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Development of the Polish non-life insurance market and macroeconomic stabilization of the Polish economy in 2000-2020

Abstract

The paper presents the results of research on the relationship between the development of the Polish non-life insurance market and macroeconomic stability of the Polish economy in 2000-2020. The research was based on The Method of Zero Unitarization (construction of a synthetic indicator of the Polish non-life insurance market development), the Pentagon of Macroeconomic Stabilization and a cross-correlogram (study of the relationship between the two variables).

***Keywords*:** insurance market, macroeconomic stabilization

***JEL classification*:** E63, G22, P00

Paper type: Research paper

Introduction

The insurance market is influenced by many different factors, starting from economic, to demographic, to social and cultural. Many studies have shown that individual factors can affect the development of the insurance market in both positive and negative ways. Such

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a multiplicity and diversity of determinants can generate difficulties in identifying the quantities that have a leading influence on the development of this phenomenon. It is also not an easy task to choose or create appropriate indicators that can most accurately reflect the changes taking place in the insurance market. It should be noted, however, that in practice all determinants of insurance market development ultimately manifest themselves primarily in the form of increasing number of insurance products, their growing availability and increasing value of insurance premiums. Therefore, the process of measuring insurance development is based mainly on three measures: the value of gross written premiums, insurance density ratio and insurance penetration ratio. The second and third indicator, taking into account the relationship to GDP and the size of the population, are further based on the value of premiums, so it can be considered that these measures, due to their main component, are also not able to comprehensively reflect the changes taking place in the insurance market. Therefore in the research a synthetic indicator of development of Polish non-life insurance market was constructed, which in its construction, in addition to the above mentioned indicators, includes also other important phenomena for this market (number of companies and the associated indicator of market concentration). For this purpose The Method of Zero Unitarization was used.

It was decided to examine the created indicator in comparison with an important economic category, which is macroeconomic stabilization. Achieving it is a difficult task, because just like the insurance market, it is influenced by many factors dependent on each other. It often happens that the growth of one economic indicator generates negative trends in the case of another (for example, the relationship between economic growth and inflation). Therefore, it is problematic to find optimal relationships between factors determining this stability. This complexity also generates difficulties in precise definition of this phenomenon. Therefore, generalizing it can be said that macroeconomic stabilization can be identified with a positive economic situation in close relationship with the political and socio-demographic sphere. An important element is also the links of the economy in the international arena. Therefore, macroeconomic stabilization includes the internal and external balance state of the economy.

The analysis of macroeconomic stabilization was conducted using the Pentagon of Macroeconomic Stabilization. The relationship between changes in the synthetic indicator of the Polish non-life insurance market and changes in macroeconomic stabilization of the Polish economy in the analyzed period (2004-2020) was examined using a cross-correlogram.

The main aim of the research was to examine the relationship between the development of the Polish non-life insurance market

and changes taking place in the sphere of macroeconomic stabilization. According to the research aim, the research hypothesis was formulated: There are statistically significant relationships between changes in the Polish non-life insurance market and changes in the macroeconomic stabilization of the Polish economy.

1. Overview of research findings

1.1. Insurance market development and its measurement

Insurance development is a category characterized by great complexity. In the literature this process is usually considered in two aspects. It is seen as a key factor in the financial development of the economy and more broadly, as a determinant of long-term economic growth (Bednarczyk, 2011, p. 86).

The development of insurance is identified by J. Handschke, as various aspects of transformations occurring in this area (Handschke, 2009, pp. 56-69). T. H. Bednarczyk (2011, p. 86) is of the opinion that insurance development is a long-term process of "improvement of the insurance market, insurance institutions and instruments, aimed at increasing the volume of insurance transactions and improving their efficiency".

On the other hand, in the practical sphere, insurance development occurs primarily in the form of increasing number of insurance products, their growing availability and increasing value of insurance premiums. Therefore, the process of measuring insurance development is based primarily on three measures (Bednarczyk, 2011, pp. 86-87):

- the value of gross written premiums and the dynamics of their growth;
- insurance density ratio;
- insurance penetration rate.

