Impact of macroeconomic factors on the MTPL insurance in Latvia

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Abstract

The objective of the article is to do a research on current and the most important issues regarding the impact of macroeconomic factors on one of the most widespread insurance products - Motor Third Party Liability insurance (MTPLI). A research has been made to evaluate the actual presence of the MTPLI insurance in the Latvian market of motor vehicle insurance and the presence in the general insurance portfolio at European level. The authors studied the performance of Motor Third Party Liability insurance in the Latvian insurance market from 2005 till 2019. This research examines the actual problems of Latvian insurance market in the context of the impact of macroeconomic indicators on MTPLI product performance. Further considerations regarding the macroeconomic impact on MTPLI have been made, taking into account the role of the macroeconomic factors on the demand for the specific insurance product. The paper focuses on the analysis of factors determining development of the insurance market as well. An overall evaluation of the impact of macroeconomic factors on the MTPLI in Latvia has been carried out.

Keywords: Motor Third Party Liability insurance, macroeconomic factors, insurance consumption, insurance premiums.

Introduction

A developed and stable insurance market is an important part of any economic system. In the current economic conditions, there is a lot of competition in the Latvian insurance market, therefore, in order to successfully attract customers and develop a competitive business, it is especially important for each insurance company to understand the macroeconomics impact to insurance business. Insurance plays an important role in supporting economic activity, and

the insurance mechanism makes a significant contribution to the country's sustainability by compensating for financial losses. The insurance industry provides coverage for various types of risks, reducing uncertainty and unpredictability for both individuals and companies. The fact that insurance plays an important role of any economy has been proven in several studies and has been recognized as an essential factor for successful economic development. Insurance as a financial concept is designed to manage risks, seeks to provide security for economic growth or to hedge against uncertain loss. Although the market has been incredibly profitable, the insurance industry is highly fragmented, and the sector is fraught with challenges (Kaffash et al., 2020). Adapting to the changing conditions of the world, new types of insurance are emerging (Shaw and Bauman, 2021). Apergis and Poufinas (2020) concluded in their study on the role of insurance growth in economic growth that insurance is one of the main activities in the globalized financial and economic environment, and the study confirmed that the activities of insurers are significantly and positively associated with economic growth. Accordingly, we can say that insurance affects the economy, and conversely, the economy affects the insurance industry. In this study, the authors examine the impact of the economy on the insurance industry. Given the cross-country heterogeneity in insurance consumption, the literature has widely accepted that the adjustment dynamics of insurance premium are complex and varied from one country to another (Chang, Lee and Chang, 2014). Several theoretical and empirical studies have more precisely indicated that the insurance premium grows nonlinearly with macroeconomic factors (Enz, 2000; Zheng, Liu and Dickinson., 2008; Lee and Chiu, 2012). Studies mainly utilize a conventional linear model specification to investigate the relevant issues of insurance market development and economic growth, e.g., Ward and Zurbruegg (2000) and Kugler and Ofoghi (2005), to mention a couple. However, the literature has extensively supported that a number of important macroeconomic variables should exhibit non-linear behavior. As to financial markets, they may also exhibit non-linear behavior resulting from the presence of market frictions and transaction costs, as well as the interaction between heterogeneous traders (McMillan, 2003). Since insurance premiums are usually based on projected investment income and expected losses, which are related to business cycles, it may be reasonable to expect a significant interrelationship exists between insurance markets' activities and macroeconomics (Lee and Chiu, 2012). Consequently, the non-linear model specification is more appropriate than the simple linear setting to examine the insurance-growth nexus (Lee, Lee and Chiou, 2017).

Christophersen and Jakubik (2014) suggest that the nominal GDP is the key driver for non-life insurance, while unemployment is a driving factor for premium growth on the life side. Use of such models could provide a projection of insurance market growth under different macroeconomic scenario and help to assess key risks for the insurance sector (Christophersen and Jakubik, 2014).

Non-life insurance activities may be linked to the general economic performance of the national economy and may be related to changes in real GDP. The reason to include income variables is not only because of the wealth and income effect on attitudes toward risk, but also the economic growth effect, which creates more insurable risk as a result of

the increase in goods, such as houses and automobiles, and affects the demand for insurance. Kristīne Sūniņa-Markēviča (Sūniņa, 2003) suggests that the following factors are the most important in determining the total amount of premiums in the insurance market:

- general situation in the insurance market. If insurers have accumulated reserves and there have been no significant insurance events for several years in a row, they might lower the prices of insurance services. Even if such reserves are accumulated by only few market participants, everyone is forced to lower prices in a competitive environment. Thus, the total amount of the insurance premiums in the market depends on the methodology calculated by each participant. Insurers use their own methodology by determining factors, which are the most important in determining the amount of premiums;
- a wide range of regulatory, risk and economic factors determine insurers' calculations of premiums. Premiums are set in proportion to the expected risks and need to cover expected claims as well as operational, administrative costs and other obligations. All these factors differ widely from one country to another, which explains the varying levels of average insurance premiums across Europe (Sūniņa, 2003).

