

THE IMPACT OF MACROECONOMIC STABILISATION ON THE DEVELOPMENT OF NON-LIFE INSURANCE MARKETS OF THE VISEGRAD GROUP IN 2004-2020

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Purpose: The article's purpose is to present the impact of macroeconomic stabilisation on the development of the non-life insurance markets of the Visegrad Group¹ between 2004 and 2020.

Design/methodology/approach: A critical review of literature is undertaken. The research used the Zeroed Unitarisation Method, the Macroeconomic Stabilisation Pentagon Model and the Reciprocal Correlogram.

Findings: The studies carried out indicate that insurance markets are influenced by a number of factors, which are both macroeconomic in nature and individual characteristics of the market in question (size and structure). The highest value of the synthetic indicator of the development of the non-life insurance market in the last period included in the analysis (2020) was recorded in Poland. The most favorable situation in terms of macroeconomic stabilisation was recorded in the case of Poland (0.518) at the end of the analyzed period.

Research limitations/implications: To verify the hypothesis regarding the impact of macroeconomic stabilisation on the development of insurance markets, scientific research requires further research on another group of countries (insurance markets).

Originality/value: The results of the research will contribute significantly to the development of theories on the determinants of the development of insurance markets.

Keywords: development, non-life insurance market, macroeconomic stabilisation, Visegrad Group (V4).

Category of the paper: Research paper.

¹ Hereinafter also as V4.

1. Introduction

Macroeconomic stabilisation issues are very important from the point of view of a permanently changing environment. In today's economic reality, stability is a very important aspect of the functioning of economies. Therefore, the primary objectives of global economies include maintaining macroeconomic stability. Maintaining macroeconomic balance is characterised by responsibility to stabilise the country internally, but also externally, which is determined by the international situation. The matter of macroeconomic stability refers to such values as economic growth, price level, unemployment rate and balance of payments balance. The possibility of crises is one of the main consequences of macroeconomic instability. Contemporary institutional connections mean that entities operating in a given environment are exposed to the possibility of danger and risk. The appropriate level of financial development of an economy is the basis for the growth of the real sphere. As M. Lament and S. Bukowski (Lament, Bukowski, 2022) point out, insurance companies and banks are the main pillars of entities belonging to the financial market. By providing insurance protection, insurance companies influence the stabilisation of the entity architecture of a given economy. The development of insurance markets is therefore an important issue from the point of view of a country's socio-economic development. The development of insurance markets is influenced by a variety of factors of an economic, demographic, social, cultural or structural character.

The aim of the research carried out was to identify the relationship between macroeconomic stabilisation and the development of the Visegrad Group's non-life insurance markets between 2004 and 2020. The study presents a critical review of the literature analysis on the subject and creates a synthetic indicator on the development of the non-life insurance market. This required us to find answers to the following research questions:

- Which V4 country has the most developed non-life insurance market?
- Which V4 country is characterized by the highest macroeconomic stabilisation?
- How does macroeconomic stabilisation affect the non-life insurance markets of the V4 countries?

The research used the Zeroed Unitarisation Method, the Macroeconomic Stabilisation Pentagon Model and the Reciprocal Correlogram. The article uses data from the following databases Insurance Europe and OECD Statistics. The paper is divided into three parts. The first presents the results of a literature review on the determinants of insurance market development. The second part presents the methodology of the study, while the third part presents the results of our own research.

2. Determinants of the development of insurance markets – literature review

The subject of the factors shaping the development of insurance markets is an important issue that is being analysed by many researchers from the academic world. There are numerous reasons for the relevance of this topic. First and foremost, insurance companies and banks are the backbone of the financial market (in relation to the number of institutions and the level of assets). In addition, insurance companies have a significant share of GDP, exceeding 10% in countries with a high level of economic development (Bukowski, Lament, 2020). Research conducted in the literature on the subject indicates that the development of insurance markets influences the economic growth and development of a given country. In a changing environment, the tremendous impact of insurance in suppressing unforeseen events that slow down a country's economic development becomes visible. The constant changes in the world, which affect the development and role of technology in the economy, mean that the insurance sector and its entities must seek new solutions adapted to the requirements of the environment. A constant analysis of the environment is therefore an important condition for the stability of a company (Śliwiński, 2016).