It is accepted in the literature that the development of insurance markets is determined by many different factors. These usually include:

- economic;
- demographic
- social and cultural;
- structural.

A number of studies have shown that individual factors can affect the development of the insurance market in both positive and negative ways. Table 1 provides an overview of such factors.

Table 1. The economic and demographic factors shaping demand for insurance according to empirical studies

Variable	Effect	Example of research
Economic factors		
Disposable income	Positive	All research
Permanent income	Positive	Fortune (1972); Outreville (1980, 1985); Beck, Webb (2003); D. Li et al. (2007); Nguyen et al. (2010); Chien-Chiang Lee, Chiu (2012).
Inequality in income distribution	Ambiguous	Beenstock i inni (1986); Beck, Webb (2003); Nakata, Sawada (2007); Feyen i inni (2010); Wicka, Miedzik (2010)
Insurance price	Negative	Mantis, Farmer (1968); Fortune (1973); Babbel (1985); Outreville (1985); Outreville (1990); Browne i inni (2000); Esho i inni (2004); Ward, Zurbruegg (2000); Arena (2006); Wicka, Miedzik (2010).
Expected inflation rate	Negative	Neumann (1969); Browne, Kim (1993); Outreville (1996); Beck, Webb (2003); Li i inni (2007).
Real interest rates	Ambiguous	Outreville (1996); Beck, Webb (2003); Lim, Haberman (2003); Li i inni (2007); Sen (2008); Chen, Lee, Lee (2011).
Impact of the stock market	Ambiguous	Headen, Lee (1974); Lim, Haberman (2003); Chui, Kwok (2009); Chui, Kwok (2009); Avram i inni (2010); Chen, Lee, Lee (2011); Hamydova (2014).
Unemployment rate	Negative	Mantis,Farmer (1968); Outreville (1980); Beenstock i inni (1986); Lenten, Rulli (2006).
Pension funds	Positive	Davis, Hu (2004)
Demographic factors		
Population size	Positive	Mantis, Farmer (1968); Nakata, Sawada (2007); Feyen i inni (2011).
Number of family members (number of children)	Positive	Berekson (1972); Burnett and Palmer (1984); Ward, Zurbruegg (2002); Li et al. (2007); Kurdyś-Kujawska, Sompolska-Rzechuła (2019); Abdul-Fatawu et al. (2019).
Gender	Ambiguous	Sarkodie, Yusif (2015); Narradda Gamage et al. (2016); Kurdyś-Kujawska, Sompolska-Rzechuła (2019).
Urbanization	Positive (with exceptions)	Outreville (1996); Browne i inni (2000); Szablicki (2002); Beck, Webb (2003); Hwang, Gao (2003); Esho i inni (2004); Hwang, Greenford (2005); Sen (2008); Chen, Lee, Lee (2011); Park, Lemaire (2011).
Age structure	Ambiguous	Berekson (1972); Truett, Truett (1990); Browne i inni (2000); Chen i inni (2001), Nowotarska-Romaniak, Ogrodnik (2011); Feyen i inni (2013); Bugajski (2017).
Age dependency ratio	Ambiguous	Beenstock i inni (1986); Truett, Truett (1990); Browne, Kim (1993); Beck, Webb (2003); Li i inni (2007); Sen (2008); Chui, Kwok (2008 i 2009); Feyen i inni (2011); Cheng and Yu (2018); G. Li et al. (2020).
Life expectancy	Ambiguous	Beenstock i inni (1986); Browne, Kim (1993); Outreville (1996); Ward, Zurbruegg (2000); Beck, Webb (2003); Lim, Haberman (2003); Li i inni (2007); Sen (2008); Chui, Kwok (2009); Chen, Lee, Lee (2011); Feyen i inni (2011); Bugajski (2017).