Tian et al. say that price of the insurance products is usually determined by demand and supply; thus, factors affecting the demand side or supply side can have impacts on price determination. When the revenue from investment is considerable, insurance firms may lower the expectation on underwriting profit, which means that insurance firms can underwrite some relatively bad risk that they would not accept otherwise or underwrite standard risk with a lower price. According to definition of insurance price, insurance price reflects the margin that insurance firms can obtain from selling the policies. Thus, insurance price has a negative relation with investment profitability, a proxy for rate of market return. Premiums are usually thought to be the discounted present value of future costs; thus, it is not surprising to see that the interest rate, a proxy for discount rate, is negatively related with insurance price (Tian et al., 2018).

GDP serves as an indicator for potential losses and mainly influences the demand side of the model. The results indicate that, compared with the U.S. and Switzerland, the Japanese insurance market reveals quite different features for both GDP and interest rate implications. Lamm-Tennant and Weiss (1997) use a generalised least square regression model to analyse the changes in premiums with respect to the changes in lagged losses, interest rates, average stock prices and real gross domestic products of nine developed countries. The changes in GDP usually have neutral or even negative impacts on insurance premiums, as in the cases of Italy, Japan and Switzerland (Tian et al., 2018). Chen, Wong and Lee (1999) focus on Asian countries for the first time and report that the changes in GDP have no impact on insurance premiums in Japan and Taiwan. Because a significant relationship between the premium and real gross domestic product is identified after accounting for the claim paid in Lamm-Tennant and Weiss (1997) and Chen, Wong and

Lee (1999), it is reasonable to assume that GDP is related to insurance price (Tian et al., 2018).

Methods and data

The objective of the study is to find out the macroeconomic indicators that determine the demand for Motor Third Party Liability insurance (MTPLI) with a sufficiently high level of confidence and to assess the degree of impact of the relevant factors.

Based on the literature analysis and the study of macroeconomic indicators available in the databases (Eurostat, OECD and local Statistical Bureau), a list of variables was created for a more in-depth study of MTPLI gross premium (MTPLIGP) volumes and growth rates using correlation analysis.

The simulation method was used to find out the relationships between the dependent variables (the amount and increase of MTPLI) and the selected independent variables based on Latvian insurance market data for the period 2005-2019. Various combinations of factors as well as linear and nonlinear forms of relationships were tested. The statistical stability of the generated models was tested using the F test, but the regression parameter stability was tested using t tests. Durbin–Watson test was used to detect the presence of autocorrelation in the residuals. The best fit models were determined using the coefficient of determination (R^2) and *p*-values.

Results and Discussion

The scope of insurance product covered in this paper: non – life insurance products group, motor insurance division. It should be mentioned that definition of "motor insurance" are distinguished, namely liability for motor vehicles to third parties (MTPLI) and own damage to the engine (MOD). In our study, we analyze the extent to which economy characteristics can explain premiums of MTPLI.

The Motor insurance can also be made taking into account the degree of autonomy of the parties to the insurance contract (Sliviski, Poliychronidou and Karasavvoglou, 2019). In this case, it stand out:

- Compulsary insurance – concluded as a result of an order resulting from directly applicable laws; the main representative of this group is compulsory MTPLI
- Voluntary insurance – there is no obligation to conclude a contract, expl. Motor Own damage.

