

Keywords: life insurance market, direct premium written, insurance density, insurance penetration

JEL: C51, C53

1. Introduction

Small countries like the Baltic States could serve as small-scale laboratories in the research of the insurance market to understand better the policies and regulations in bigger states. The history of the insurance market in the Baltic States is recent, since the origin is related to the independence of these countries after the collapse of the communist regime.

The legislation corresponding to the insurance market and the supervising authorities were developed at the beginning of 1990s (Estonia in 1992, Latvia in 1993 and Lithuania in 1990). Germany and other EU member states provided assistance to the Baltic states in the creation of the insurance market (Rupeika-Apoga et al., 2020). The public insurance firms were privatized in the period 1995-1997 (Bokans, 2018) and the separation between life and non-life insurance were made at different moments (Estonia in 1992, Latvia in 1994 and Lithuania in 1996). After the countries joined the euro area, all the EU requirements were fulfilled. The Solvency II requirements came into force in 2016 and put many difficulties to insurance companies because of the issues related to risk management (Zarina et al., 2018).

The development of the life insurance sector in Lithuania, Latvia and Estonia is supported by economic growth and the insurance activities abroad, especially among the Baltic countries. On the other hand, a few threats determined the weak

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performance of the life insurance companies in these states: the evolution of the financial market with negative fluctuations and low interest rates. The changes in the investment policy in financial instruments affected the life insurance companies more than non-life insurance firms.

Life insurance companies in these countries are quite stable, characterized by high solvency ratios defined as proportions of the insurers' capital to the minimum capital requirement or solvency. The lower limit of 100% is exceeded by all the Baltic States, Lithuania being the best positioned from this point of view.

In the context of the Covid-19 pandemic, the insurance markets in these countries have adapted to new challenges, but the efforts should continue to face the next challenges related to social responsibility, cyber insurance, sustainability and transport regulations.

Considering this background, the aim of the paper is to identify a few factors that support the development of the life insurance market in the Baltic States. The evolution of the insurance market is described by specific indicators like life direct premiums written, life insurance density, and life insurance penetration. The paper employs a panel data approach for the period 1993-2020. Macroeconomic indicators are considered among the determinants of the life insurance market.

The novelty of this study is related to the identification of factors that contribute to the development of the life insurance market in the Baltic States. From this point of view, this empirical analysis fills a gap in the literature related to this specific segment of the insurance product. A previous study of Simionescu and Ulbinaite (2021) has indicated that better living standards and well-being brought by economic growth and households' income support the development of the insurance market in Lithuania, Latvia and Estonia reflected by specific insurance indicators like penetration, premiums and density. This previous analysis is based on mixed-effect and panel models for the period 1996-2017, but it does not make distinctions between determinants for the life and non-life insurance market in the Baltic States. Since the factors that affect the insurance market might be different, our paper comes up with a separate analysis for the life segment since it is a challenge for any country during the pandemic period. Moreover, previous studies on the impact of macroeconomic indicators on the insurance market in the Baltic countries have not considered the level of education and unemployment in explaining insurance market indicators (Rupeika-Apoga et al., 2020; Simionescu and Ulbinaite, 2021). Arguments are provided for justifying the selection of the potential determinants of the insurance market in the Baltic States. After the presentation of data and methodology, the results are described.

2. Data and methodology

The following indicators were considered in the models proposed for the Baltic States (Lithuania, Estonia and Latvia): life direct premiums written (DPW), life insurance density, life insurance penetration, GDP (constant 2010 USD), expenditure on tertiary education (% of government expenditure on education), net primary income in constant prices (2010=100), GINI index (World Bank estimate) and unemployment rate (% of total labour force) (national estimate). The data associated with indicators related to the insurance market (life DPW, insurance density and insurance penetration) are provided by World Statistics (http://www.sigma-explorer.

com/index.html). The data for the rest of the variables are taken from the Word Bank database (https://data.worldbank.org/). The data refer to the period 1993-2020.