The development of insurance markets in individual countries is influenced by many factors. In the literature on the subject, the most frequently mentioned categories of determinants influencing the insurance market include: economic (e.g. GDP, inflation, unemployment rate, interest rates), demographic (e.g. age structure, gender, population size), social and cultural (e.g. education, religion, risk aversion) and structural (e.g. financial development, legal system, political risk). This is confirmed by studies by T. Beck and I. Webb (2003), T.H. Bednarczyk (2011), S. Sen, S. Madheswaran (2013), M. Curak, I. Dzaja, S. Pepur (2013), J. Phutkaradze (2014), M. Ertl, (2017), T.H. Bednarczyk, K. Bielawska, B. Jackowska, E. Wycinka (2020), K. Ortyński and J. Wołoszyn (2021), M. Lament and S. Bukowski (2022), M.P. Segodi, A.B. Sibindi. The determinants influencing the insurance market can be both negative and positive, which is confirmed in the literature by the studies presented in Table 1. Contemporary factors are influencing the booming insurance market. The insurance sector is characterised by a high potential, which is significantly influenced by technological and socio-economic development making insurance companies more attractive. M. Balcerowicz-Szkutnik and W. Szkutnik argue that the development of the world economy is determined by increasing economic integration. The integration processes, in a broad sense, refer to all aspects of economic life that lead to the integration of economic entities and the creation of uniform business conditions and normative acts. These developments affect all segments of the financial sector, including the insurance market. Internal insurance markets operate according to a specific model, which is determined by the level of economic development and a given organisation.

Table 1.*Factors influencing the development of life and non-life insurance*

Type of factors		Estimated effect	Author									
			Browne, Kim (1933)	Outreville (1996)	Beck, Webb (2003)	Li et al. (2007)	Fayen et al. (2011)	Christophersen, Jakubik (2014)	Alhassan, Biekpe (2016)	Fayen et al. (2011)	Christophersen, Jakubik (2014)	Brokesova et al. (2014)
			Life insurance						Non-life insurance		Results	
Economic	Income (GDP)	Positive	+	+	+	+	+	+	-	+	+	+
	Inflation rate	Negative	-	-	-	-	+		-	+		NS
	Interest rate	Ambiguous		NS	+	-					+	+
Demographic	Life expectancy	Ambiguous	NS	+	NS	-	-		-			+
	Age dependency ratio	Ambiguous	+	NS	MIXED	NS	MIXED		-			-
	Population size	Positive					+			MIXED		+
Social and	Education	Positive	NS	NS	NS	+	NS		MIXED		+	
	Religion	Negative	-	NS	-	-	-			-		
	Social security	Ambiguous		NS	NS	-	-			-		NS
Structural	Financial development	Positive		+	+	+			+			
	Legal environment	Positive			+		+		MIXED	+		
	Market concentration	Negative		-			+			-		-

Source: own analysis based on Hodula, Janků, Časta, Kučera, 2023.

Gross premiums written and growth rate, insurance density ratio and insurance penetration rate are the most commonly used measures of the importance of insurance development. Confirmation studies have been carried out by, among others: N.S. Erbas, C.L. Sayers (2006), Li and others (2007), T.P. Kramaric, F. Galetic (2013), Sajid Mohy Ul Din and others (2017), S.I. Bukowski, M. Lament (2019). Insurance density ratios illustrate the ratio of premiums to the population of a given country. As T.H. Bednarczyk points out, the most appropriate comparative indicators of the development of insurance markets in different countries include density and insurance penetration ratios. The density ratio shows the actual level of insurance market growth, while the penetration ratio shows the importance of the insurance market in a given economy.

3. Research methodology

The research constructed synthetic indicators of the development of non-life insurance markets in the V4 countries. For this purpose, the Zeroed Unitarization Method was used. It was decided to examine the created indicators in comparison with an important economic category, which is macroeconomic stabilisation. The analysis of macroeconomic stabilisation was carried out using the Macroeconomic Stabilisation Pentagon Model (PSM). The relations between the development of the non-life insurance market and the macroeconomic stabilisation of a given V4 country were examined using a mutual correlogram. The sequence of procedures is presented in Figure 1.