In the futher part of the paper, authors will limit to considerations to compulsory third-party liability insurance calling them interchangeably both motor insurance and MTPLI. MTPLI due to its mandatory nature is the most frequently concluded insurance in various European Union (EU) countries (Andreeva, 2019). MTPLI is homogeneous across the EU in terms of insurance cover provided, as well scope included: any damages to property

and health of victims caused by the drivers fault. Under the 2009 motor insurance directive (European Commission, 2009) anyone who holds a compulsory motor insurance policy in an EU country is covered to drive throughout the EU. The directive regulates such aspects, as:

- obliges all motor vehicles in the EU to be covered by compulsory third party insurance
- abolishes border checks on insurance, so that vehicles can be driven as easily between EU countries as within one country
- specifies minimum third-party liability insurance cover in EU countries
- specifies exempt persons and authorities responsible for compensation
- introduces a mechanism to compensate local victims of accidents caused by vehicles from another EU country
- requires claims about accidents in an EU country other than the victim's country of residence to be settled quickly (so-called visiting victims)
- entitles policy holders to request a statement of any claims involving their vehicle, which were covered by their insurance contract, over the last 5 years

According to the Organization for Economic Co-operation and Development (OECD) classification, at the macroeconomic level, the effectiveness of insurance companies is assessed according to the following criteria (Kwon and Wolfrom, 2016): insurance premiums (volume and growth), premiums per employee, insurance density and distribution; the share of life and non-life insurance in the total insurance market; national market share OECD; market share of foreign insurers in the domestic market; balance sheet and income; portfolio distribution; accepted reinsurance ratio; retention ratio (net written premiums / gross written premiums); loss ratio, expenditure ratio and combined ratio (non-life). P&C insurance is typically characterised by cycles of upward and then downward movements in premiums and combined ratios. A cycle comprises a hard market of intense competition and a soft market in which reserves can be accumulated.

Over the past decade, motor premiums in Europe grew 8.1%, largely due to an 18.1% increase in optional motor damage insurance. Premiums for mandatory MTPLI cover decreased 0.8% over the same period. After four consecutive years of decline (2011–2014), total motor claims expenditure rose slightly (0.6%) in 2015, followed by a further 4.5% increase in 2016, to total EUR 103.5bn (Insurance Europe, 2019). MTPLI premiums increased up 1.0% in 2015 and 4.0% in 2016 to reach EUR 61.1bn. Strong growth in 2016 was recorded in Turkey (+76.3%), Poland (+42.9%) and Hungary (+34.2%), whereas several other markets experienced a decline, notably Latvia (-15.8%), Greece (-9.6%), Italy (-4.9%), Finland (-2.2%) and Norway (-1.6%). Large and mature markets such as Germany, Spain, France and the Netherlands registered 2.9%, 2.7%, 1.2% and 0.5% growth respectively. Average MTPLI premiums rose by a modest 1.1% in 2016 to €205 as a result of a 4.0% increase in premiums and a 2.9% increase in the number of policies (Insurance Europe, 2019).

The average motor premium in 2016 ranged from EUR 66 in Latvia to EUR 622 in the UK. The number of claims rose 2.3% in 2015 and 1.9% in 2016.

Motor insurance is cyclical in nature too. The financial crisis of 2007–2008 left its mark on the European motor sector: the highest combined ratio (108.1%) and the worst underwriting results (-EUR 5.5bn) were recorded in 2009. Most European countries registered their highest combined ratio in the 2008–2010 period, notably Germany (107%), France (109%), Italy (119.5%) and the UK (115.6%). After the 2008–2010 peak, combined ratios and underwriting results started to improve but then began to rise again in 2016.

The MTPLI is the largest non-life insurance product in Latvia and forms one fifth of the total non-life insurance portfolio (See Table 1).

Tab. 1: Gross Written Premiums and proportion of types of insurance in the Latvia in 2019.

Gross premiums written by Non-life Insurance Companies. (Thousands of EUR)	**4 quarters 2019**
Total	442,121.00
Motor vehicle liability insurance	126,295.00
Land vehicle insurance	95,889.00
Property insurance	67,192.00
Motor vehicle liability compulsory insurance	47,665.00
Health insurance	47,541.00
General liability insurance	13,722.00
Suretyship insurance	13,643.00
Assistance insurance	13,063.00
Accident insurance	10,139.00
Ship insurance	3,076.00
Goods in transit insurance	1,968.00
Insurance against miscellaneous financial losses	886.00
Railway rolling stock insurance	341.00
Credit insurance	328.00
Aircraft ownership liability insurance	146.00
Aircraft insurance	110.00
Ship ownership liability insurance	104.00
Legal expenses insurance	17.00

Source: Latvian Insurers Association (2020).

The same situation can be observed in EU on the whole, where Motor insurance has the largest share in non-life insurance products portfolio (See Table 2).

Tab. 2: Total premiums by business line in the EU — 2017–2018 (bn EUR).