The indicators associated with the insurance market development are selected according to previous empirical researches. For example, the insurance market is described in the study of Ul Din et al. (2017) by three proxies like insurance penetration rate, net written premiums and insurance density. These variables are considered standard measures of the insurance market development, suggesting the ratio of insurance premiums in relation to GDP, the volume of insurance premiums, and respectively the ratio of insurance premiums per capita. Han et al. (2010) used insurance penetration as a proxy for insurance sector development showing that global financial development including banking system, stock markets and insurance are more correlated with economic growth. The insurance development reflected by insurance penetration was previously used in the studies of Curak et al. (2009) and Dash et al. (2018). Other authors, like Lee et al. (2018), Wanat et al. (2016), and Han et. al. (2010) used insurance density to express the development of the insurance market. In the studies of Muye and Hassan (2016) and Arena (2008) insurance activity is described by the insurance premiums.

The connection between economic growth and insurance market indicators has been the subject of many previous studies. Wanat et al. (2016) and Ul Din et al. (2017) made a review of studies analyzing the connection between economic growth and the insurance market. Most of these studies focused on a group of countries and used panel data models like in our research. In some cases, comparative analyses were made between developed and developing states. For example, Han et al. (2010) showed that GDP growth contributed to the development of the insurance sector in 77 countries in the period 1994-2005, but in developing countries the growth is more important in supporting insurance activities compared to the developed ones. Moreover, Simionescu and Ulbinaite (2021) also suggested the correlation between the insurance market in the Baltic States and output growth in the period 1996-2017, but without drawing a distinction between life and non-life insurance market.

The link between unemployment and the insurance sector has been explained by Rosen (1983) using equilibrium properties that characterize contract labor markets. In our paper, the unemployment-insurance market nexus is indirect, since high unemployment is associated with growth decline that is reflected in negative consequences for the insurance market.

Education might impact the households' decision to insure, as Simionescu and Ulbinaite (2021) suggested. People with tertiary education might have higher salaries and might be more open to buy insurance products. The role of education in insurance demand was explained by Outreville (2015). The level of education is used as a proxy for risk aversion that is positively correlated with insurance demand. Households' income conditions the decision to insure (Levy and Schady, 2013; Kajwang, 2022), since people with low income will consider insurance products as luxury goods and could not afford to pay for these.

According to Figure 1, Lithuania registered higher values of the life direct premiums written (DPW) in USD (constant prices) in the period 1993-2020 compared to Estonia and Latvia. Lithuania achieved the highest value

of life DPW in 2007. The lowest value of this indicator in Lithuania was registered in 2010 (a decrease by almost 60.72% compared to the value of the indicator in 2007), but Lithuania still had a higher value compared to the other Baltic countries.

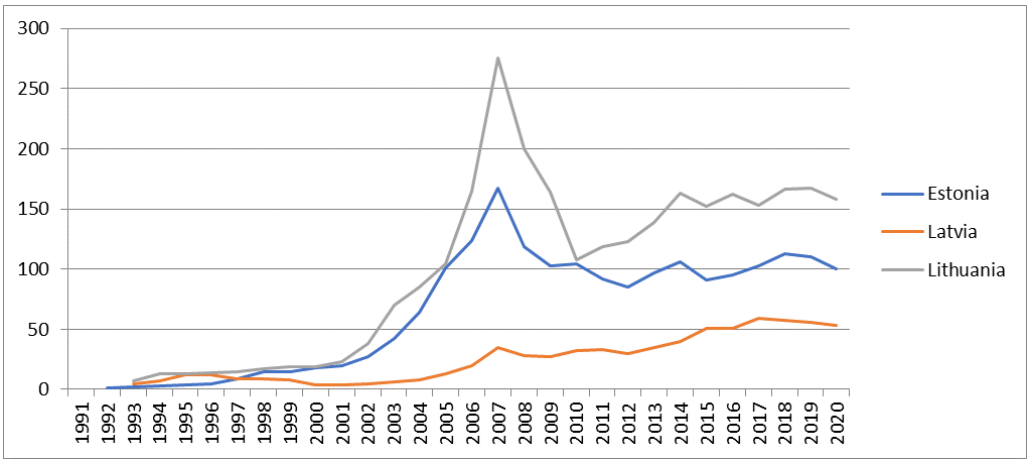

Figure 1. Life direct premiums written in the Baltic States in the period 1993-2020, in millions USD, constant prices
Source: Swiss Re Institute, 2021