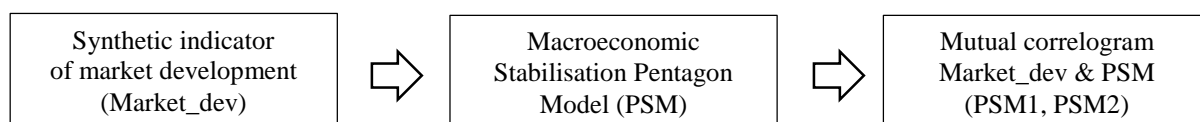


Figure 1. Sequence of research.

Source: Own study.

The development process of the insurance market is a phenomenon determined by many different variables. Adopting only one of them to represent this phenomenon may be a significant simplification and make its comprehensive analysis impossible. Therefore, it was decided to build a synthetic indicator of the development of the Polish non-life insurance market, consisting of the most important values most often used in the literature to describe this issue, i.e. the value of gross written premium, density index, penetration index and the number of insurance companies. The Zeroed Unitarization Method was used for this purpose. The operation diagram is shown in Figure 2.

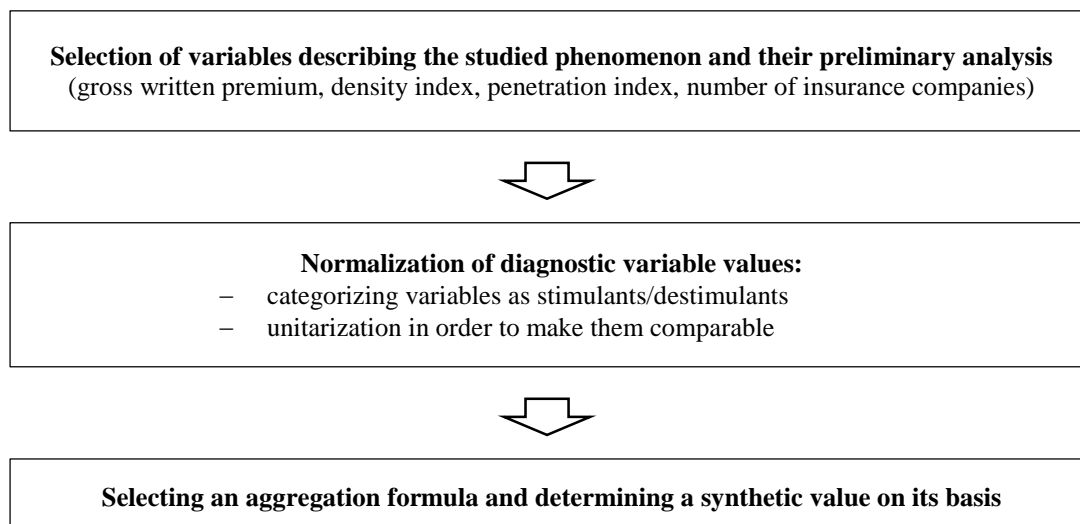


Figure 2. The process of creating a synthetic indicator of the development of the non-life insurance market - Zeroed Unitarization Method.

Source: Own study.

Then, the Pentagon Macroeconomic Stabilisation Model (PSM) was constructed. As part of the selected method, observations were made of basic economic values changing over time, such as (Misala, 2011; Siek, 2015):

- gross domestic product growth rate (Δ GDP),
- registered unemployment rate (U),
- inflation rate (CPI),
- ratio of the state budget balance to GDP (G),
- ratio of current account balance to GDP (CA).

The higher the PSM value, the more favorable the situation in terms of macroeconomic stabilisation. In the optimal case, this value is 1. PSM is the sum of the values of the areas of the five triangles. These include triangle "a" (the real sphere triangle), triangle "b" (the stagflation triangle), triangle "c" (the budget and inflation triangle), triangle "d" (the financial balance triangle) and triangle "e" (the triangle external sector) (Rojek, 2022). This division is presented in Figure 3.

