ALEKSANDRA HĘĆKA-SADOWSKA
DOROTA WIŚNIEWSKA
https://doi.org/10.33995/wu2025.2.5
date of receipt: 21.05.2025
date of acceptance: 30.06.2025

The property insurance market in the CEE countries: common trends or a heterogeneous group?

Property insurance is a significant part of the non-life insurance sector, playing a vital role in providing financial security and stability for individuals and businesses. It is worth tracking the development of this part of the insurance sector particularly in light of the increasing number of extreme weather events observed worldwide. Previous research on the European non-life insurance market has mainly focused on an overview of the European Union's Member States, with no exploration of potential common trends. This creates a research gap with regard to transition countries from Central and Eastern Europe (CEE). The article aims to compare and evaluate the development of the property insurance market in 16 transition countries from 2009 to 2023. The research methods involve descriptive statistics and statistical inference, and panel data models. Data was obtained from the XPRIMM database and reports. Main results lead to the conclusion that in several respects, a convergence phenomenon has been observed – the degree of differentiation of selected measures of market development is decreasing. However, the dynamics of changes cannot be described by a common panel trend.

Keywords: property insurance, CEE countries, insurance penetration, insurance density, panel data trend model

Introduction

The transition from centrally planned political and economic systems to a market-based economy has revealed a variety of economic, social, health, and environmental problems affecting the financial sector, including insurance. Since the early 1990s, the insurance sector in Central and Eastern European countries has experienced significant growth, evolving from a state-dominated,

concentrated market to one with increased competition and private participation. However, the changes have not taken place in the same way in all countries.

The insurance industry plays a unique role in addressing global challenges such as climate change, leading to human, physical, economic, and environmental losses by making society and the economy more climate-resilient[1]. Weather- and climate-related natural hazards generated a total economic loss between EUR 450 and 520 billion from 1980 to 2020 in the European Environment Agency member countries, and only about a quarter of Europe's extreme weather- and climate-related losses were insured. This proves that there is an insurance protection gap in Europe, although the percentage of insured economic losses varies among the Member States (e.g., based on CATDAT data, ranging from 48–56% in Denmark, the Netherlands and Norway to 0.5–1.5 % in Lithuania, Romania and Croatia)[2]. The assertion above raises the question of the state and direction of development of the property insurance market, which includes insurance products that protect individuals and businesses against financial loss resulting from damage to, or loss of, property, in CEE countries. These countries have had to 'catch up' with Western European countries over the last two decades as a result of transition.

This article aims to compare and evaluate the development of the property insurance market in Central and Eastern European countries including Albania (AL), Bosnia and Herzegovina (BA), Bulgaria (BG), Croatia (HR), the Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Montenegro (ME), North Macedonia (MK), Poland (PL), Romania (RO), Serbia (RS), Slovakia (SK), and Slovenia (SI). The comparison is based primarily on the 'property insurance penetration rate' (GWP_P/GDP) measured as the ratio of gross written premiums in property insurance, hereafter referred to as GWP_P, to GDP (in %), and 'property insurance density' (GWP_P per capita) measured as GWP in property insurance, (GWP_P) per capita (in EUR). The claims ratio in the sector was also compared. For comparison purposes and given the type of data available, the authors assume that property insurance covers fire, allied perils, and other damage to the property, which coincides with the nomenclature used in the XPRIMM database and FULL-YEAR XPRIMM Insurance Reports.

The authors aim to answer the following questions:

- whether the CEE countries can be considered as a homogeneous group by comparing the averages and calculating the coefficient of variation of the analyzed measures;
- whether convergence phenomenon could be observed, manifested by a decrease in the diversity of the analyzed measures;
- whether differences between EU and non-EU countries are still evident (whether any differences are significant); and
- whether changes in measures of market development (the penetration rate in particular) can be described by a common trend, or whether the dynamics of development are different in the countries analyzed.

To answer the questions, methods of descriptive statistics are used, as well as methods of statistical inference (test of equality of means, test of correlation significance), with a significance

1. See, for example, Sheehan B., Mullins M., Shannon, D. and McCullagh, O., *On the benefits of insurance and disaster risk management integration for improved climate-related natural catastrophe resilience*, "Environment Systems and Decisions", 2023 vol. 43(4).
2. European Environment Agency, Economic losses and fatalities from weather – and climate-related events in Europe, https://www.eea.europa.eu/publications/economic-losses-and-fatalities-from/economic-losses--and-fatalities-from (20.03.2025).

level of 0.05. Panel data models are used to describe the dynamics of development measures. These models have been chosen because they make it possible to take into account the different overall level of the phenomenon in each country (so-called individual effects) while estimating the growth rate, and to verify whether these differences in levels are still statistically significant. To assess whether the rate of market development is similar in the analyzed countries, a linear restriction test was performed for the directional coefficient in the trend for panel data. Due to the general lack of data for 2024 and some missing values for 2023, the period of the dynamic analysis is 2009–2023 with three exceptions (Bulgaria, Croatia, and Serbia)[3], where the scope of the analysis ends in 2022. The slightly different length of the time series is not an obstacle to the estimation of panel data models (unbalanced panel model has been estimated); however, it must be taken into account when comparing the actual state of insurance development in the countries under consideration. The comparisons were based on the development metrics set for 2022. Data was obtained from the XPRIMM database and FULL-YEAR XPRIMM Insurance Reports from 2009–2010 and 2013–2023.

The paper is organized as follows: section 1 provides a literature overview on the development of the insurance sector in the CEE region. In section 2, the authors analyze the state of the insurance market in the CEE countries as a background for property insurance. In section 3, the condition of the property insurance market in the CEE region, including the position of non-life and property insurance in market structure, claims ratio, property insurance penetration, and density is shown. In section 4, the authors analyze the dynamics of change in the property insurance development indicator between 2009 and 2023.

1. Development of the insurance sector in the CEE region – literature overview

The literature on the development of insurance systems in transition economies of the CEE is rather limited, as indicated by R.B.K. Pye[4] and M.S. Dorfman and K.C. Ennsfellner[5,6]. Before the 1990s, there were very few studies on the insurance markets in communist countries. Some studies, including those by P.P. Rogers, B. Schönfelder, E. Schütte, J. Marbacher and J. Furrer, provided an insight into the general conditions of the insurance sector in these countries[7]. These studies characterised the insurance market in communist countries as monopolistic and uncompetitive, driven by political factors[8]. Additionally, they revealed the discernible disparity in the 'insurance culture' between these countries and those in the West, caused by the functioning of the insurance market

3. These exceptions will be marked with '*'.
4. Pye R.B.K., *The Evolution of the Insurance Sector in Central and Eastern Europe and the former Soviet Union*, William Davidson Institute Working Paper nr 336, 2000, pp. 5–6.
5. Dorfman M.S. and Ennsfellner K.C., *The Coming Of Private Insurance To A Former Planned Economy: The Case Of Slovenia*, IIF Occasional Paper 2, International Insurance Foundation, Washington, DC 1998, p. 4.
6. Dorfman M.S. and Ennsfellner K.C., *Transitions from central planning to market-based insurance transactions: A case study of Poland, the Czech Republic and Hungary*, "Journal of Insurance Regulation", 2001 vol. 20(2), p. 163.
7. Pye R.B.K., *The Evolution of Financial Services in Transition Economies: An Overview of the Insurance Sector,* "Post-Communist Economies", 2005, vol. 17(2), p. 206.
8. Kozarević S., Perresin L and Valentinuz G., *Efficiency of the transition of insurance markets in South-Eastern European post-communist countries*, "South-Eastern Europe Journal of Economics", 2013 vol. 11(2), p. 141.

in the communist model[9]. In some cases, the state established a two-tier insurance system, with one insurer managing and controlling all domestic insurance (including setting premiums at almost arbitrary levels for the limited range of products it offered) and the other handling insurance, which required foreign currency due to its international nature[10]. As indicated by M.S. Dorfman and K.C. Ennsfellner, 'the Soviet-style model for insurance had little in common with the Western model of actuarially sound, privately owned, competitively sold commercial and personal insurance'[11].