Product Line	**2017**	**2018**	**Growth**
Life	718	764	6,7%
Health	134	140	4,8%
P&C	389	407	5,7%
Motor	140	144	3,8%
Property	101	105	4,8%
General Liability	40	43	6,9%
Accident	37	37	2,5%
Total	1241	1311	6,2%

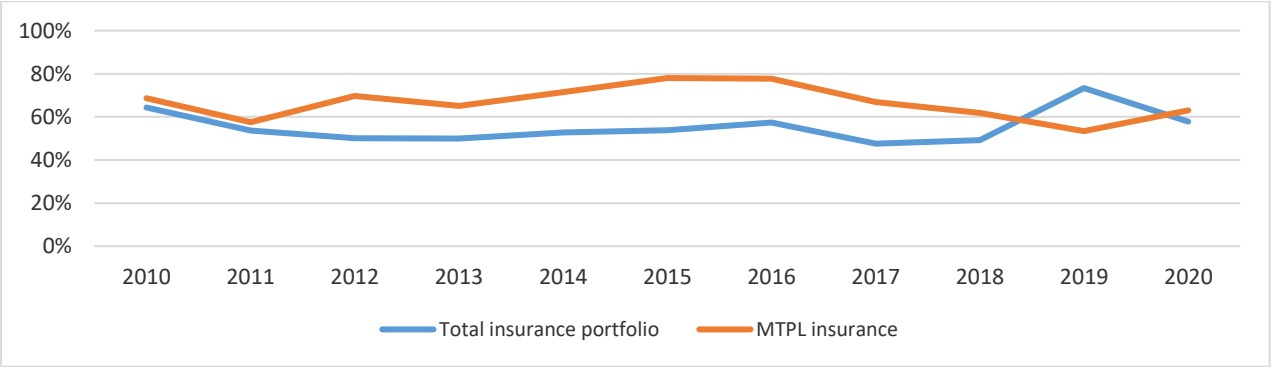
Source: Insurance Europe (2021)

MTPLI product for a long time - in the period from 2011 to 2018 has had a higher loss ratio than the total insurance portfolio in Latvia. Here is a Graph 1.

According The Financial and Capital Market Commission (FCMC) the MTPLI market in Latvia has been loss-making for the insurance industry for a long time - in the period from 2010 to 2017 (The Financial and Capital Market Commission, 2021), which has not motivated insurance companies to develop this service and create more precise pricing criteria for this insurance service.

The research will promote the development of scientific discussions on the problems and current issues of the insurance industry in Latvia.

Graph 1: MTPL insurance and total insurance portfolio loss ratio in Latvia 2010-2020,%.

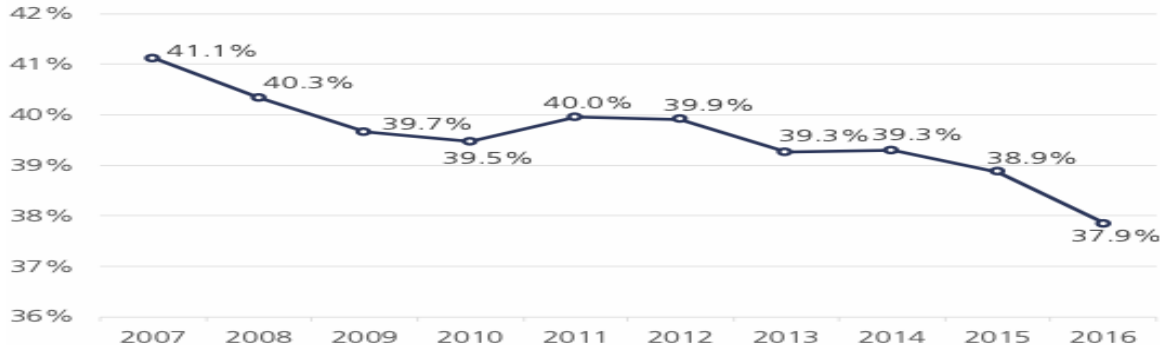


Source: FCMC (2021)

These considerations raise the need to find out and study the related processes in depth, finding answers to what factors influence the written premium of MTPLI.

The diversity of the national motor insurance markets in Europe reflects differences in EU member states' regulatory, risk and economic environment. Over the past decade, the motor insurance share of property and casualty (P&C) business in Europe has been steadily decreasing (See Graph 2).

Graph 2: Motor premiums as proportion of P&C premiums in Europe, 2007 – 2016.