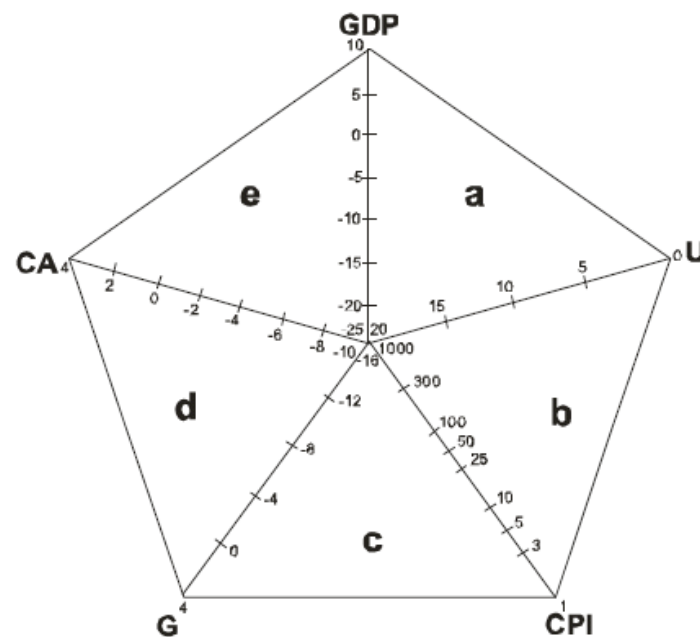


Figure 3. The Pentagon Macroeconomic Stabilisation Model.

Source: Siek, 2015.

The Pentagon Macroeconomic Stabilisation Model also allows for the separation of macroeconomic stabilisation indicators that depend primarily on internal and external factors. In the first case, it is PSM1 consisting of triangles a, b and c. In the second case, PSM2 is the sum of triangles d and e (Rojek, 2022).

The relations between the development of the non-life insurance market and the macroeconomic stabilisation of a given V4 country were examined using a mutual correlogram - i.e. a function of the value of the Pearson correlation coefficient of two time series shifted by Δt relative to each other depending on the value of Δt .

4. Findings

For the vast majority of the period under study, the Czech Republic was the leader in terms of the level of development of the insurance market (measured by a constructed synthetic indicator). Only since 2016 has the Polish market gained an advantage. However, a year after achieving the leadership position, there was a downward trend. In 2020, the difference between both markets was insignificant. Moreover, taking into account the emerging trends, it can be assumed that the Czech Republic will return to first place. The third market of the Visegrad Group is Hungary. Slovakia came in last place. The positions of these countries remained unchanged throughout the period under study. The development of the discussed phenomenon is shown in Figure 4.

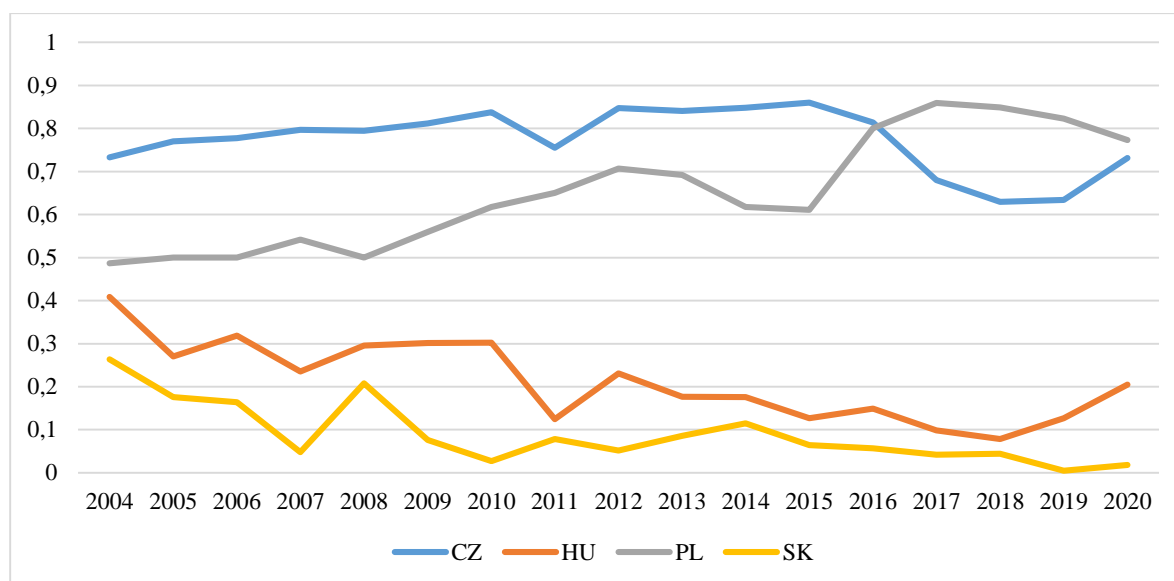


Figure 4. Synthetic indicator of the development of the non-life insurance market of V4 countries.