The CEE region has mainly attracted the interest of scholars and practitioners since it transitioned from a centrally-planned economy to a market-based economy, thus more studies on that period are available. As identified by R.B.K. Pye, the greatest contributors to the literature on this subject have been authors with professional experience in the insurance industry, particularly from major Western European reinsurance companies like Swiss Re[12].

An important evaluation of the transition process in Poland, the Czech Republic, and Hungary between 1991–1999 was carried out by M.S. Dorfman and K.C. Ennsfellner, who examined the development of supervision authority and regulation of the industry. According to Dorfman and them, the surveyed countries had indeed achieved significant progress in developing private insurance. Nonetheless, there was an ongoing need for support in terms of legal and professional facilities[13]. These authors also analyzed the conditions of the Slovenian insurance market from 1991 to 1996[14].

R.B.K. Pye investigates the development of the insurance sector in the CEE and the Former Soviet Union (FSU) countries over the period from 1990–2001 using insurance density and penetration rates and classifying them into groupings (clusters). The author identified the remaining underdevelopment of the insurance sector in the CEE and FSU countries and also refuted the claim of M.A. Frinquelli, M.M. Mitra and S.I. Davis that insurance penetration rates in the CEE countries would converge with other EU levels within five to ten years[15].

Reducing insurance market concentration as an effect of the growing number of insurers and increased competition was investigated by D. Tipurić, M. Pejić Bach and T. Pavić in six selected countries in transition (Croatia, Slovenia, the Czech Republic, Slovakia, Poland, and Hungary) between 1998 and 2006. The study revealed significant changes that occurred in these insurance markets, such as the entry of private capital, the growing number of insurance companies (despite recent mergers and takeovers in some of them) and overall growth of the market, measured, among others, by gross written premium[16].

An ongoing process of market liberalization, an initial transformation of insurance monopolies into state-owned companies and their further privatisation, the emergence of foreign investments and know-how, and meeting EU requirements were crucial to ensuring transition in the CEE countries[17].

9. Pye R.B.K., *The Evolution of Financial*..., op. cit., pp. 206–207.
10. Pye R.B.K., *The Evolution of the Insurance*..., op. cit., p. 9.
11. Dorfman M.S. and Ennsfellner K.C., *The Coming*..., op. cit., p. 6.
12. Pye R.B.K., *The Evolution of the Insurance*..., op. cit., pp. 5–6.
13. Dorfman M.S. and Ennsfellner K.C., *Transitions*..., op. cit. p. 190.
14. For more details, see: Dorfman M.S. and Ennsfellner K.C., op. cit.
15. Pye R.B.K., *The Evolution of Financial*..., op. cit., p. 218.
16. Tipurić D., Pejić Bach M. and Pavić, T., *Concentration of the insurance industry in selected transition countries of Central and Eastern Europe, 1998–2006*, "Post-Communist Economies", 2008, vol. 20(1), p. 29.
17. Wieczorek-Kosmala M., *Non-life insurance markets in CEE countries – part I: Products' structure*, "Journal of Economics and Management", 2016 vol. 25(3), p. 112.

The transition period for some of the CEE countries officially ended with the EU accession in 2004 and 2007. Joining the EU enforced the process of insurance market harmonization, which involved complying with EU insurance guidelines that normalize legal, solvency, and accounting standards. It was a major boost to the modernization of the insurance industry in the candidate countries and provided full access to their markets for companies from other EU Member States[18].

Extensive literature research on the integration of insurance markets, as well as a study on the degree of integration of insurance markets in the CEE countries of the EU for the period 1999–2019 using gross written premiums and investments, was carried out by M. Lament and S. Bukowski. They indicated that the degree of integration of the insurance markets of the countries studied continued to increase, although less than in the group of all the EU and Eurozone Member States[19].

A significant correlation between the EU integration process and insurance market development in the former Yugoslavia between 2001–2010 was pointed out by S. Kozarević, L. Regan, and R.J. Gibbson[20]. Subsequently, a similar analysis was carried out by S. Kozarević, E. Kozarević and E. Šiljegović in the Western Balkans for the period 1996–2009[21]. Also, a study on the efficiency of the transition of insurance markets in South-Eastern European (SEE) post-communist countries between 2001–2010 was conducted by S. Kozarević, L. Perresin and G. Valentinuz, revealing that the higher the level of integration with the EU, the higher the level of insurance development[22]. The impact of globalization on the insurance and reinsurance market of Eastern Europe with a special focus on Slovenia, Croatia, and Serbia from 2000 to 2008 was also analyzed by G.B. Anđelić, L. Ćosić and V. Đaković. The study confirmed the significance and mutual dependence of the above relationship[23].

The market structure, conduct, and performance relationship (S-C-P) as well as the effect of liberalisation of the non-life insurance sector in 11 Eastern European Countries in the period between 2004–2008 was studied by V. Njegomir and D. Stojić. The research results confirmed the negative influence of greater liberalisation, leading to reduced market concentration on insurers' profitability[24].

An interesting comparative study of non-life insurance markets in eight transition countries in four years (2004, 2008, 2012 and 2015) was conducted by M. Wieczorek-Kosmala, who, in the first part of the study, focused on the structure of market products and MTPL (Motor Third

18. Ibidem, pp. 113–114.
19. Lament M. and Bukowski S., *Integracja rynków ubezpieczeniowych – przykład krajów Europy Środkowo-Wschodniej należących do Unii Europejskiej*, "Ekonomista", 2023 no. 4, pp. 399–400.
20. Kozarević S., Regan L. and Gibbson R. J., *The European Integration Process and Insurance Market Development: The Case of Former Yugoslav Countries*, Occasional Paper 7, International Insurance Foundation, Washington, DC 2008, p. 31.
21. For more details, see: Kozarević S., Kozarević E. and Šiljegović E., *Development of the Insurance Sector in the Western Balkan Countries: The Drive towards the European Union Insurance System.* "International Journal of Economic Policy in Emerging Economies", 2011 vol. 4(3).
22. Kozarević S., Perresin L. and Valentinuz, G., *Efficiency of the transition of insurance markets in South-Eastern European post-communist countries*, "South-Eastern Europe Journal of Economics", 2013 vol. 11(2), p. 160.
23. Anđelić G.B., Ćosić I. and Đaković V., *The Impact of Globalization on the Insurance and Reinsurance Market of Eastern Europe*, "South East European Journal of Economics and Business", 2010 vol. 5(1), p. 111.
24. Njegomir V. and Stojić D., *Liberalisation and Market Concentration Impact on Performance of the Non-Life Insurance Industry: The Evidence from Eastern* Europe, "The Geneva Papers", 2011 no. 36, p. 104.

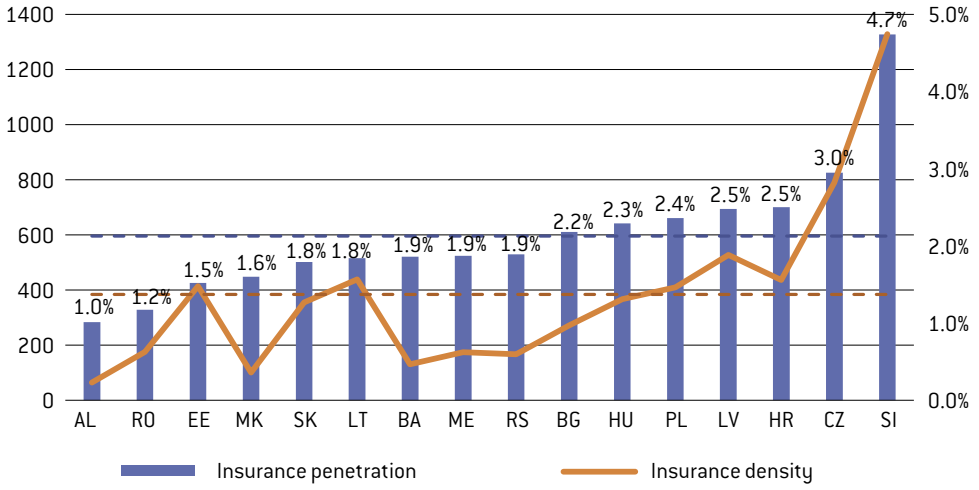
Party Liability) insurance in particular[25] and, in the second, evaluated the insurance market concentration and polarisation. The author indicated that the insurance market in some countries remains highly or moderately concentrated and that many countries continue to be dominated by just a few major players[26].