Source: (Insurance Europe, 2019)

Nonetheless, motor remained the largest P&C business line at 38% in 2016, followed by property insurance (27%) and general liability insurance (11%). Europe's national motor insurance markets are generally very competitive, but tend to be subject to cycles of expansion and contraction. (Insurance Europe, 2019). The number of vehicles on the road depends largely on the economic environment and the demographics in each state. Boosted by European economic recovery, the number of insured vehicles increased 3.4% between 2014 and 2016. The total number of MTPLI and damage policies increased 4.8% between 2014 and 2016 and 3.0% between 2015 and 2016. Most countries experienced growth in the total number of MTPLI and damage policies (Insurance Europe, 2019).
Based on the literature analysis and the study of macroeconomic indicators available in the databases (Eurostat, OECD and local Statistical Bureau), a list of variables was determined for a more in-depth study of MTPLI gross premium (MTPLIGP) volumes and growth rates for the period 2005-2019 using regression analysis methods, see the following table.

Tab. 3: Macro indicators correlation with MTPLIGP amounts and MTPLIGP growth.

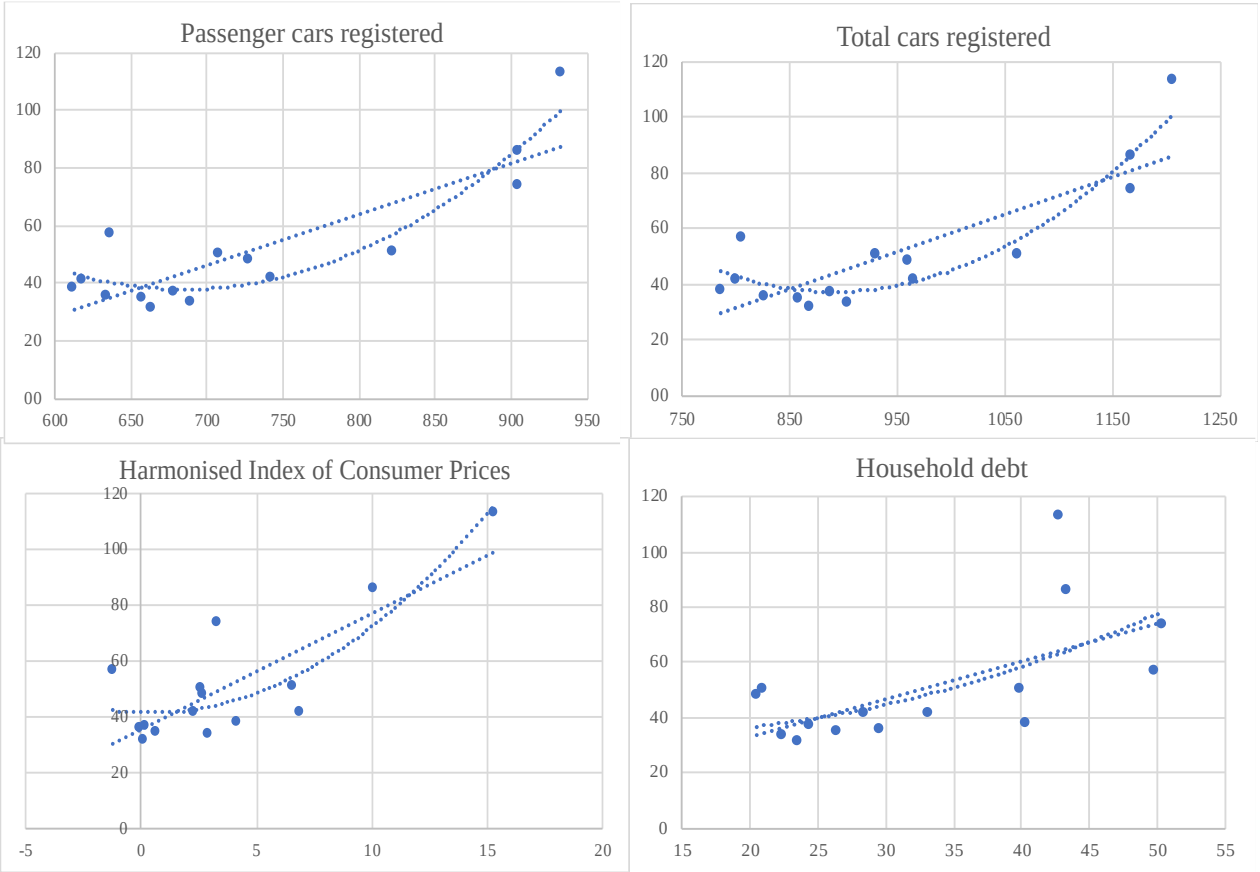
Factors	Unit of measure	Denotation	MTPLIGP amounts	MTPLIGP growth
Passenger cars registered	thousands	*PCR*	0.8491	0.4583
Total cars registered	thousands	*TCR*	0.8303	0.4746
HICP	y-o-y, %	*HICP*	0.7945	0.5598
HH debt to GDP	%	*HDG*	0.6245	-0.1203
Investments to GDP	%	*INVG*	0.5711	0.6633
Private sector debt to GDP	%	*PSD*	0.5406	-0.2579
Long-term interest rate	%	*LTR*	0.5305	-0.3080
Net wages growth rate	y-o-y, %	*NWG*	0.4609	0.7994
GDP growth	%	*GDP*	-0.3285	0.4742
Unemployment rate	annual, %	*UNPL*	-0.1331	-0.7238
HH disposable income	y-o-y, %	*HDIG*	-0.0815	0.6755