According to Figure 2, Estonia reported the highest life insurance density in the entire period, outperforming the rest of the Baltic States. The maximum level of life insurance density was registered in Estonia in 2007, before the economic crisis started. However, life insurance density dropped suddenly in this country in the period 2008-2010. Moreover, in 2010, Estonia's life insurance density decreased by 59.3% compared to 2007. Latvia registered a lower life insurance density in the period 1993-2020 compared to the rest of the countries.

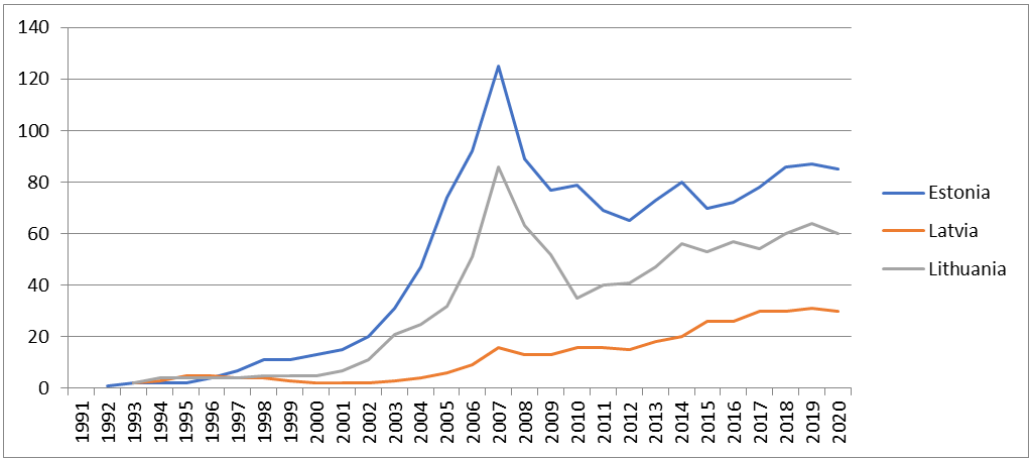

Figure 2. Life insurance density in the Baltic States in the period 1993-2020, USD, constant prices
Source: Swiss Re Institute, 2021

According to Figure 3, Estonia reported the highest life insurance penetration in the period 1993-2020. The maximum level of this indicator was achieved by Estonia in 2007 (0.7%), before the economic crisis started. In 2008 the life insurance penetration dropped, the values of the variable in the period 2008-2020 varying from 0.3% to 0.4%. Except in 2001, Latvia registered lower values of life insurance penetration compared to Estonia and Lithuania in the entire period.

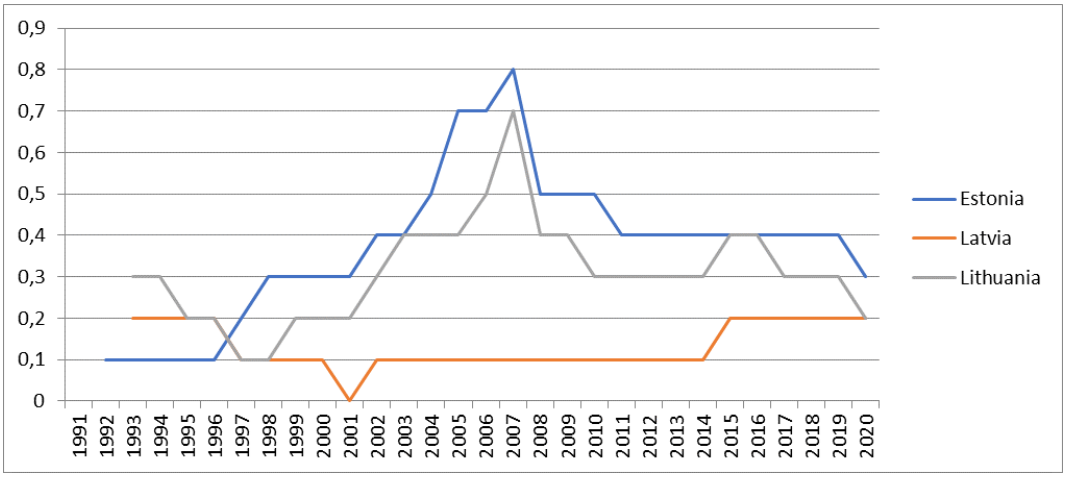

Figure 3. Life insurance penetration in the Baltic countries in the period 1993-2020, in per cent
Source: Swiss Re Institute, 2021