The latest study of life and non-life insurance market in the EU-27 Member States in 2022 was conducted by J. Witkowska. The author asserts that there are still differences among countries and indicates that post-communist countries are at the initial stage of insurance market development[27].

2. The state of the insurance market in the CEE countries as a background to property insurance

The best-known and most widely used measures to assess the development of the general insurance market are insurance penetration rate (GWP/GDP in %) and insurance density (GWP per capita)[28]. Due to the lack of data for Bulgaria, Croatia, and Serbia for 2023 and 2024, in order to compare the stages of insurance development in the countries under consideration, data for 2022 were analyzed. The values of these measures in individual countries, together with the averages in the analyzed group, are illustrated in Figure 1. The distribution of the observed measures in space is illustrated in Figure 2.

Figure 1. Insurance penetration rate (in %) and insurance density (euro per capita) in 2022 in the CEE countries together with the average lines

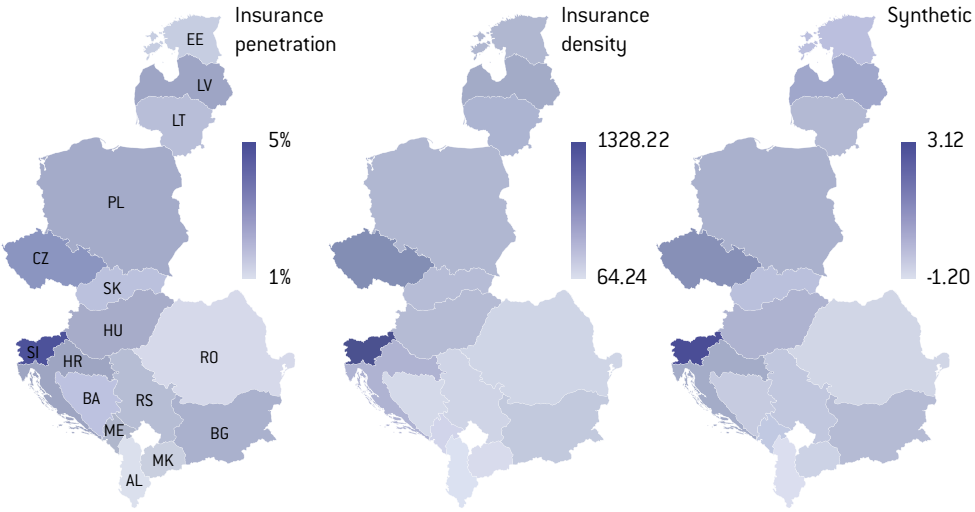


Source: Own compilation based on data from the XPRIMM database and XPRIMM Insurance Reports.

25. For more details, see: Wieczorek-Kosmala M., *Non-life insurance markets in CEE countries – part IE*, op. cit.
26. Wieczorek-Kosmala M., *Non-life insurance markets in CEE countries – part II: Polarisation and concentration*, "Journal of Economics and Management", 2016 vol. 26(4), p. 164.
27. Witkowska J., *The life and non-life insurance market in the European Union*, "Olsztyn Economic Journal", 2023 vol. 18(2), p. 169.
28. Kozarević S., Perresin L. and Valentinuz, G., *Efficiency* …, op. cit. p. 147.

In 2022, the insurance penetration rate averaged 2.13%, with individual countries deviating from this level by an average of 0.83 percentage points. The average level in the CEE was significantly lower than the EU average of 7.6% at the time and significantly lower than the average of the EU leaders, Denmark and the Netherlands, where the insurance penetration rate was 10.8% and 10.7% respectively[29]. Insurance density in CEE countries also varied, with gross premiums written averaging EUR 384 per capita (which is much lower than the EU's average: EUR 2,771) and a standard deviation of 304 units. The coefficient of variation was higher in insurance density (as high as 79% vs 39% for insurance penetration). Interestingly, it was also significantly higher than the coefficient of variation for GDP per capita (46%). The large variation in the level of gross written premiums per capita cannot therefore be explained by a variation in the overall degree of economic development alone. However, it is worth noting that, although in terms of overall measures of market development the countries analyzed still do not form a homogenous group, a phenomenon of convergence can be observed – manifested in the fact that both coefficients of variation have been falling over the past few years (in the case of penetration from 44.6% in 2009 to 39% in 2022, and in insurance density from 99% to 79%).

Figure 2. Measures of general insurance market development in 2022 on the CEE map



Source: Own compilation with Bing@Microsoft, OpenStreetMap.

29. *Raport roczny 2023*, Polska Izba Ubezpieczeń, Warszawa, pp. 58–59.

It is also worth mentioning that both measures of insurance market development were above average in Slovenia, the Czech Republic, Croatia, Latvia, and Poland – all these countries are Member States of the EU. By contrast, both measures were below average in Albania, Romania, Montenegro, North Macedonia, Bosnia and Herzegovina, Slovakia, and Serbia (Figure 1). As a result, the averages for the EU Member States are still higher than for non-EU countries. However, only in the case of insurance density can the difference in averages be considered as statistically significant (p-value: 0.006) and clear (523.8 vs 151.2, d-Cohen: 1.4).

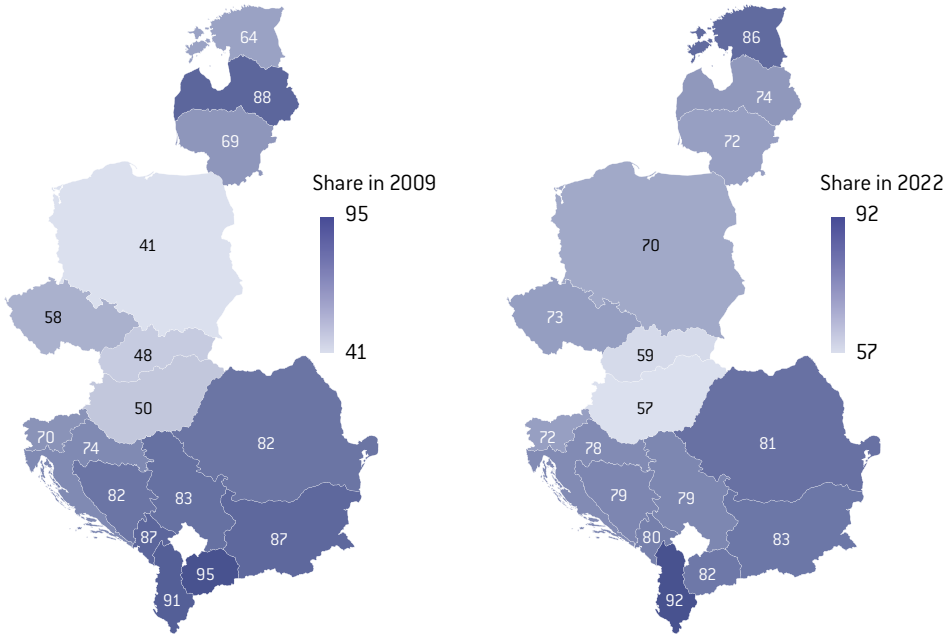
Both measures of development were standardised and averaged to obtain a synthetic measure of development. The synthetic measures range from – 1.19 (in Albania) to 1.16 in the Czech Republic to as high as 3.124 in Slovenia. In the third case, this means that the development measure deviates upwards from the average by more than 3 standard deviations. Slovenia can, therefore, be considered a clear outlier and a leader. For the remaining 13 countries, the synthetic measure was within the typical range of variability (mean +/ – standard deviation).