Source: Own study.

The largest increase in the synthetic indicator occurred in Poland. This applies to both the total increase (since the beginning of the analyzed period) and the average annual growth rate. On this basis, it can be concluded that the Polish non-life insurance market has developed the most intensively among the V4 countries. Detailed data in this regard are presented in Table 1.

Table 2.

Classification of V4 countries in terms of the pace of development of the non-life insurance market

Criterion	Average annual growth rate [%]	Total growth in 2004-2020 [%]
Synthetic indicator of market development	1. Poland	1. Poland
	2. Czech Republic	2. Czech Republic
	3. Hungary	3. Hungary
	4. Slovakia	4. Slovakia
Gross written premium	1. Czech Republic	1. Poland
	2. Poland	2. Czech Republic
	3. Slovakia	3. Slovakia
	4. Hungary	4. Hungary
Density index	1. Czech Republic	1. Poland
	2. Poland	2. Czech Republic
	3. Slovakia	3. Slovakia
	4. Hungary	4. Hungary
Penetration rate	1. Czech Republic	1. Poland
	2. Hungary	2. Hungary
	3. Poland, Slovakia	3. Czech Republic
	4. Slovakia	4. Slovakia
Number of enterprises	1. Slovakia	1. Slovakia
	2. Czech Republic	2. Czech Republic
	3. Poland	3. Poland
	4. Hungary	4. Hungary

Source: Own study.

Discussing the components of the synthetic indicator of the development of insurance markets in individual V4 countries, it can be concluded that Poland is the leader in the case of gross written premium. This applies to both the last year and the entire period. An assessment of market development based on the density index would place the Czech Republic in first place (both time perspectives). The Czech Republic was also a leader in terms of penetration rate. In turn, the Polish market has an advantage in terms of the number of insurance companies. Table 2 presents the classification of the V4 countries in this respect.

Table 3.

Classification of V4 countries in terms of the development of the non-life insurance market

Criterion	Classification 2004-2020	Classification 2020
Synthetic indicator of market development	1. Czech Republic 2. Poland 3. Hungary Slovakia	1. Poland 2. Czech Republic 3. Hungary Slovakia
Gross written premium	1. Poland 2. Czech Republic 3. Hungary Slovakia	1. Poland 2. Czech Republic 3. Hungary Slovakia
Density index	1. Czech Republic 2. Slovakia 3. Poland Hungary	1. Czech Republic 2. Poland 3. Slovakia Hungary
Penetration rate	1. Czech Republic 2. Poland 3. Hungary Slovakia	1. Czech Republic 2. Poland 3. Hungary Slovakia
Number of enterprises	1. Poland 2. Czech Republic 3. Hungary Slovakia	1. Poland 2. Czech Republic 3. Hungary Slovakia

Source: Own study.

Based on the value of the Macroeconomic Stabilisation Pentagon, it can be concluded that the most favorable situation in this respect was in the case of Poland (0.518) at the end of the analyzed period. A slightly lower PSM value was recorded in our southern neighbor - the Czech Republic (0.511). The next places were taken by Slovakia (0.473) and Hungary (0.420). The development of PSM in the analyzed period is shown in Figure 5.