The empirical analysis also uses some macroeconomic variables: GDP (constant 2010 USD), expenditure on tertiary education (% of government expenditure on education), net primary income in constant prices (2010=100), GINI index (World Bank estimate), and unemployment rate (% of total labour force) (national estimate). We use net income like in many papers focused on insurance demand and insurance consumer behaviour. The evolution of the GDP in constant prices is suitable for characterizing the economic development, since it is usually used as an expression of the economic activity in a country. In general, GDP is used to determine the strength and direction of relationship between economic growth and the insurance market. Since the behaviour of the insurance consumer is correlated to their level of education, we considered the expenditure to tertiary education. The higher the level of education, the higher the population propensity to buy insurance products. High unemployment rates generate social tension and less money in the economy to insure the goods and persons, including life insurance products. The GINI index is a measure of income inequality which might explain the consumers' behaviour in the insurance sector.

In this paper, an econometric approach based on panel data models and cointegration in panel data is employed. The main advantage of panel data models is the flexibility in modelling differences in behaviour across different cross-sections. Another advantage of this method is that the issue of a low number of observations in the sample is solved. We will start from the basic framework for K regressors in x_{it}:

$$y_{it} = x'_{it} \cdot \beta + z'_i \cdot \alpha + \varepsilon_{it}$$

$$y_{it} = x'_{it} \cdot \beta + c_i + \varepsilon_{it}$$

ε_{it} - error term

α, β - coefficients

y_{it} - dependent variable

The individual effect or heterogeneity is given by the term $z'_i \cdot \alpha$. In this case, z_i includes an intercept and more group-specific variables that might be observed or not, but they do not change in time.

If z_i is observed for all cross-sections, the model could be seen as an ordinary least square model. The model becomes more complicated when c_i is unobserved. In the case of pooled regression, if z_i includes only an intercept, OLS (ordinary least squares) provides efficient and consistent estimates of the slope vector β and common term α. In case of an unobserved z_i, β will be inconsistent and biased, because of a variable that was omitted. The fixed effects model that is convenient for this case has the following form:

$$y_{it} = x'_{it} \cdot \beta + \alpha_i + \varepsilon_{it}$$

α_i - group-specific constant term

$\alpha_i = z'_i \cdot \alpha$ includes all the effects that are observable

The Pedroni Residual Cointegration Test is based on the Engle-Granger framework, but it checks for cointegration in panel data.

The Engle-Granger cointegration test examines the residuals of a spurious regression based on variables that are integrated of order 1. In case of cointegrated variables, the residuals should be stationary. The residuals will be integrated of order 1, if the variables are not cointegrated. Pedroni (2004) proposed a few tests for cointegration based on trend parameters across cross-sections and heterogeneous intercepts. We start from the following regression, considering that x and y are integrated of order 1:

$$y_{i,t} = \alpha_i + \delta_i \cdot t + \beta_{1i} \cdot x_{1i,t} + \beta_{2i} \cdot x_{2i,t} + \cdots + \beta_{Mi} \cdot x_{Mi,t} + e_{i,t}$$

t=1,2,…,T; i=1,2,…,N; m=1,2,…,M.

α_i - individual effects

δ_i - trend effects

The null hypothesis states no cointegration, using different methods of building statistics. The standardized statistic of the Pedroni test should be asymptotically normally distributed.