3. The condition of the property insurance market in the CEE region

3.1. Position of non-life and property insurance in market structure

Property insurance is part of the non-life insurance sector. The share of GWP of non-life insurance in total GWP (hereafter simply referred to as 'share') averaged 73% in the countries surveyed, with a standard deviation of 16.4% in 2009. Interestingly, it was at a fairly similar level in 2022: with an average of 76% and a standard deviation of 9%. However, this does not mean that the share did not change at all. First of all, its national levels varied more in 2009 than in 2022. For example, in 2009, the lowest levels were observed in Poland, Slovakia, Hungary, and the Czech Republic (41%, 48%, 50%, and 58% respectively) – Group 1. In contrast, the highest shares were observed in North Macedonia (95.14%), Albania (91%), Latvia (88%), Bulgaria (87%), Montenegro (87%), Serbia (82%) and Bosnia and Herzegovina (82%) – Group 2. In Group 1, the life insurance sector dominated, while in Group 2, the share of the life insurance sector was negligible. At the same time, there was a clear increase in the share of the non-life insurance sector in total GWP in subsequent years in Group 1 countries – for example, in Poland, it reached 70% in 2022. In Group 2 countries, on the other hand, it tended to decline somewhat – for example, in Macedonia to a level of 82%. A strong negative correlation was, therefore, identified between the initial level of this share and the change observed between 2022 and 2009 – the Pearson correlation coefficient reached – 0.85. It could be argued that this is another manifestation of the convergence of these markets.

Figure 3. GWP in non-life insurance as a percentage of total GWP in 2009 and 2022: the CEE map



Source: Own compilation with Bing@Microsoft, OpenStreetMap.

Although the share of the non-life insurance sector in the total market changed over time, the structure of the sector's GWP was very stable (see Table 1). Motor insurance constantly accounted for the largest share of premiums in the non-life insurance sector, which gained 55% in 2022, which was very close to the average level calculated, based on available observations for 2009–2023*. Property insurance's share in the total GWP of the non-life insurance sector in 2022 was at an average level of 20%, with a standard deviation of 6%. The same levels were reached by these descriptive statistics which were calculated based on all data for the years 2009–2023.

Table 1. Premium per line as % of non-life insurance in 2022 and on average from 2009–2023*

	2022			Average from 2009–2023		
Country code	Property	Motor	Other	Property	Motor	Other
AL	11%	74%	15%	14%	69%	16%
BA	10%	75%	15%	12%	74%	15%
BG	13%	66%	21%	16%	70%	13%
HR	20%	49%	31%	20%	52%	29%
CZ	24%	44%	32%	25%	44%	31%
EE	28%	54%	17%	27%	58%	16%
HU	34%	50%	15%	37%	46%	17%
LV	18%	37%	45%	18%	37%	45%
LT	21%	55%	24%	20%	58%	22%
MK	20%	59%	21%	21%	62%	18%
ME	16%	53%	31%	15%	60%	25%
PL	21%	51%	28%	19%	54%	27%
RO	13%	77%	11%	16%	72%	12%
RS	25%	50%	24%	26%	55%	20%
SK	21%	56%	23%	24%	57%	19%
SI	17%	33%	50%	16%	34%	50%
Average	20%	55%	25%	20%	56%	23%
Standard deviation	6%	12%	10%	6%	11%	11%
Coef. of variation	30%	22%	40%	30%	20%	48%

Source: Own compilation based on data from the XPRIMM database and XPRIMM Insurance Reports.

It is worth adding that the share of property insurance in non-life insurance moderately, but statistically significantly, depends on the share of the non-life sector in the total insurance market – the correlation coefficient for 2022 was -0.55 (p-value: 0.02) – which means that the larger the share of the non-life insurance sector in the total market, the smaller the share of property insurance may be in the non-life insurance sector.

3.2. The claims ratio in property insurance

The claims ratio in property insurance was calculated as follows:

$$CR = \frac{PC}{GWP_P} \times 100\% \quad (1)$$

(where PC means the total value of claims in the property insurance sector). While analyzing the claims ratios in the CEE countries, no significant increasing or decreasing trend was identified between 2009 and 2023. The claims ratio fluctuated around an average level and, therefore, the focus was on analyzing basic descriptive statistics of the distribution. These are summarised in Table 2. The special distribution of the central tendency measures is illustrated in Figure 4. The distribution of the claims ratio by country is presented in Figure 5.

Table 2. Descriptive statistics of claims ratio distribution (PCR) in property insurance based on yearly data from 2009–2023

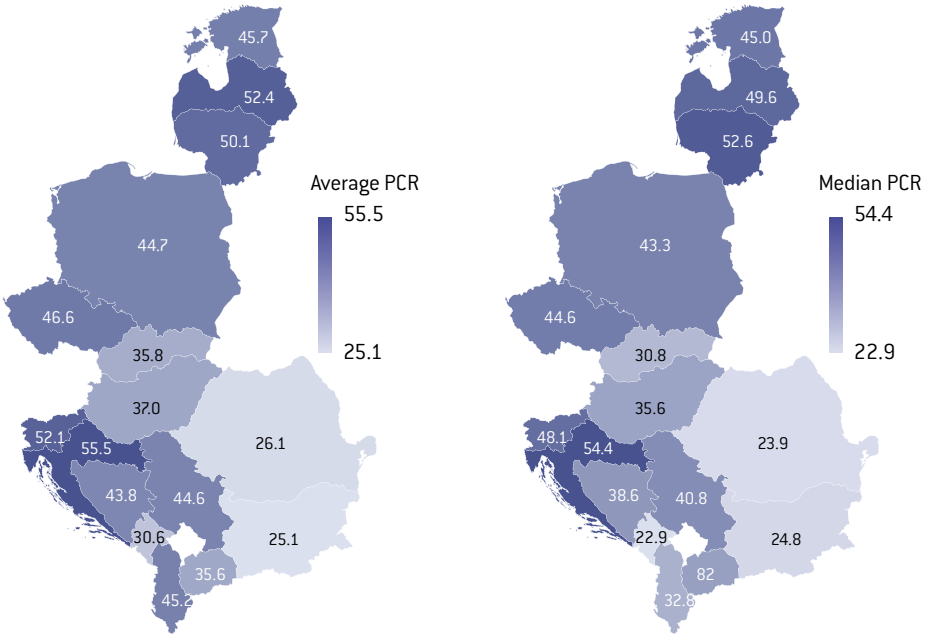
Country	No of observations.	Average (%)	Median (%)	Standard deviation (p.p)	Quartile deviation (p.p)	Min (%)	Max (%)	Classical coef of variation (%)	Positional coef. of variation (%)	Skewness	Kurtosis
AL	15	45.2	32.8	45.1	26.9	5.2	181.8	100	82	2.2	5.7
BA	13	43.8	38.6	20.4	10.7	25.8	89.8	47	28	1.5	1.5
BG	14	25.1	24.8	6.8	5.0	14.5	36.1	27	20	0.2	-0.7
HR	14	55.5	54.4	5.1	4.4	48.2	63.7	9	8	0.3	-1.3
CZ	15	46.6	44.6	9.4	5.4	35.6	64.1	20	12	1.0	-0.2
EE	15	45.7	46.0	3.9	1.7	35.0	52.1	9	4	-1.2	3.7
HU	15	37.0	35.6	8.2	3.4	30.2	63.8	22	9	2.8	9.2
LV	15	52.4	49.6	15.2	7.4	34.3	94.8	29	15	1.5	3.6
LT	15	50.1	52.6	9.8	5.4	30.5	70.0	20	10	-0.1	0.5
ME	11	30.6	22.9	20.4	8.9	15.3	88.0	67	39	2.6	7.3
MK	15	36.6	36.4	5.8	3.0	27.3	51.9	16	8	1.0	2.7
PL	15	44.7	43.3	9.5	5.0	36.2	73.9	21	12	2.3	6.6
RO	5	26.1	23.9	4.8	4.4	22.2	33.3	19	19	1.0	-0.9
RS	14	44.6	40.8	12.1	5.7	33.4	78.4	27	14	1.9	4.1
SK	15	35.8	30.8	11.4	5.4	26.4	67.1	32	18	1.9	3.4
SI	15	52.1	48.1	12.3	7.4	37.5	79.3	24	15	1.4	1.5
Total property insurance market	221	42.9	41.4	17.66	8.792	5.2	181.8	41	21	2.5	16.9
Total insurance market	232	52.7	54.8	11.1	9.2	22.2	78.2	21	17	-0.3	-0.5

Source: Own compilation based on data from the XPRIMM database and XPRIMM Insurance Reports.