Source: Own study based on Bednarczyk T. H. (2011). Ekonomiczne i instytucjonalne czynniki rozwoju ubezpieczeń, „Wiadomości Ubezpieczeniowe", No. 4, p. 86 and a literature review

Economic factors play a very important role in both life and non-life insurance. The demand for insurance has a very strong correlation with the savings rate and the amount of disposable income per capita. The development of insurance increases with the growth of the propensity to save and the amount of household income, assuming a relatively low level of inflation. This is because high inflation is a phenomenon that negatively affects long-term savings and therefore also the demand for insurance (especially life insurance, which also has a long-term nature) (Carmichael, Pomerleano, 2002, pp.78-81).

Empirical studies of individual economic factors have shown that the demand for insurance is more sensitive to income than to prices. The demand for insurance services manifests a relatively low price elasticity (Babbel, 1985, Skipper, Kwon, 2007, p. 522). Income elasticity of demand, on the other hand, is determined by the level of development of a country. It was found that the income elasticity of demand index manifests low values in the case of countries with low and very high GDP per capita. However, the average level of GDP per capita determines the occurrence of the elasticity index above 1 (Enz, 2000, pp. 396-406).

As in the case of economic factors, also non-economic factors can affect the development of insurance both positively and negatively. The stimulants of demand for insurance services include in the literature mainly the level of education, financial development, the degree of market openness, or the enforcement of property rights. Examples of these factors and destimulants are presented in Table 2.

Table 2. Social, cultural and structural factors shaping the demand for insurance according to empirical research

Variable	Effect	Example of research
Social and cultural factors		
Risk aversion	Ambiguous (toward positive)	Burnett, Palmer (1984); Browne, Kim (1993); Browne i inni (2000); Park i inni (2002); Esho i inni (2004); Chang, Berdiev (2013); Fier, Carson (2015); Kujawska, Sompolska-Rzechuła (2018).
Education	Positive	Hammond et al. (1967); Burnett and Palmer (1984); Truett, Truett (1990); Browne, Kim (1993); Ward, Zurbruegg (2002); Webb i inni (2002); Hwang, Gao (2003); Hwang, Greenford (2005); Li i inni (2007); Arena (2008); Han i inni (2010); Curak i inni (2009); Chen, Lee, Lee (2011); Feyen i inni (2011).
Religion (Islam)	Negative	Browne, Kim (1993); Outreville (1996); Webb i inni (2002); Ward, Zurbruegg (2002); Beck, Webb (2003); Chui, Kwok (2008 i 2009); Feyen i inni (2011); Park i Lemaire (2011).
Cultural factors	Ambiguous	Burnett, Palmer (1984); Park i inni (2002); Esho i inni (2004); Chui, Kwok (2008, 2009); Park, Lemaire (2011).

cd. Table 2.

Structural factors		
Financial development	Positive	Outreville (1990 i 1996); Ward, Zurbruegg (2002); Beck, Webb (2003); Li i inni (2007); Arena (2008); Sen (2008); Chui, Kwock (2008 i 2009); Avram i inni (2010); Chen, Lee, Lee (2011); Feyen i inni (2011).
Market monopolization	Negative	Outreville (1990 i 1996).
Foreign companies' presence	Ambiguous	Outreville (1990 i 1996); Browne i inni (2000); Li i inni (2007).
Market concentration	Negative	Outreville (1996); Feyen i inni (2011); Park, Lemaire (2011).
Degree of market opening	Positive	Arena (2008); Curak i inni (2009); Avram i inni (2010); Chen, Lee, Lee (2011).
Level of social security	Ambiguous	Beenstock i inni (1986); Browne, Kim (1993); Outreville (1996); Ward, Zurbruegg (2002); Hwang, Greenford (2005); Li i inni (2007); Chen, Lee, Lee (2011); Feyen i inni (2011).
Legal system	Ambiguous	Browne i inni (2000); Webb i inni (2002); Beck, Webb (2003); Esho i inni (2004); Park, Lemaire (2011).
Enforcement of the right ownership	Positive	Ward, Zurbruegg (2002); Esho i inni (2004); Nataka, Sawada (2007); Chui, Kwok (2008 i 2009); Avram i inni (2010); Feyen i inni (2011).
Political risk	Negative	Ward, Zurbruegg (2002); Webb i inni (2002); Beck, Webb (2003); C. P. Chang, Berdiev (2013).