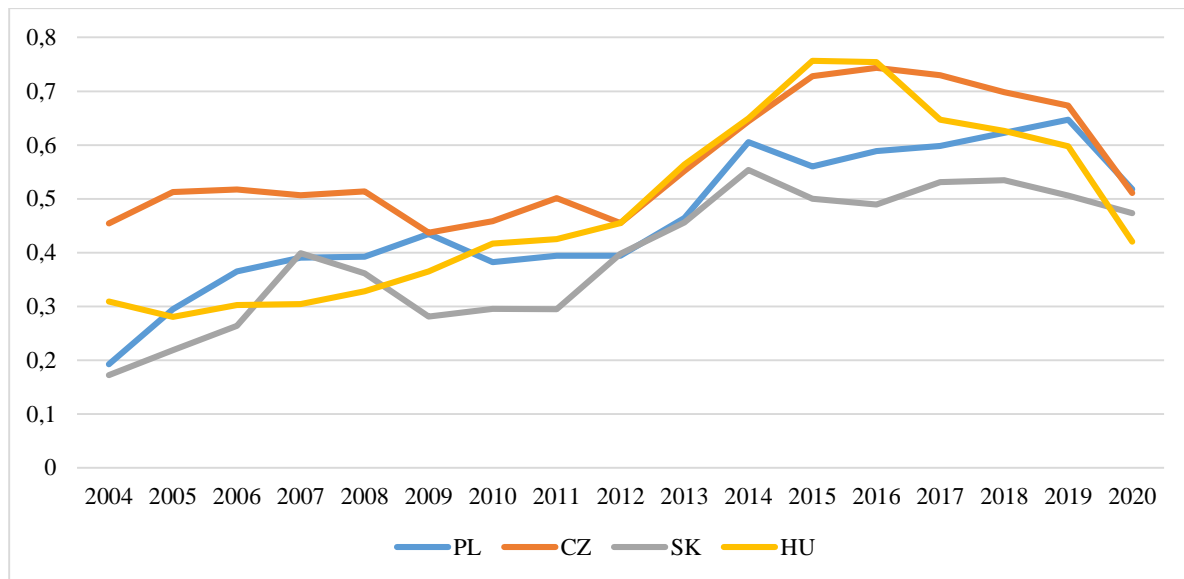


Figure 5. PSM of V4 countries.

Source: Own study.

As for PSM1, this time the Czech Republic (0.328) turned out to be slightly better than Poland (0.322). It can therefore be concluded that internal conditions have a similar impact on the macroeconomic stabilisation of these countries. Slovakia again took 3rd place (0.299), ahead of Hungary (0.292). The development of PSM1 throughout the studied period is shown in Figure 6.

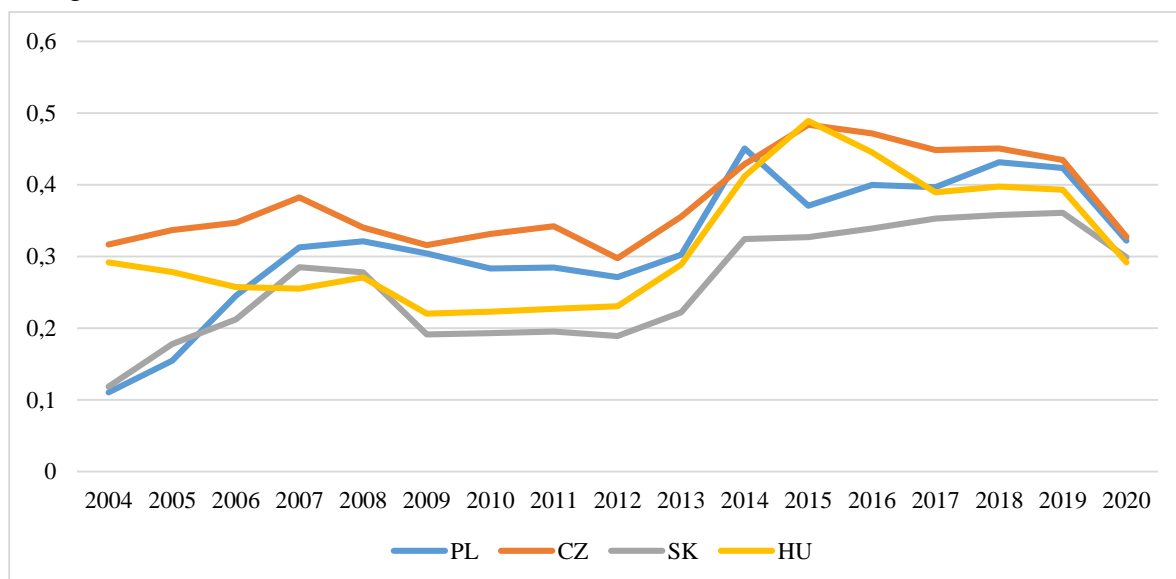


Figure 6. PSM1 of V4 countries.