3. Empirical analysis

This empirical study is based on a panel data approach, including the test of the cointegration relationships between life insurance market indicators and various macroeconomic variables in the case of the three Baltic States in the period 1993-2020. The reason for checking the connection between the insurance market and the real economy is based by the fact that overall changes in the national economies might affect also the insurance sector. Moreover, based on this relationship, the future evolution of the insurance market might be predicted using only the macroeconomic variables. Some of the indicators might affect the insurance sector, but some of them have no influence. Therefore, it is necessary to empirically determine those macroeconomic indicators that affect the life insurance sector in the Baltic States.

After applying panel data unit root tests, we got stationary data in level at 10% level of significance according to the Levin-Lin-Chu (LLC) test for the following variables: net primary income, GINI index and unemployment

rate. For the rest of the variables, the data are stationary in the first difference.

The direct premiums written (DPW) were explained using a pooled model and a fixed effects model. After checking for redundant fixed effects model, we got that POOLED model is better than fixed effects model (statistic of the test =0.995059, p-value=0.3753). For the POOLED regression model, there is no multicollinearity between explanatory variables, the correlation coefficients being under 0.1. The Durbin-Watson statistic is close to 2 (DW=2.39), suggesting that the errors are independent. Moreover, according to the White test, the errors are homoscedastic (p-value=0.556).

Table 1. Pooled regression model to explain the variation in life direct premiums written in the Baltic States (1993-2018)

Variable	Coefficient	t-statistic	P>|z|
GDP in first difference	$8.67 \cdot 10^{-3}$	4.99	0.000
Net primary income	$1.06 \cdot 10^{-2}$	2.25	0.027
Unemployment rate	-1.38	0.69	0.050
Constant	17.5626	1.82	0.0719

Source: own computations in EViews

According to the pooled regression model for life direct premiums written in the Baltic States, this indicator is explained by GDP variation from one year to another, net primary income and unemployment rate. There is a very low and positive correlation between GDP variation and direct premiums written and between income and direct premiums written. The increase in GDP and in income generates a low increase in the life DPW. On the other hand, unemployment rate has a strong and negative influence on life DPW. The increase in unemployment rate by one percent leads to a decrease in life insurance premiums by 1.38 USD in constant prices. As expected, life DPW are sensitive to tensions on labour market consisting in unemployment increase. In this case, with less money brought by job losses, the population is less open to buy life insurance products. The Gini index does not influence the variation in life DPW. The impact of unemployment on DPW for the life insurance sector is higher than the impact of growth as in the study of Christophersen and Jakubik (2014) for 30 European countries. The situation on the labour market of the Baltic States affects more the insurance companies' revenues from life insurance products than the overall evolution of output.

The results are consistent with previous findings of Levine (1998) and of Arena (2008), who showed that variation in GDP per capita has a positive influence on direct premiums written. Moreover, Christophersen and Jakubik (2014) showed that GDP has a positive impact on direct premiums written for both the life and non-life insurance market in a sample of 30 countries in the period 2005-2012. From an economic point of view, growth and more households' income are drivers for more revenues from insurance activities since the standard of living is higher and the population could afford to pay more for life insurance products. For example, people might be more interested to protect their health and prefer to sign certain types of life-insurance contracts.

Knowing that GDP and life DPW are both integrated of order 1, we check for co-integration using the Pedroni test in more variants as Table 2 shows.

Table 2. Pedroni Residual Co-integration Test between life DPW and GDP in the Baltic States (1993-2020)

Pedroni test	Statistic	p-value
Panel v-Statistic	1.046819	0.1476
Panel rho-Statistic	-0.804255	0.2106
Panel PP-Statistic	-0.719919	0.2358
Panel ADF-Statistic	-0.082817	0.4670
Weighted Panel v-Statistic	0.254065	0.3997
Weighted Panel rho-Statistic	0.197942	0.5785
Weighted Panel PP-Statistic	0.212412	0.5841
Weighted Panel ADF-Statistic	0.373406	0.6456
Group rho-Statistic	0.788206	0.7847
Group PP-Statistic	0.671184	0.7489
Group ADF-Statistic	0.929615	0.8237

Source: own computations in Eviews

According to the Pedroni test, there is a cointegration relationship between life DPW and GDP at 5% level of significance. The connection between growth and DPW was also identified by Simionescu and Ulbinaite (2021) for the Baltic States and is confirmed by panel data models. A long-run economic growth creates the premises for welfare and makes people more leaning towards consumption of life insurance products that could help them to keep or improve their well-being. Therefore, Panel Fully Modified Least Squares (FMOLS) and Panel Dynamic Least Squares (DOLS) were used to estimate the influence of the real GDP on life DPW.