Source: Own study based on Bednarczyk T. H. (2011). Ekonomiczne i instytucjonalne czynniki rozwoju ubezpie-czeń, „Wiadomości Ubezpieczeniowe", No. 4, p. 93 and a literature review

Based on the review of the literature, it can be noted that the development of insurance markets of individual countries is influenced by many different factors. These are economic and non-economic factors. Each of these categories is important, but their importance changes with the level of economic development. The higher the level of economic development, the insurance market development is less influenced by non-economic factors and more influenced by economic determinants. Therefore, the next part of the study characterizes the phenomenon of macroeconomic stabilization.

1.2. The essence of macroeconomic stabilization

Stability or macroeconomic stabilization is an ambiguous concept and therefore difficult to define precisely. In general, it is identified with a positive economic situation, which is closely correlated with political, social and demographic conditions of a given country. The international connections of the economy also play a very important role. This primarily refers to trade with foreign countries (Grynia, Marcinkiewicz, 2017, p. 43).

Macroeconomic stabilization is also called macroeconomic balance. It occurs in a given country when there is one internally related system of production function, demand function and supply function, both for all production factors and manufactured goods. The occurrence

of such a state of the economy is equivalent to the occurrence of internal and external equilibrium. It should be noted that this phenomenon is impossible to achieve in practice (Siek, 2015. p. 1).

The phenomenon of macroeconomic stabilization has been studied and understood in classical terms as a derivative of the four main goals of economic policy. These include achieving high economic growth, a stable price level, full employment and balance of payments equilibrium. These goals are called the "magic quadrilateral" (Kulbacki, 2021, p. 72).

The assumption presented above was extended by G.W. Kolodko (1993, pp. 48-49). According to him, macroeconomic stability is derived from six basic features that should characterize the economy. G.W. Kolodko included a high and stable rate of economic growth, a low unemployment rate, a low inflation rate, a balanced state budget and a balanced current account balance. To study macroeconomic stability in this way, the PSM model (Pentagon of Macroeconomic Stabilization) is used, which will be discussed in the next part of the paper.

2. Own research

2.1. Synthetic indicator of non-life insurance market development in Poland

The development process of the insurance market is a phenomenon determined by many different variables. Adopting only one of them, in order to represent this phenomenon, may be a significant simplification and prevent its comprehensive analysis. Therefore, it was decided to build a synthetic indicator of development of Polish non-life insurance market, consisting of the most important values, most often used in the literature to describe this issue. For this purpose The Method of Zero Unitarization was applied, which includes the following stages (Kowalik, 2011, pp. 204-210):

a) The selection of variables describing the studied phenomenon and their preliminary analysis.
b) Normalization of the values of diagnostic variables which are stimulants or destimulants (unification in order to make them comparable).
c) Choice of aggregation formula and determination of synthetic value on its basis.

Among the variables qualified[1] to build a synthetic indicator of the development of the Polish non-life insurance market, only one had a destimulant character - it was an indicator of market concentration. In the case of four indicators there was a positive dynamics of change

[1] Selection was based on a review of the literature

between the beginning and the end of the study period. Only changes in the number of insurance companies were negative. There was a decrease from 37 companies in 2004, to 32 in 2020 (-13,51%). Detailed data relating to this issue are presented in Table 3.

Table 3. Development indicators of the Polish non-life insurance market in 2004-2020

Year	Gross written premium [€m]	Density index [€]	Penetration index [%]	Market concentration index* [%]	Number of companies
2004	3 671,93	88	1,64	83,93	37
2005	4 072,80	93	1,44	76,73	37
2006	4 284,26	97	1,35	76,00	42
2007	5 093,36	108	1,31	74,07	36
2008	4 840,50	119	1,24	71,30	36
2009	5 130,71	124	1,49	75,00	34
2010	5 720,50	135	1,41	73,50	32
2011	5 565,72	147	1,47	68,43	43
2012	6 296,02	152	1,48	67,10	30
2013	6 241,48	153	1,48	67,10	30
2014	5 863,29	148	1,37	79,19	30
2015	5 921,81	150	1,32	78,00	32
2016	6 722,45	176	1,56	76,00	33
2017	8 406,03	208	1,69	77,00	33
2018	8 654,39	221	1,68	78,00	33
2019	8 992,23	229	1,64	81,00	33
2020	8 767,27	231	1,68	81,00	32
Δ 2004-2020	138,76	161,31	2,65	- 3,49	- 13,51