Source: Calculated by authors based on The Financial and Capital Market Commission and Eurostat data.

As can be seen from Table 3, MTPLIGP volumes are most significantly affected by indicators such as passenger cars registered (PCR), total cars registered (TCR) and Harmonised Index of Consumer Prices (HICP), as shown by the correlation coefficients of 0.8491, 0.8303 and 0.7945, respectively. The growth of the MTPLIGP, on the other hand, is most strongly influenced by indicators such as net wage growth (NWG), unemployment rate (UNPL) and household disposable income growth (HDIG), as shown by the correlation coefficients of 0.7994, -0.7238 and 0.6755, respectively.

Graph 3 shows the associations of the major macro indicators with the MTPLIGP volumes. Consequently, we see that as PCR, TCR, HICP and HH debt to GDP increases, so do MTPLIGP premiums.

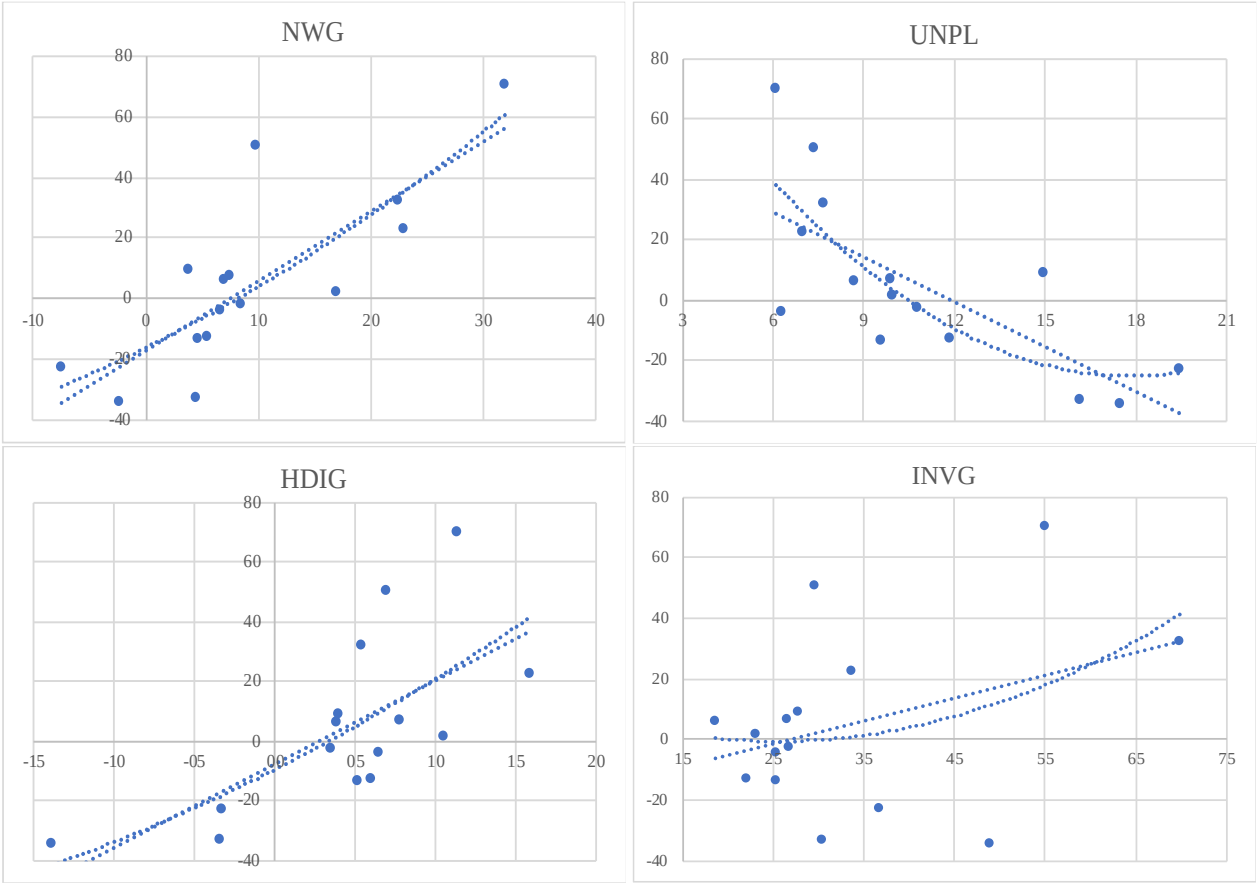
Graph 3: Macro indicators and MTPLI gross premiums trends