When analyzing the compiled measures, first of all it should be noted that the highest property claims ratio was observed in Croatia (mean 55.5%, median 54.5%) where, at the same time, the lowest volatility was observed, with the PCR observed in each year deviating from the mean by only 5.1 percentage points and from the median by 4.4 percentage points on average[30]. The classic coefficient of variation reaches only 9%, indicating a very stable PCR over time (claims ratios were very close to the average in each year). The high level of claims may be caused by Croatia's, as well as Italy's and the analyzed Balkan countries' significant exposure to the risk of earthquakes, caused by the overlapping of the African and Eurasian tectonic plates (see the data on the map – Figure 4).

30. The highest values have been marked in red and the lowest in green.

Figure 4. Measures of central tendency of the claims ratio from 2009–2023 on the CEE map

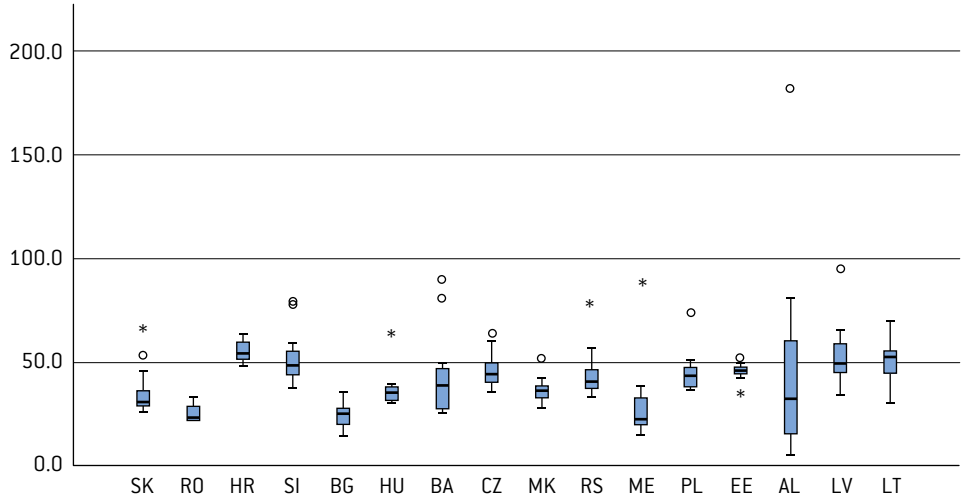


Source: Own compilation with Bing@Microsoft, OpenStreetMap.

Relatively high (above 50%) and, at the same time, fairly stable claims ratios were observed in Slovenia, Lithuania, and Latvia. In contrast, countries with exceptionally low and stable claims ratios were Bulgaria and Romania (averages and medians below 30%).

In most countries, the claims ratio is not very volatile (volatility coefficients mostly below 30%). However, outliers, i.e. unusually high claims ratios (indicated by a circle in the box plot – Figure 5), should be noted. Their occurrence means that, in most cases, the claims ratio distribution is right-skewed, and thus the mean exceeds the median and the classic measures of variability have slightly lower values than their positional counterparts. For example, an exceptionally high number of claims was paid in Albania in 2020 (PCR of 181.8%) as a result of an earthquake which took place in November 2019 and in Slovakia in 2010 as a result of the flooding in May and June 2010.

Figure 5. Claims ratio distribution based on available yearly data from 2009 to 2023



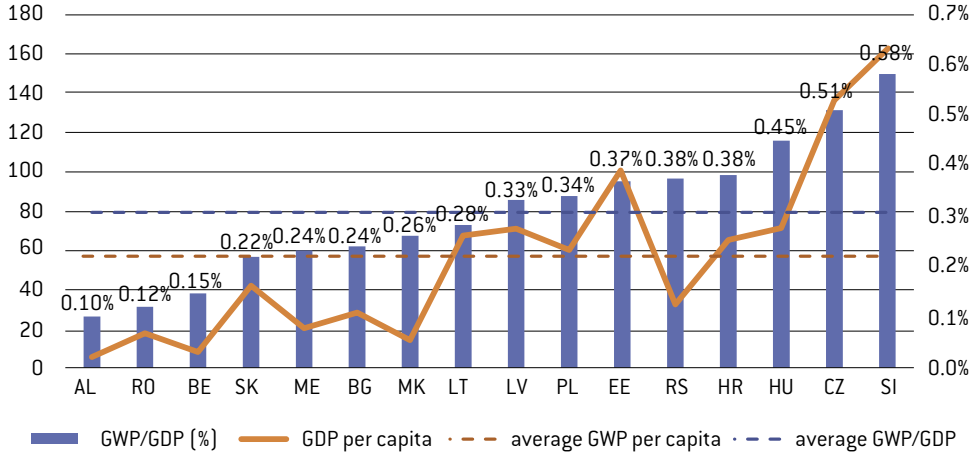
Source: Own compilation in IBM Predictive Solutions.

At the same time, it is worth noting that the overall average claims ratio for the sector under review (42.9%) and the median (41.4%) do not exceed the average claims ratio for the insurance market as a whole (in the latter case, the average based on all available annual data was 52.7% and the median 54.8%).

3.3. Property insurance penetration and density

The equivalents of the penetration measure (GWP/GDP) and the density measure (GWP per capita), calculated taking into account only the GWP in the property insurance (GWP_P), were used as financial measures of the development of the property insurance market. The values of these measures in individual countries in 2022, together with the averages in the analyzed group, are shown in Figure 6.

Figure 6. Property insurance penetration rate (in %) and property insurance density (euro per capita) in 2022 in the CEE countries together with the average lines

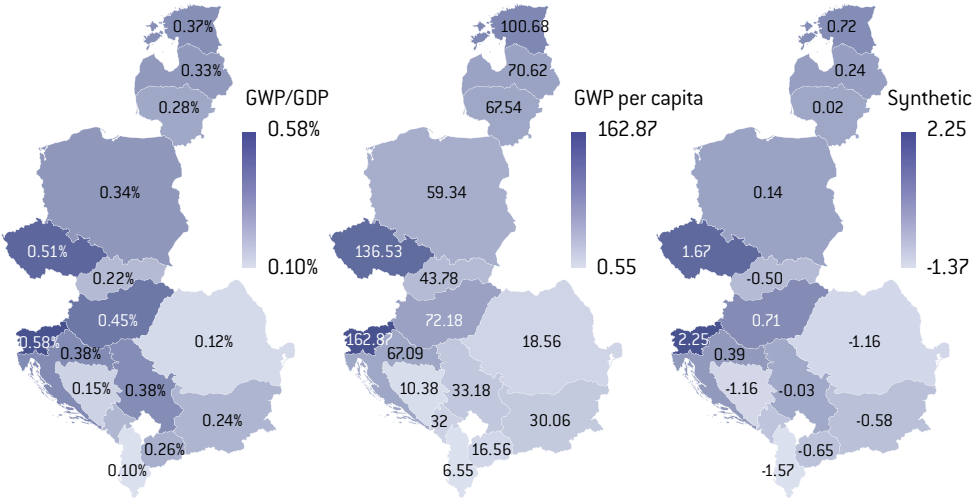


Source: Own compilation based on data from the XPRIMM database and XPRIMM Insurance Reports.