* Market share of the top 5 insurance companies
Source: Own study based on Insurance Europe and OECD

After normalizing the values of diagnostic variables and choosing the aggregation formula, the synthetic value (Market_development_index) was determined, the development of which in the studied period is shown in Figure 1.

Figure 1. Synthetic indicator of the Polish non-life insurance market development and its components in 2004-2020
Source: Own study using Grelt software

Based on the analysis of the built synthetic indicator of the development of the Polish non-life insurance market, it can be noted that in the period studied it is characterized by an upward trend (average annual dynamics of change reached 9%) and a significant decline falling in 2014. (-42,9%). Moreover, it is worth pointing out that there are many relationships between the presented indicators, both in relation to each other and in relation to the synthetic indicator of development of the Polish non-life insurance market. An example of such a correlation is the highest y/y decrease in the number of companies recorded in 2012 (-30.23%), which soon after (in 2014) contributed to the highest y/y increase in the market concentration ratio (18.02%). The cross-correlation between these indicators has the highest statistical significance coefficient for lags of 2 and -2. These changes may have generated the largest decreases in gross written premium and density ratio (-6.06% and -3.26% y/y, respectively) and the second largest for penetration ratio (-7.23% y/y) recorded in 2014. All these changes affected the market development and contributed, to the already mentioned, its temporary regression from 2014.

2.2. Pentagon of Macroeconomic Stabilization Pentagon (PSM) of Polish economy

On the basis of the selected method, observations were made of the changing over time of basic economic quantities, such as (Misala, 2011, p. 144):

— the growth rate of gross domestic product (ΔGDP) - a synthetic reflection of the economic development of a country and the level of living standards of its citizens and residents;
— the rate of registered unemployment (U) - a quantity measured as the ratio of the stock of labor able to take up work to the number of employed;
— inflation rate (CPI) - which is an indicator of internal balance, which is measured by the increase in prices of consumer goods;
— the ratio of the state budget balance to GDP (G);
— current account balance to GDP (CA).

The above-mentioned indicators were appropriately scaled and formed five vertices of the pentagon of macroeconomic stabilization. The better the development of the analyzed values, the further the points representing them are located from the center of the system, i.e. the center of the pentagon.

The following scales were adopted for individual macroeconomic quantities[2]:

— the growth rate of gross domestic product (ΔGDP) – od -25% do 10%;
— the rate of registered unemployment (U) – od 0% do 20%;
— inflation rate (CPI) – od 1% do 1000%;
— the ratio of the state budget balance to GDP (G) – od -16% do 4%;
— current account balance to GDP (CA) – od -10% do 4%.

The values (sides) of the pentagon are expressed in percent. On the side representing the level of inflation, a logarithmic scale was used (Figure 2).

[2] The scale has been kept in line with the original adopted by G. Kołodko.