Source: Own study.

However, in the case of the impact of external factors on macroeconomic stabilisation, Poland turned out to be the leader in the last analyzed period, whose PSM2 was 0.196 in 2020. The next places were taken by the Czech Republic (0.183), Slovakia (0.174) and Hungary (0.129), which were the leaders in this respect for a significant part of the analyzed time period. This is shown in Figure 7.

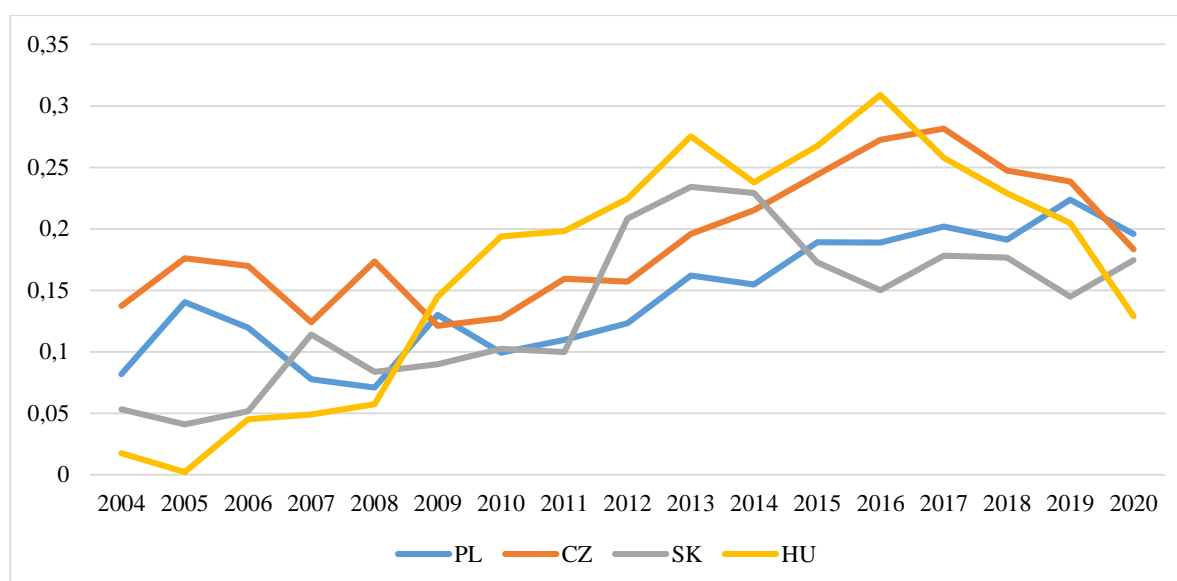


Figure 7. PSM2 of V4 countries.

Source: Own study.

The conducted research showed that there are statistically significant relationships between changes in the constructed synthetic indicator of the development of the non-life insurance market and the values of the PSM, PSM1 and PSM2 indicators, describing the macroeconomic stabilisation of the economies of Poland, Slovakia and Hungary. In the case of the Czech Republic, a statistically significant correlation was recorded for delays of 1-4. This proves that the Czech non-life insurance market reacts with the greatest delay (in the V4 group) to changes in macroeconomic stabilisation. For the rest of the countries, the highest correlation and statistical significance occurred, in most cases, in period 0. The exact results in this respect are presented in Table 3.

Table 4.

Correlogram for the synthetic indicator of the development of the non-life insurance market and PSM, PSM1 and PSM2