In 2022, GWP_P/GDP averaged 0.31%, with individual countries deviating from this level by an average of 0.13 percentage points. GWP_P per capita also varied, with gross premiums written averaging EUR 57.37 per capita and a standard deviation of 43.73 units. Similar to the insurance market in general, the coefficient of variation was higher in property insurance density (as high as 76.2% vs 42% for insurance penetration). Both coefficients confirm that the countries analyzed still do not form a homogeneous group. Interestingly, the coefficient of variation of the GWP_P/GDP was stable – in 2009, it was almost the same: 42.2%. A slight convergence can only be seen in the case of GWP_P per capita, with the coefficient of variation falling from 89.2% in 2009 to 76.2% in 2023. The order of countries (applied in Figure 6) appears slightly similar to the rating based on measures of the development of the general insurance market (see Figure 1) – with some exceptions. Both measures of property insurance market development were again above average in Slovenia, the Czech Republic, Croatia, Latvia, and Poland. Hungary and Estonia joined the leaders. All these countries belong to the EU. Both measures of development were below average again in Albania, Romania, Montenegro, North Macedonia, Bosnia and Herzegovina, and Slovakia. Bulgaria joined the below-average group. Comparing the averages of development measures in the CEE countries which are EU members and the non-EU countries, it can be concluded that, although the average GWP_P/GDP in the EU-group is slightly higher (0.36% vs 0.23%), the difference in averages could not be considered statistically significant (p-value: 0.055) due to the high intra-group variation. The difference between the averages of GWP_P per capita in the Member States (EUR 79.9) and non-Member States (EUR 19.79) can be considered statistically significant (p-value: 0.001), but it should also be borne in mind that GDP per capita also varies similarly between the two groups. Both measures of the development of property insurance were standardized and averaged to obtain a synthetic measure. The synthetic measures range from – 1.37 (in AL) and 1.16 (in RO and BA) to 1.67 (in CZ) and as high as 2.25 in Slovenia (Figure 7). This result is very similar to that obtained for development measures of the overall insurance market (cf. Figure 2). Also, in terms of the property insurance market, the Czech Republic and Slovenia exhibit higher levels

of development compared to other countries. In the latter case, the development measure deviates upwards from the average by more than 2.24 standard deviations. For the remaining 11 countries, the synthetic development measure was within the typical range of variability.

Figure 7. Measures of property insurance market development in 2022 on the CEE map



Source: Own compilation with Bing@Microsoft, OpenStreetMap.

Due to the different GDP levels and different purchasing powers, the market penetration rate appears to be a more suitable basis for comparing the development of the insurance market in CEE countries.

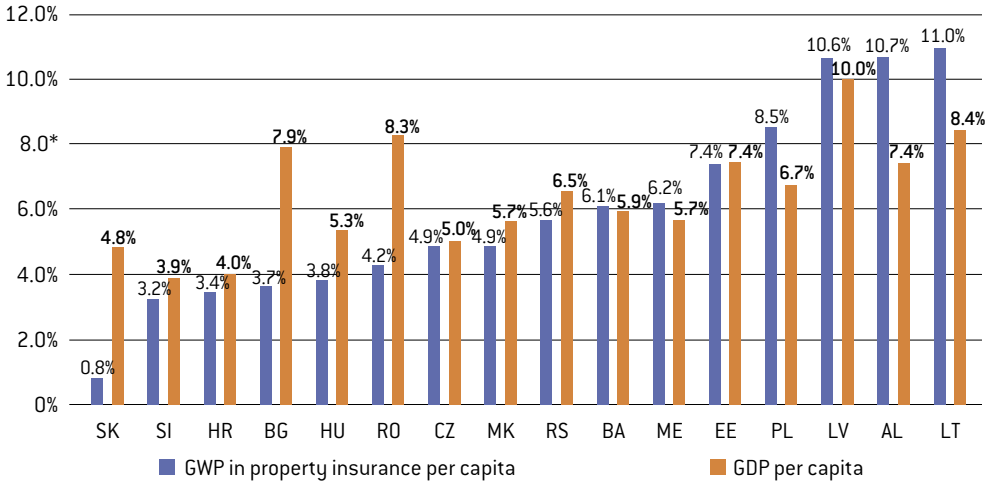
4. Analysis of the dynamics of change in the property insurance development indicator from 2009 to 2023

To initially establish the dynamics of change, in a first step, the average rate of change (growth rate) of GWP_P per capita and GWP_P/GDP from 2009 to 2023 was determined using the formula:

$$\underline{i} = \left(\sqrt[(2023-2009)]{\frac{y_{2023}}{y_{2009}}} - 1 \right) \times 100\% \qquad (2)$$

This formula was also applied to GDP per capita, as it would clearly result in obtaining an important benchmark for the growth rate of GWP_P per capita. Such an approach proved to be justified. Figure 8 shows the results – first from the right are the countries where the difference between the growth rate of GWP_P per capita and the growth rate of GDP per capita was most negative. At the end of the ranking are those where GWP_P grew faster than GDP.

Figure 8. Average yearly growth rates of GWP_P per capita and GDP per capita based on 2009–2023*



Source: Own compilation based on data from the XPRIMM database and XPRIMM Insurance Reports.

From Figure 8, it can be seen that, in most countries, the growth of GWP_P was slower than the growth of GDP; the least favourable relation is observed in Bulgaria, where, between 2009 and 2022, GWP_P per capita grew by an average of 3.7% per year while GDP per capita grew by 7.9%. The most favourable relation is found in Albania, where GWP_P per capita grew by an average of 10.7% per year between 2009 and 2023, while GDP per capita grew by 7.4% per year. However, it is worth recalling that, despite this relatively high rate, Albania has still not caught up with the other CEE countries.

Due to the observed differences between the growth rate of GDP per capita and the growth rate of GWP_P per capita, the market penetration rate proved to be a much better basis to compare the development of the insurance market in CEE countries.

To describe the changes in the GWP_P/GDP (denoted in formulas as Y) over time, it was decided to first estimate individual trends for each country using the general formula:

$$ln\left(Y_{it}\right) = a_i + \beta_i \times t + \varepsilon_{it} \qquad (3)$$

where:

Y_{it} – $(GWP_P/GDP)\times 100\%$ in the i-th country and period t,

a_i – intercept in the trend for the i-th country,

t – time variable, where t=1 in 2009, t=2 in 2010, etc.,

β_i – slope coefficient reflecting the growth rate of the explained variable in the i-th country,

ε_{it} – random component of the model, associated with the i-th country and period t.

It was also decided to estimate a common trend by constructing a panel data model of the formula[31]:

31. *Mikroekonometria: modele i metody analizy danych indywidualnych,* ed. M. Gruszczyński, Wolters Kluwer, Warszawa 2010, p. 272.

$$ln\left(Y_{it}\right) = a_i + a_0 + \beta \times t + \varepsilon_{it} \quad (4)$$

where:

a_0 – average intercept,

a_i – individual effect in the *i*-th country,

β_i – common slope coefficient, defined as the average growth rate observed across all panel units.

The common trend thus assumes that the initial level of the phenomenon in 2009 may differ across countries (which is the effect of country-specific factors), but the slope of the trend is the same. The assumption of equal slope coefficients across all panel units adopted in the panel data model is a linear restriction, the validity of which should be verified. If the assumption is valid, then the fit of the panel data trend will not be significantly worse than that of individual trends. The linear restrictions test was conducted using the statistic[32]:

$$F = \frac{\left(SS\varepsilon_r - SS\varepsilon_{unr}\right)/k}{SS\varepsilon_{unr}/df} \sim F^k_{df} \quad (5)$$

where:

$SS\varepsilon_{unr}$ – sum of squares of errors in the model with linear restrictions,

$SS\varepsilon_{unr}$ – sum of squares of errors in the unrestricted model (total of SSE of individual trends),

k – number of restrictions, i.e., the difference between the total number of parameters estimated in individual trends and the number of parameters in the panel data model,

df – degrees of freedom in the model without linear restrictions.

The coefficients of individual trends (slope coefficient with p-value and intercept), model values resulting from the trend for the initial period of analysis (2009), and the coefficients of determination of individual trends are presented in Table 3[33]. The Table also presents p-values for the linear restrictions test – a low p-value (below 0.05) indicates that with 95% confidence, it can be inferred that the rates of change in GWP_P/GDP in the individual countries from a given group are significantly different. The higher the p-value, the stronger the evidence that the dynamics of changes in GWP_P/GDP in the grouped countries may be similar.