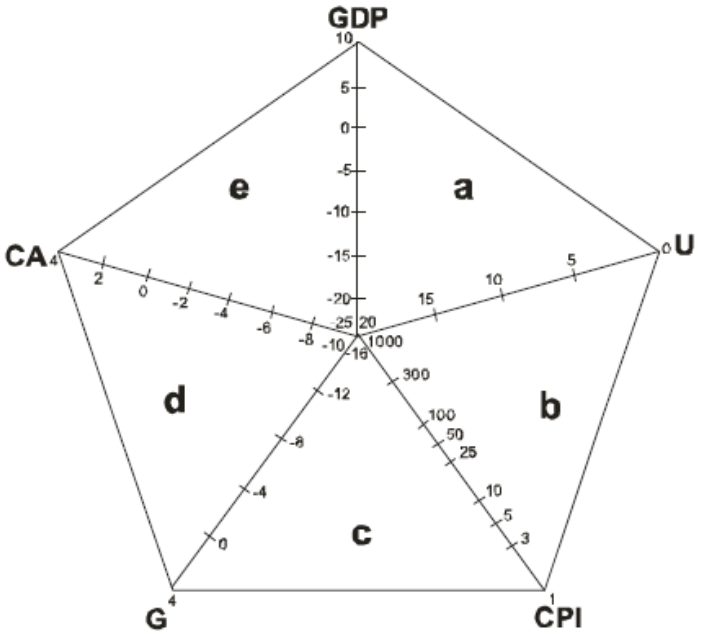


Figure 2. Macroeconomic Stabilization Pentagon
Source: Siek E. J. (2015). Pięciokąt stabilizacji makroekonomicznej. Materiały dydaktyczne, Katedra Biznesu i Finansów Międzynarodowych Uniwersytet Technologiczno-Humanistyczny im. K. Pułaskiego w Radomiu, Radom, s. 3.

If any of the analyzed macroeconomic quantities were smaller or larger than the marginal values on the scale, then those values (marginal values) were taken (Siek, 2015, p. 5).

The total area of the PSM is determined by the formula (Kołodko, 1993, p. 54):

$$\underbrace{(\Delta GDP \times U)}_{a} + \underbrace{(U \times CPI)}_{b} + \underbrace{(CPI \times G)}_{c} + \underbrace{(G \times CA)}_{d} + \underbrace{(CA \times \Delta GDP)}_{e} \times k$$

where the k-factor is defined as:

$$k = \frac{1}{2}\sin 72^{o}$$

Therefore, the factor has a constant value of 0.475. It is half of the sine of the angle located at the central vertex of each triangle of the pentagon. This angle is 72°, which is a fifth of a full angle. The larger the area of the PSM, the more positive the macroeconomic stabilization situation. In the optimal case, the area of the pentagon is 1, and the area of each of its five triangles (a, b, c, d, e) is equal to 0.2.

The total area of the PSM is the sum of five triangles. These include triangle "a" (real sphere triangle), triangle "b" (stagflation triangle), triangle "c" (budget and inflation triangle), triangle "d" (financial balance triangle) and triangle "e" (external sector triangle). The pentagon model of macroeconomic stabilization also allows us to distinguish a field (indicators) of macroeconomic stabilization that depends primarily on internal and external factors. In the first case it is PSM1 consisting of triangles a, b and c. In the second, PSM2 which is the sum of the areas of triangles d and e. Table 4 presents the PSM sub-indices for Poland in 2004-2020.

Table 4. The PSM sub-indices for Poland in 2004-2020

Rok	a	b	c	PSM1	d	e	PSM2	PSM	PSM1/ PSM	PSM2/ PSM
2004	0,008	0,007	0,094	0,109	0,037	0,055	0,092	0,201	54,16 %	45,84 %
2005	0,017	0,019	0,116	0,152	0,069	0,086	0,155	0,307	49,44 %	50,56 %
2006	0,054	0,059	0,131	0,244	0,058	0,076	0,135	0,379	64,43 %	35,57 %
2007	0,095	0,090	0,126	0,311	0,039	0,048	0,087	0,398	78,13 %	21,87 %
2008	0,107	0,102	0,112	0,321	0,033	0,039	0,072	0,394	81,59 %	18,41 %
2009	0,094	0,095	0,114	0,303	0,061	0,068	0,129	0,432	70,15 %	29,85 %
2010	0,084	0,089	0,111	0,284	0,042	0,054	0,096	0,380	74,72 %	25,28 %
2011	0,088	0,083	0,115	0,286	0,049	0,059	0,108	0,394	72,61 %	27,39 %
2012	0,075	0,080	0,114	0,270	0,064	0,068	0,132	0,402	67,17 %	32,83 %
2013	0,073	0,100	0,139	0,312	0,084	0,094	0,177	0,489	63,77 %	36,23 %
2014	0,089	0,146	0,191	0,426	0,081	0,091	0,172	0,598	71,26 %	28,74 %
2015	0,103	0,131	0,143	0,377	0,091	0,110	0,202	0,579	65,15 %	34,85 %
2016	0,111	0,170	0,166	0,447	0,092	0,109	0,200	0,648	69,04 %	30,96 %
2017	0,129	0,141	0,137	0,406	0,107	0,124	0,231	0,638	63,71 %	36,29 %
2018	0,138	0,157	0,151	0,446	0,100	0,110	0,210	0,656	67,97 %	32,03 %
2019	0,142	0,149	0,136	0,427	0,115	0,127	0,242	0,669	63,86 %	36,14 %
2020	0,108	0,136	0,072	0,317	0,082	0,118	0,200	0,517	61,25 %	38,75 %