Delays		-4	-3	-2	-1	0	1	2	3	4
Poland	PSM	0.176	0.333	0.506 **	0.638 ***	0.793 ***	0.747 ***	0.699 ***	0.576 **	0.4152 *
	PSM1	0.07	0.159	0.342	0.520 **	0.682 ***	0.668 ***	0.694 ***	0.595 **	0.449 *
	PSM2	0.336	0.584 **	0.693 ***	0.704 ***	0.804 ***	0.708 ***	0.532 **	0.394	0.245
Czech Republic	PSM	0.317	0.382	0.272	0.08	-0.297	-0.581 **	-0.739 ***	-0.807 ***	-0.605 **
	PSM1	0.277	0.355	0.302	0.137	-0.229	-0.526 **	-0.712 ***	-0.793 ***	-0.639 ***
	PSM2	0.343	0.384	0.216	0.006	-0.354	-0.602 **	-0.713 ***	-0.761 ***	-0.519 **
Slovakia	PSM	-0.26	-0.255	-0.373	-0.509 **	-0.631 ***	-0.356	-0.388	-0.28	-0.282
	PSM1	-0.252	-0.108	-0.191	-0.386	-0.544 **	-0.385	-0.396	-0.226	-0.264
	PSM2	-0.198	-0.368	-0.497 **	-0.522 **	-0.568 **	-0.225	-0.272	-0.27	-0.228

Cont. table 4.

Hungary	PSM	-0.256	-0.396	-0.536 **	-0.683 ***	-0.786 ***	-0.700 ***	-0.643 ***	-0.494 **	-0.327
	PSM1	-0.396	-0.515 **	-0.540 **	-0.614 **	-0.627 ***	-0.510 **	-0.411 *	-0.331	-0.093
	PSM2	-0.079	-0.206	-0.414 *	-0.593 **	-0.752 ***	-0.712 ***	-0.703 ***	-0.527 **	-0.460 *

* - significance at the 10% level, ** - significance at the 5% level, *** - significance at the 1% level.

Source: Own study.

Moreover, only in the case of the Polish non-life insurance market there was a positive and the highest correlation with PSM and its components (including delays). This proves that it is positively stimulated by the macroeconomic stabilisation of the economy and reacts most strongly almost immediately. This applies to both the entire macroeconomic stabilisation (PSM) and its components determined by both internal and external factors (PSM1, PSM2). The strength of this correlation (tested with the Pearson correlation index) can be described as being on the border between medium and high². The smallest associations in period 0 were recorded in the case of the Czech Republic.

Conclusion

Insurance companies are entities that operate in market conditions that are subject to change as a result of various factors. The insurance sector is shaped by the impact of determinants related to the functioning of insurance and reinsurance companies, banks and other financial institutions, but also by macroeconomic and social factors, which include, in particular: human behaviour, demographic changes, trends and specific features related to other markets, the economic situation and the development of the global economy. The variety of factors influences the determinants of the modern insurance market. The constant changes in the insurance market are mainly due to changes in regulation (both at the level of national and grouping-specific laws) and technological changes that are used by market players. The literature research carried out shows that economic factors play a very important role in non-life insurance. The importance of these factors is determined by the level of economic development. In turn, the conditions for economic development should be considered as a corresponding configuration of economic indicators, which is known as macroeconomic stability. A critical review of the scientific literature and analysis of the results of the authors' research into the insurance markets of the Visegrad Group countries in 2004-2020 have helped to answer the research questions.

² The assessment was made on the basis of a comparison of various scales of correlations between two variables most frequently found in the literature.

Which V4 country has the most developed non-life insurance market?

The highest value of the synthetic indicator of the development of the non-life insurance market in the last period included in the analysis (2020) was recorded in Poland. The Czech market took second place, followed by the Hungarian and Slovak markets. It should be mentioned, however, that for the vast majority of the analyzed time period, the Czech Republic was the leader. However, the Polish market was developing more intensively. This applies to both the increase over the entire period and partial annual increases.

Which V4 country is characterized by the highest macroeconomic stabilisation?

The most favorable situation in terms of macroeconomic stabilisation was recorded in the case of Poland (0.518) at the end of the analyzed period. A slightly lower PSM value occurred in the Czech economy (0.511). The next places were taken by Slovakia (0.473) and Hungary (0.420).

How does macroeconomic stabilisation affect the non-life insurance markets of the V4 countries?

The non-life insurance markets of Poland, Slovakia and Hungary are shaped most strongly and with the greatest statistical significance by the macroeconomic stabilisation of their economies in period 0 - they respond immediately to ongoing economic changes (exception - Polish PSM1). The Czech market reacts with a delay, because the greatest strength of correlation and its greatest statistical significance were recorded at a lag of order 4.

It should also be noted that only in the case of the Polish non-life insurance market a positive correlation was recorded.

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