Source: Created by authors, based on FCMC and Eurostat data

Following Graph 4 shows the associations of the major macro indicators with the MTPLIGP growth.

Graph 4: Indicators and MTPLI gross premiums growth trends



Source: Created by authors, based on FCMC and Eurostat data

Consequently, we see that as net wages (NWG), household disposable income (HDIG) and investments (INVG) increases, so do MVLCIGP growth. And opposite, as unemployment increases, MTPLIGP growth decreases.

The regression model

Let $MTPLI_t$ be dependent variable in year t. Further, let $x_{1t},\ldots,x_{kt}$ denote independent variables (macroeconomic indicators) and $b_{it},\ldots,b_{kt}$ denote regression coefficients of independent variables, than the model can be expressed as in equation:

$$MTPLI_t = f(x_{1t}, \ldots, x_{kt}) + \varepsilon_t \qquad (1)$$

where ε_t – the error term.

During the research, combining the selected factors, linear and polynomial regression models were calibrated which passed the F-test at the confidence level of 0,95 and the Durbin Watson test with α = 0,05.

The following table summarizes the coefficients of determination, F-statistics and p-values for top 8 statistically significant models for MTPLIGP volumes.

Tab 4: Top 8 regression models statistics

Model type	Variables	R^2	*F*	*p* - value
Polynomial	*TCR*	0.8816	44.67	<0.01%
Polynomial	*PCR*	0.8670	39.11	<0.01%
Polynomial	*HICP, LTR*	0.8616	37.36	<0.01%
Polynomial	*HICP, HDG*	0.8434	32.32	0.01%
Linear	*NWG, GDP*	0.7887	22.39	0.05%
Linear	*NWG, GDP per capita*	0.7595	18.95	0.09%
Polynomial	*HICP*	0.7397	36.94	<0.01%
Linear	*PCR*	0.7209	33.58	<0.01%

Source: Calculated by authors based on FCMC and Eurostat data.

As one can see, the top 8 regression models explain more than 72%, while the top for regression models explain at least 84% of the total *MTPLI* gross premiums variability. The *F*-test results show that the statistical stability of all top 8 models is high (<0.1%), but the probability of statistical error of the first tree models is even lower than 0.01%.

The following table summarizes the regression coefficients and *t*-test *p*-values for top 8 statistically significant models for MTPLIGP volumes.

Tab 5: Top 8 regression models for MTPLIGP volumes variables statistics

Model variable	Regression coefficient	*p* - value	Model variable	Regression coefficient	*p* - value
TCR^2	0.0006	0.042%	PCR^2	0.0010	0.172%
TCR	-1.1474	0.098%	*PCR*	-1.3846	0.372%
Intercept	548.7276	0.115%	*Intercept*	511.9497	0.431%
Model variable	Regression coefficient	*p* - value	Model variable	Regression coefficient	*p* - value
$HICP^2$	0.2881	0.001%	$HICP^2$	0.2685	0.004%
LTR	2.3055	0.347%	*HDG*	0.7622	0.773%
Intercept	32.3635	0.000%	*Intercept*	17.3469	3.706%
Model variable	Regression coefficient	*p* - value	Model variable	Regression coefficient	*p* - value
NWG	2.3265	0.002%	*NWG*	2.2407	0.005%
GDP	-3.3433	0.005%	*GDP per capita*	-3.2476	0.011%
Intercept	38.0740	0.000%	*Intercept*	42.3229	0.000%
Model variable	Regression coefficient	*p* - value	Model variable	Regression coefficient	*p* - value
$HICP^2$	0.3173	0.002%	*PCR*	0.1774	0.003%
Intercept	40.9970	0.000%	*Intercept*	-78.0742	0.211%

Source: Calculated by authors based on FCMC and Eurostat data.