According to the FOLS method of estimation, the coefficient associated with GDP is $5.87 \cdot 10^{-3}$, where the statistic is 7.57 (p-value=0.000). According to the DOLS method of estimation, the coefficient associated with GDP is $3.08 \cdot 10^{-3}$, where the statistic is 7.31 (p-value=0.000). However, both estimations suggest a positive and very low influence of GDP on life DPW at 5% level of significance. For both models the coefficients of correlations for errors are zero from a statistical point of view at 5% level of significance up to 10^{th} lag. The low influence of growth on life DPW was also obtained by Simionescu and Ulbinaite for the Baltic States and by Christophersen and Jakubik (2014) for 30 European countries. This tendency might be explained by the weak connection between the macroeconomic environment and the financial market.

Table 3. Pedroni Residual Cointegration Test between life DPW and expenditure on tertiary education in the Baltic States (1993-2020)

Pedroni test	Statistic	p-value
Panel v-Statistic	-0.238496	0.5943
Panel rho-Statistic	-0.057948	0.4769
Panel PP-Statistic	-0.531489	0.2975
Panel ADF-Statistic	-0.694551	0.2437
Weighted Panel v-Statistic	-0.220059	0.5871

Pedroni test	Statistic	p-value
Weighted Panel rho-Statistic	-0.404374	0.3430
Weighted Panel PP-Statistic	-0.772452	0.2199
Weighted Panel ADF-Statistic	-0.520900	0.3012
Group rho-Statistic	0.483073	0.6855
Group PP-Statistic	-0.388871	0.3487
Group ADF-Statistic	-0.046640	0.4814

Source: own computations in Eviews

According to the Pedroni test in Table 3, there is a cointegration relationship between life DPW and expenditure on tertiary education at a 5% level of significance. Therefore, the Panel Fully Modified Least Squares (FMOLS) and the Panel Dynamic Least Squares (DOLS) were used to estimate the influence of expenditure allocated to tertiary education on life DPW.

According to the FMOLS method of estimation, the coefficient associated with expenditure on tertiary education is 8.15, where the statistic is 3.1 (p-value=0.0032). According to the DOLS method of estimation, the coefficient associated with expenditure on tertiary education is 6.86, where the statistic is 1.49 (p-value=0.1480). However, both estimations suggest a positive and significant influence of expenditure allocated to tertiary education on life DPW at a 5% level of significance. For both models the coefficients of correlations for errors are zero from a statistical point of view at a 5% level of significance up to the 10th lag. An increase in the expenditure on tertiary education by one percentage points generated, in average, an increase in the life DPW by 8.15 dollars, respectively 6.86 dollars. The results are according to expectations and according to previous studies from literature that analysed the relationship between the level of education and life insurance demand (Browne and Kim, 1993; Outreville, 2015). In other words, more educated people tend to buy more life insurance products.

Table 4. Fixed effects panel data model to explain the variation in life insurance density in the Baltic States (1993-2020)

Variable	Coefficient	t-statistic	P>|z|
GDP in first difference	$3.88 \cdot 10^{-3}$	4.83	0.000
Net primary income	$6.02 \cdot 10^{-2}$	2.46	0.011
Unemployment rate	-0.57	-1.75	0.08
Constant	8.28	1.81	0.07
Fixed effects (cross)			
Constant Estonia	1.95		
Constant Latvia	-2.46		
Constant Lithuania	0.61		

Source: own computations in EViews

Table 4 indicates a low and positive influence of variation in GDP and net primary income on variation in life insurance density. If the GDP per capita increases, the government spends more and, consequently, households have a higher disposable income and the insurance density grows as shown before (Beck and Webb (2004) for EU countries; Sen

(2008) for Asian countries). On the other hand, the unemployment rate has a negative impact on changes in the life insurance density. Higher unemployment means less income and consequently fewer tendencies to buy life insurance products. Each increase in the unemployment rate by one percentage point brought, on average, a decrease in the life insurance density by 0.57 units. The negative correlation between the unemployment rate and insurance density was previously showed by Cristea and Dănciulescu (2016) in the case of Romania for the period 1997-2015. Higher unemployment implies less disposable income for households to buy life insurance products, which determines a decrease in DPW and, consequently, a low life insurance density.