Based on the results of the estimation of individual trends, three main groups of countries can be preliminarily distinguished:

- Group 1 – comprising eight countries, where a statistically significant decrease in the share of GWP_P in GDP was observed, which translates into relatively high coefficients of determination for the trends;
- Group 2 – comprising six countries, where the trend was statistically insignificant – thus fluctuations around the average level were observed, resulting in low levels of the determination coefficient; and
- Group 3 – consisting of two countries, where a significant positive growth trend was observed (only Poland and Lithuania).

32. Maddala G.S., *Ekonometria*, Wydawnictwo Naukowe PWN, Warszawa 2006, pp. 209–211.

33. Downward trends are marked in red and upward trends in green.

Table 3. Results of the estimation of individual trends and linear restriction test in panel trends

Group	INDIVIDUAL TRENDS					P-VALUES IN RESTRICTION TESTS				
	Country	Slope	Intercept	Model value in 2009	R^2					
1A	RO	-0.0495 (0.000)	-1.431	0.0024	85.00%	0.06	0.000	0.06	0.000	F=11.73(0.000); common slope: – 0.00836 (0.000)
	BG	-0.0367 (0.000)	-0.911	0.0040	93.00%					
1B	SK	-0.0257 (0.001)	-0.993	0.0037	58.00%	0.500		0.01		
	BA	-0.0196 (0.008)	-1.525	0.0022	43.00%					
	HU	-0.0172 (0.000)	-0.585	0.0056	85.00%					
1C	SI	-0.0092 (0.000)	-0.407	0.0067	64.75%	0.62	0.94			
	RS	-0.0084 (0.007)	-0.874	0.0042	46.56%					
	CZ	-0.0067 (0.017)	-0.623	0.0054	36.44%					
2A	MK	-0.0061 (0.188)	-1.251	0.0029	12.92%	0.89		0.62	0.47	0.000
	HR	-0.0046 (0.421)	-0.942	0.0039	5.46%					
	EE	-0.0032 (0.613)	-0.888	0.0041	2.02%					
	LV	-0.0004 (0.942)	-1.079	0.0034	0.04%					
2B	ME	0.0055 (0.443)	-1.434	0.0024	4.58%	0.33	0.87	0.34	0.02	
	AL	0.0109 (0.333)	-2.287	0.0010	7.21%					
3A	PL	0.0104 (0.006)	-1.237	0.0029	44.82%					
3B	LT	0.0234 (0.000)	-1.590	0.0020	68.79%		1		1	

Source: Own compilation based on data from the XPRIMM database and XPRIMM Insurance Reports.

The statistically significant slope coefficient in the panel data trend indicates that the dependent variable decreased in the analyzed CEE countries by approximately 0.8% on average per year. However, the linear restriction test confirms that this common trend does not match all countries (the F-statistic:11.73 with a p-value of 0.000)[34]. It was, therefore, decided to identify subgroups where the trend was similar. Linear restriction tests were conducted within preliminarily selected groups. The results indicate that the three groups are not internally homogeneous, particularly Group 1, where the rate of decrease in GWP_p/GDP differs significantly. Within Group 1, the following subgroups were therefore additionally established:

34. Whenever the trend slopes were found to be significantly different, the p-value was written in red front.

- Group 1A – Romania and Bulgaria, which demonstrated the most pronounced decrease in the property insurance market penetration indicator (an average of 4.4% annually);
- Group 1B – comprising Slovakia, Bosnia and Herzegovina and Hungary, countries where the dependent variable decreased by an average of 2.1% annually, with the common panel trend explaining over 99% of total variability; and
- Group 1C – comprising Slovenia, Serbia, and the Czech Republic, where the dependent variable decreased by an average of 0.86% annually, with the common panel trend explaining over 99% of total variability.

It is worth noting that in countries where low claims ratio values were observed (Bulgaria and Romania), the most pronounced downward trends for the penetration ratio were also identified. This may indicate that consumers do not perceive the benefits of property insurance.

For Group 2, there was insufficient basis to reject the linear restriction (p-value: 0.47), and the slope coefficient of the panel trend is statistically insignificant. It is worth noting, however, that this group might be divided into two subgroups:

- Group 2A – comprising countries with negative, though statistically insignificant, slope coefficients of individual trends (North Macedonia, Croatia, Estonia, Latvia), which may simultaneously be similar to Group 1C in terms of dynamics (there is no basis to reject the hypothesis of the same development rate); and
- Group 2B – comprising countries with positive, though statistically insignificant, slope coefficients of individual trends (Montenegro and Albania), which may simultaneously be similar to Group 3 in terms of dynamics (likewise, there is no basis to reject the hypothesis of a common trend slope).

As mentioned, significantly positive growth rates of the property insurance market development measure were obtained in only two countries. The growth rates in these countries, however, must be considered as significantly different. In Poland, GWP_P/GDP increased by an average of 1.04% (0.014×100%) annually, while simultaneously exhibiting fairly large fluctuations around the trend line. In Lithuania, GWP_P/GDP increased by an average of 2.34% (0.0234×100%) annually, with the trend explaining 70% of the dependent variable's variability. Relatively low coefficients of determination may indicate that forecasts from the obtained trends may be of low quality. It is worth noting that in cases where trends were significantly downward (e.g., Group 1A), the fit of the trends was better.

In conclusion, it should be emphasized that the analyzed countries do not form a homogeneous group in terms of the dynamics of GWP_P/GDP. The fact that a downward trend was observed in half of the CEE countries should be considered very concerning. The property insurance market is developing more slowly than the overall economy.

Conclusions

Although the non-life sector's share in the total market has changed over time, the structure of the non-life insurance sector's GWP was very stable between 2009 and 2023. Motor insurance constantly accounted for the largest share of the premiums in the non-life insurance sector (above 50%). Property insurance's share in the total GWP of the non-life insurance sector in 2022 was at an average level of 20%, with moderate variations between countries.

In most countries, the claims ratio in the property insurance sector was not very volatile (volatility coefficients mostly below 30%), which certainly facilitates risk management for local insurance companies. However, more pronounced differences between countries were identified. The highest property claims ratio was observed in Croatia and its claims ratios were very stable over time. In most CEE countries, the claims ratio distribution is right-skewed, which is associated with the occurrence of earthquakes, floods, or fires. At the same time, it is worth noting that the overall average claims ratio for the sector under review (42.9%) and the median (41.4%) are slightly lower than the average and median claims ratios for the insurance market as a whole. This can be seen as a factor that may encourage insurance companies to expand their operations in this sector.

The analyzed countries still differ significantly in terms of insurance density and property insurance density, which, however, may be explained by the differences in GDP per capita. For that reason, the relation of GWP to GDP was recognized as a more appropriate measure to compare the development of the property insurance market. The coefficient of variation of the GWP_P/GDP (above 40%) indicates moderate differences between countries. The differences did not disappear from 2009–2023, and, therefore, no convergence was observed in this respect. Both measures of market development (penetration and density) confirm that the countries analyzed still do not form a homogenous group.

It is worth emphasizing that both in terms of the property insurance market and the overall insurance market, the Czech Republic and Slovenia stand out from the other CEE countries. The lowest levels of development were found in Albania and Romania. Moreover, the average indicators of insurance market development and the property insurance market in the CEE countries are still lower than in the EU countries. Differences between the EU Member States and non-EU Member States within the CEE countries are also visible.

What may be concerning is the fact that in most countries, a decrease in the share of GWP in GDP is observed. This applies to both the overall insurance market and the property insurance market. At the same time, in the case of the property insurance market, it is impossible to identify a common development trend for CEE countries. In some countries, the downward trend was significantly negative. In others, the decline was slower or the downward trend proved statistically insignificant. In two countries (Poland and Lithuania), a statistically significant upward trend was observed.