Source: Own study based on Eurostat, World Bank and OECD

On the basis of the calculations carried out it can be noted that the macroeconomic stabilization of Poland, considered as an appropriate configuration of economic indicators corresponding to the conditions of economic growth, increases over time. This is evidenced by the increasing area of the pentagon of macroeconomic stability over the years. The y/y declines were recorded only in 2008. (-0,98%),

2010 r. (-12,3%), 2015 r. (-3,4%), 2017 r. (-1.48%) and the largest in 2020. (-22,75%). Despite these few decreases, the overall trend is upward. Which can be observed in Figure 3.

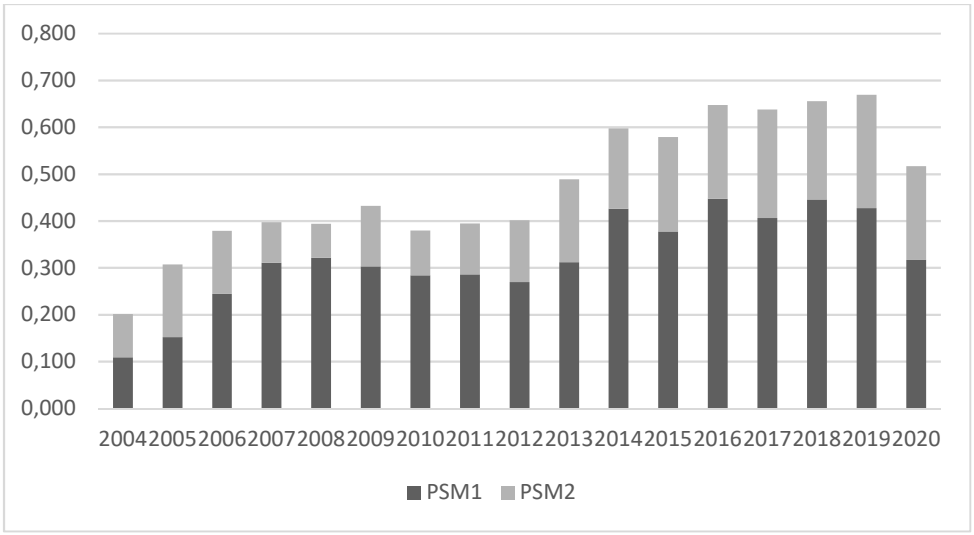


Figure 3. Evolution of the PSM index in Poland in 2004-2020
Source: Own study based on Eurostat, World Bank and OECD

There is also a noticeable advantage of PSM1 over PSM2 in the share of the total PSM index. At the beginning of the analysed period (the first two years) these proportions were similar. Then, internal conditions played a much greater role in shaping the macroeconomic stability of the Polish economy.

It should be pointed out that the most optimal form of the PSM for Poland (from the theoretical point of view) would be a sufficiently high rate of economic growth while maintaining full use of production resources and maintaining internal and external balance. Then, drawing a graph on the PSM, one would move around the edges of its vertices, and the maximum value of the index would be 1. The Polish economy came closest to this in 2016, when the PSM was 0,669.