Knowing that GDP and life insurance density are both integrated of order 1, we check for co-integration using the Pedroni test in more variants as Table 5 shows.

Table 5. Pedroni Residual Cointegration Test between life insurance density and GDP in the Baltic States (1993-2020)

Pedroni test	Statistic	p-value
Panel v-Statistic	1.063083	0.1439
Panel rho-Statistic	-0.394424	0.3466
Panel PP-Statistic	-0.396410	0.3459
Panel ADF-Statistic	0.171031	0.5679
Weighted Panel v-Statistic	0.308902	0.3787
Weighted Panel rho-Statistic	0.177171	0.5703
Weighted Panel PP-Statistic	0.175905	0.5698
Weighted Panel ADF-Statistic	0.438603	0.6695
Group rho-Statistic	0.613230	0.7301
Group PP-Statistic	0.496980	0.6904
Group ADF-Statistic	0.885602	0.8121

Source: own computations in Eviews

According to the Pedroni test, there is a cointegration relationship between life insurance density and GDP at a 5% level of significance. However, a valid model with independent errors was not identified.

Knowing that expenditure on tertiary education and life insurance density are both integrated of order 1, we check for co-integration using the Pedroni test in more variants as Table 6 shows.

Table 6. The Pedroni Residual Co-integration Test between life insurance density and expenditure on tertiary education in the Baltic States (1993-2020)

Pedroni test	Statistic	p-value
Panel v-Statistic	-0.154210	0.5613
Panel rho-Statistic	-0.483709	0.3143
Panel PP-Statistic	-1.175854	0.1198
Panel ADF-Statistic	-0.813748	0.2079
Weighted Panel v-Statistic	-0.280689	0.6105
Weighted Panel rho-Statistic	-0.559096	0.2880
Weighted Panel PP-Statistic	-0.878088	0.1899

Pedroni test	Statistic	p-value
Weighted Panel ADF-Statistic	-0.584483	0.2794
Group rho-Statistic	0.350000	0.6368
Group PP-Statistic	-0.534445	0.2965
Group ADF-Statistic	-0.160352	0.4363

Source: own computations in Eviews

Therefore, the Panel Fully Modified Least Squares (FMOLS) and Panel Dynamic Least Squares (DOLS) were used to estimate the influence of expenditure allocated to tertiary education on life insurance density. According to the FOLS method of estimation, the coefficient associated with expenditure on tertiary education is 3.38, where the statistic is 2.32 (p-value=0.030). According to the DOLS method of estimation, the coefficient associated with expenditure on tertiary education is 4.41, where the statistic is 2.24 (p-value=0.0336). However, both estimations suggest a positive and strong influence of expenditure allocated to tertiary education on life insurance density at a 5% level of significance. For both models the coefficients of correlations for errors are zero from a statistical point of view at a 5% level of significance up to the 10th lag. This type of connection was highlighted by Outreville (2015) and it could be explained by the higher income of higher educated people that could afford life insurance products.

The life insurance penetration in the Baltic States in the period 1993-2020 is explained using a Pooled OLS regression, as Table 7 shows.

Table 7. Pooled OLS regression model to explain the variation in life insurance penetration in the Baltic States (1993-2020)

Variable	Coefficient	t-statistic	P>|z|
GDP in first difference	$1.7 \cdot 10^{-4}$	2.48	0.0156
Net primary income	$3.59 \cdot 10^{-4}$	2.17	0.033
Constant	0.0079	0.65	0.5122

Source: own computations in EViews

According to the POLS regression model for life insurance penetration in the Baltic States, this indicator is explained by GDP variation from one year to another and net primary income. There is a very low and positive correlation between GDP variation and life insurance penetration and between income and life insurance penetration. As expected, GDP growth was positively correlated with insurance penetration in the Baltic countries as in the studies of Beck and Webb (2004) and Sen (2008). Moreover, Ostrowska-Dankiewicz and Simionescu (2020) showed the direct connection between growth and insurance penetration in the EU countries in the period 1996-2017.