Due to the lack of data for 2024, the analysis of dynamics only includes data until 2023. The estimated trends describe past patterns without examining their causes. The temporal scope and the lack of causal analysis are the most important limitations of this study. Therefore, future research could include the reasons behind the observed downward trends. Among others, these may include socioeconomic factors, such as level of trust in the insurance industry, an over-reliance on public assistance in the event of disasters (fire, earthquake, hurricane), private consumption expenditures and disposable income, and inadequate financial education[35]. Some of these factors were recognized as important drivers of insurance market development in Central, Eastern, and Southeastern Europe. In the absence of an obligation to insure property against fire, etc. in selected countries, the payment of a premium could be seen as an unnecessary expense, especially

35. See, for example, Born P.H. and Bujakowski D., Drivers of Insurance Market Development in Central, Eastern, and Southeastern Europe, https://www.semanticscholar.org/paper/Drivers-of-Insurance-Market-Development-in-Central%2C-Born/5b40e4f7ffb565c14e15c19caeabdfb11d45c6e1 (27.03.2025).

in an environment of increasing living costs (linked to rising energy prices) and declining revenues linked to the Covid-19 pandemic.

We strongly recommend that the reasons for the declining share of GWP in GDP be recognised and a further decline be prevented. This downward trend should be of concern to market regulators, especially at a time when extreme weather events may be causing increasing property losses.

In view of the significant disparities in the development of the property insurance market across CEE countries, steps should be taken to gradually harmonize selected regulatory and supervisory aspects. This should focus particularly on strengthening cooperation between insurance supervisors by creating a platform for sharing information and best practices, promoting insurance market development in less developed countries, and developing minimum common standards for natural disaster risk management. Governments also have a vital role in the popularisation of property insurance, especially in insurance markets which are still developing, for example by promoting awareness, accessibility, and trust in property insurance. Such support could be offered on many levels, such as by establishing legal frameworks, offering incentives or subsidies, investing in natural disaster risk management tools or even direct participation as an insurer or reinsurer of last resort. The lack of convergence highlights the need for coordination activities and support to develop less mature insurance markets, with the aim of reducing disparities in the availability and quality of insurance coverage, and strengthening the sector's resilience to natural disaster risks.

References

Anđelić G.B., Ćosić I. and Đaković V., *The Impact of Globalization on the Insurance and Reinsurance Market of Eastern Europe*, "South East European Journal of Economics and Business", 2010 vol. 5(1).

Born P.H. and Bujakowski D., Drivers of Insurance Market Development in Central, Eastern, and Southeastern Europe, https://www.semanticscholar.org/paper/Drivers-of-Insurance-Market-Development-in-Central%2C-Born/5b40e4f7ffb565c14e15c19caeabdfb11d45c6e1 (27.03.2025).

Dorfman M.S. and Ennsfellner K.C., *The Coming Of Private Insurance To A Former Planned Economy: The Case Of Slovenia*, IIF Occasional Paper 2, International Insurance Foundation, Washington, DC 1998.

Dorfman M.S. and Ennsfellner K.C., *Transitions from central planning to market-based insurance transactions: A case study of Poland, the Czech Republic and Hungary*, "Journal of Insurance Regulation", 2001 vol. 20(2).

European Environment Agency, Economic losses and fatalities from weather – and climate-related events in Europe, https://www.eea.europa.eu/publications/economic-losses-and-fatalities--from/economic-losses-and-fatalities-from (20.03.2025).

Kozarević S., Kozarević E. and Šiljegović E., *Development of the Insurance Sector in the Western Balkan Countries: The Drive towards the European Union Insurance System.* "International Journal of Economic Policy in Emerging Economies", 2011 vol. 4(3).

Kozarević S., Perresin L. and Valentinuz G., *Efficiency of the transition of insurance markets in South-Eastern European post-communist countries*, "South-Eastern Europe Journal of Economics", 2013 vol. 11(2).

Kozarević S., Regan L. and Gibbson R.J., *The European Integration Process and Insurance Market Development: The Case of Former Yugoslav Countries*, Occasional Paper 7, International Insurance Foundation, Washington, DC 2008.

Lament M. and Bukowski S., *Integracja rynków ubezpieczeniowych – przykład krajów Europy Środkowo-Wschodniej należących do Unii Europejskiej*, "Ekonomista", 2023 no. 4.

Maddala G. S., *Ekonometria*, Wydawnictwo Naukowe PWN, Warszawa 2006.

Mikroekonometria: modele i metody analizy danych indywidualnych, ed. M. Gruszczyński, Wolters Kluwer, Warszawa 2010.

Njegomir V. and Stojić D., *Liberalisation and Market Concentration Impact on Performance of the Non-Life Insurance Industry: The Evidence from Eastern* Europe, "The Geneva Papers", 2011 no. 36.

Pye R.B.K., *The Evolution of the Insurance Sector in Central and Eastern Europe and the former Soviet Union*, William Davidson Institute Working Paper no. 336, 2000.

Pye R.B.K., *The Evolution of Financial Services in Transition Economies: An Overview of the Insurance Sector,* "Post-Communist Economies", 2005, vol. 17(2).

Raport roczny 2023, Polska Izba Ubezpieczeń, Warszawa.

Sheehan B., Mullins M., Shannon, D. and McCullagh, O., *On the benefits of insurance and disaster risk management integration for improved climate-related natural catastrophe resilience*, "Environment Systems and Decisions", 2023 vol. 43(4).

Tipurić D., Pejić Bach M. and Pavić, T., *Concentration of the insurance industry in selected transition countries of Central and Eastern Europe, 1998–2006*, "Post-Communist Economies", 2008, vol. 20(1).

Wieczorek-Kosmala M., *Non-life insurance markets in CEE countries – part I: Products' structure*, "Journal of Economics and Management", 2016 vol. 25(3).

Wieczorek-Kosmala M., *Non-life insurance markets in CEE countries – part II: Polarisation and concentration*, "Journal of Economics and Management", 2016 vol. 26(4).

Witkowska J., *The life and non-life insurance market in the European Union*, "Olsztyn Economic Journal", 2023 vol. 18(2).

Rynek ubezpieczeń mienia w krajach Europy Środkowo-Wschodniej: wspólne trendy czy heterogeniczna grupa?

Ubezpieczenia mienia stanowią istotną część sektora ubezpieczeń innych niż na życie, odgrywając kluczową rolę w zapewnianiu bezpieczeństwa i stabilności finansowej osobom fizycznym i przedsiębiorstwom. Warto śledzić rozwój tej części sektora ubezpieczeń, zwłaszcza biorąc pod uwagę rosnącą liczbę ekstremalnych zjawisk pogodowych obserwowanych na całym świecie. Dotychczasowe badania europejskiego rynku ubezpieczeń innych niż na życie koncentrowały się głównie na przeglądzie państw członkowskich Unii Europejskiej i pomijały eksplorowanie wspólnych trendów. Stwarza to lukę badawczą w odniesieniu do krajów przechodzących transformację z Europy Środkowej i Wschodniej. Celem artykułu jest porównanie i ocena rozwoju rynku ubezpieczeń mienia w 16 krajach transformacji w latach 2009–2023. Metodyka badawcza obejmuje metody statystyki opisowej i wnioskowania statystycznego oraz modele danych panelowych. Dane uzyskano z bazy danych i raportów XPRIMM. Główne wyniki pozwalają stwierdzić, że pod kilkoma względami zaobserwowano zjawisko konwergencji

– *zmniejsza się stopień zróżnicowania wybranych miar rozwoju rynku. Dynamiki zmian nie można jednak opisać wspólnym trendem panelowym.*

Słowa kluczowe: ubezpieczenie mienia, kraje Europy Środkowo-Wschodniej, wskaźnik penetracji ubezpieczeń, wskaźnik gęstości ubezpieczeń, model trendu danych panelowych

DR ALEKSANDRA HĘĆKA-SADOWSKA – Assistant Professor, Department of Insurance, Poznań University of Economics and Business,
e-mail: aleksandra.hecka-sadowska@ue.poznan.pl,
ORCID: 0000-0002-7649-9528

DR DOROTA WIŚNIEWSKA – Assistant Professor, Department of Insurance, Poznań University of Economics and Business,
e-mail: dorota.wisniewska@ue.poznan.pl,
ORCID: 0000-0002-2584-9495