As one can see from Table 5, the regression coefficients *t*-test *p*-values for all top 8 models do not exceed 0.8%, indicating strong relationship between *MTPLI* gross premiums and relevant macro indicators.

The following table summarizes the coefficients of determination, *F*-statistics and *p*-values for top 8 statistically significant models for MTPLIGP growth.

Tab 6: Top 8 regression models for MTPLIGP growth variables statistics

Model type	**Variables**	R^2	***F***	***p* - value**
Polynomial	*INVG², ln(GDP per capita)*	0.7750	20.66	0.067%
Polynomial	*NWG², GDP per capita*	0.7701	20.09	0.075%
Linear	*INVG, ln(GDPper capita)*	0.7551	18.50	0.103%
Linear	*INVG, GDP per capita*	0.7475	17.76	0.120%
Linear	*INVG, GDP*	0.7465	17.66	0.122%
Linear	*NWG, GDP*	0.7405	17.12	0.138%
Linear	*NWG, GDP per capita*	0.7305	16.26	0.166%
Linear	*NWG, GDP*	0.7168	15.19	0.212%
Linear	*GDP per capita, INV*	0.7159	15.12	0.215%

Source: Calculated by authors based on FCMC and Eurostat data.

As one can see from Table 6, the top 8 regression models explain more than 71%, while the top for regression models explain almost 75% of the total *MTPLIGP* growth variability. The *F*-test results show that the statistical stability of all top 8 models is high (<0.22%), but the probability of statistical error of the first two models is even lower than 0.1%.
The following table summarizes the regression coefficients and *t*-test *p*-values for top 8 statistically significant models for MTPLIGP growth.

Tab 7: Top 8 regression models for MTPLIGP growth variables statistics.

Model variable	Regression coeff.	*p* - value	Model variable	Regression coeff.	*p* - value
INVG²	0.0968	0.002%	*NWG²*	0.0959	0.002%
Ln(GDP per capita)	101.040	0.067%	*GDP per capita*	6.1922	0.077%
Intercept	-338.287	0.029%	*Intercept*	-158.360	0.013%
Model variable	Regression coeff.	*p* - value	Model variable	Regression coeffi.	*p* - value
INVG	5.2813	0.003%	*INVG*	4.3852	0.007%
ln(GDP per capita)	99.7223	0.100%	*GDP per capita*	13.0131	0.121%
Intercept	-403.448	0.021%	*Intercept*	-237.557	0.010%
Model variable	Regression coeff.	*p* - value	Model variable	Regression coeff.	*p* - value
INVG	4.6104	0.006%	*NWG*	2.3291	0.007%
GDP	0.0038	0.124%	*GDP*	0.0020	2.555%
Intercept	-196.01	0.007%	*Intercept*	-63.571	0.701%
Model variable	Regression coeff.	*p* - value	Model variable	Regression coeff.	*p* - value
NWG	2.2480	0.011%	*NWG*	2.6022	0.007%
GDP per capita	6.8129	3.323%	*INV*	0.0024	4.721%
Intercept	-86.154	1.426%	*Intercept*	-45.845	0.928%

Source: Calculated by authors based on FCMC and Eurostat data.

As one can see from Table 7, the regression coefficients *t*-test *p*-values for all top 8 models do not exceed 5,0%, indicating strong relationship between *MTPLIGP* growth and relevant macroeconomic indicators.

Conclusions

The results of the study allow concluding that macroeconomic developments have a significant impact on the demand for MTPLI - both the changes in amount of premiums and in premium growth can be explained by macroeconomic indicators with a high level of confidence. Consequently, business volume forecasts for the insurance industry and the companies operating in it can be reasonably compiled on the basis of macroeconomic development scenarios with a relatively high level of reliability.

However, it should be noted that no model is perfect by definition. In addition, both the level of macroeconomic development, as well as intercultural differences and the dynamics of the two, cause changes that cannot be ignored. Therefore, first, MTPLIGP models need to be calibrated based on local data and regularly updated, and second, it is desirable to maintain more than one regression model in order to be able to base forecasting on a set of macroeconomic indicators that cannot be included in the model at the same time due to their statistical incompatibility (non-compliance with regression analysis assumptions). In this way, using the predictions of several models and weighing them, e.g. based on R^2, it is possible to increase the reliability of the obtained results.

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