According to the Pedroni test, there is a co-integration relationship between life insurance penetration and expenditure on tertiary education at a 5% level of significance (see Table 8). The connection between these variables is also supported by Lin et al. (2019) and Simionescu and Ulbinaite (2021). A better quality of education is a key element in the development of the life insurance sector.

Table 8. The Pedroni Residual Co-integration Test for life insurance penetration and expenditure on tertiary education in the Baltic States (1993-2020)

Pedroni test	Statistic	p-value
Panel v-Statistic	0.954608	0.1699
Panel rho-Statistic	-0.511062	0.3047
Panel PP-Statistic	-0.594123	0.2762
Panel ADF-Statistic	1.495580	0.9326
Weighted Panel v-Statistic	1.443927	0.0744
Weighted Panel rho-Statistic	-1.046187	0.1477
Weighted Panel PP-Statistic	-1.317966	0.0938
Weighted Panel ADF-Statistic	1.026983	0.8478
Group rho-Statistic	-0.582384	0.2802
Group PP-Statistic	-1.499950	0.0668
Group ADF-Statistic	1.336750	0.9093

Source: own computations in Eviews

According to the FOLS method of estimation, the coefficient associated with expenditure on tertiary education is -0.031, where the statistic is -4.076 (p-value=0.0002). According to the DOLS method of estimation, the coefficient associated with expenditure on tertiary education is -0.04, where the statistic is -4.88 (p-value=0.0001). However, both estimations suggest a negative and low influence of expenditure allocated to tertiary education on life insurance penetration at a 5% level of significance. For both models the coefficients of correlations for errors are zero from a statistical point of view at a 5% level of significance up to the 10th lag.

The results suggest that higher expenditure on tertiary education reduced to some extent the life insurance penetration, even if the DPW and density contributed to increase. These findings are contrary to Lin et al. (2017) and could be explained by the fact that not only people with higher education might have bigger salaries to afford these insurance products. The economic growth of the Baltic States is supported also by categories of people with lower salaries.

All these empirical results present policy implications. First, income and growth have a positive influence on life insurance market indicators, but this impact remains low. Therefore, the economic crisis with a high decline in GDP did not impact too much the insurance sector compared to the banking sector. Second, unemployment presents a negative and more significant influence on the life insurance market. Lack of jobs that could ensure expected salaries are a bigger threat for the insurance sector in the Baltic States. In periods characterized by high unemployment, policy makers should support the activities of companies selling life insurance products. Labour market policies that promote employment are also necessary to reduce the magnitude of the negative impact on the insurance sector. Direct written premiums and insurance density are positively correlated with the expenditure on education. Therefore, the promotion of life insurance products among less educated people should be made by more investments in quality education. This is part of the financial education that should be enhanced even from the secondary level of education. Investment in education and the

creation of new jobs especially in the green economic sectors should be a priority for policy makers at the European and national level. On the other hand, the general public should be informed more about the utility of life insurance products using formal and informal means of education.

4. Conclusions

The life insurance market in the Baltic States fulfils the EU requirements, but its evaluation is influenced by macroeconomic indicators related to economic growth and financial market. This paper is based on a panel data approach that confirms the positive influence of economic growth on life insurance market indicators (life direct premiums written, life insurance density, and life insurance penetration). As expected, the unemployment rate is negatively correlated with life insurance market indicators. Consequently, an economic crisis determined by the Covid-19 pandemic and characterized by high unemployment will significantly affect the insurance market.

This study presents a few limitations. First, only a few determinants of the life insurance market were considered in the panel data models. Second, the overall conclusions for the entire sample might not be the same for each country. Future directions of research should take into account the consideration of more variables in the model like indicators related to the financial market. For robustness check, time series models should be constructed for each country.

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