2.2. Relationship between the development of the non-life insurance market in Poland and macroeconomic stabilization of the Polish economy

The study showed that in the analyzed period there are significant statistical relationships between the changes in the constructed synthetic indicator of the development of the Polish non-life insurance market, and the development of indicators PSM, PSM1 and PSM2, describing

macroeconomic stabilization of the Polish economy. The strength of this correlation (tested by Pearson correlation coefficient) can be described as being on the border of medium and high[3]. Table 5 shows the values of correlation between changes in the synthetic indicator of development of Polish non-life insurance market, and the delay of changes in indicators of macroeconomic stabilization of the Polish economy.

Table 5. Correlogram between market_dev changes and delay of PSM, PSM1 and PSM2 changes

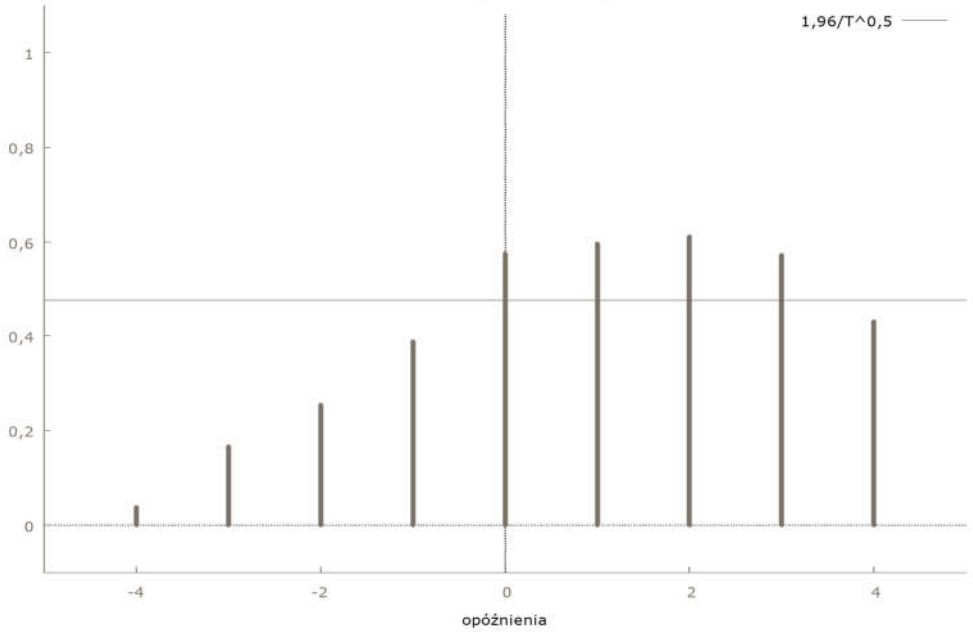
Delays	PSM	PSM1	PSM2
-4	0,0381	-0,0467	0,1816
-3	0,1661	0,0624	0,3125
-2	0,2543	0,1175	0,4393 *
-1	0,3880	0,2993	0,4542 *
0	0,5759 **	0,4876 **	**0,5961 ** **
1	0,5966 **	0,5646 **	0,5106 **
2	**0,6121 ** **	**0,6194 ** **	0,4517 *
3	0,5727 **	0,6108 **	0,3664
4	0,4301 *	0,4617 *	0,2697

* - significance level of 10% , ** - significance level of 5%, *** - significance level of 1%
Bold - the highest value of the correlation index
Source: Own study

The examined correlation relationships are characterized by greater statistical significance in the case of delays of PSM and PSM1, than in period 0. This indicates that the non-life insurance market reacted with a delay to changes occurring in macroeconomic stability, including internal conditions represented by PSM1. Synthetic market_dev indicator also reacted with a delay with high statistical significance to changes occurring in the case of PSM2, but the highest value of correlation was recorded in the period 0. On this basis it can be concluded that the Polish non-life insurance market reacted faster to external factors than to domestic conditions. This phenomenon is illustrated in Figure 4.

[3] Assessed by comparing different scales that describe the strength of correlation between two variables

K Correlogram between Market_development_index changes and delays of PSM changes



Correlogram between Market_development_index changes and delays of PSM1 changes

delays

Correlogram between Market_development_index changes and delays of PSM1 changes

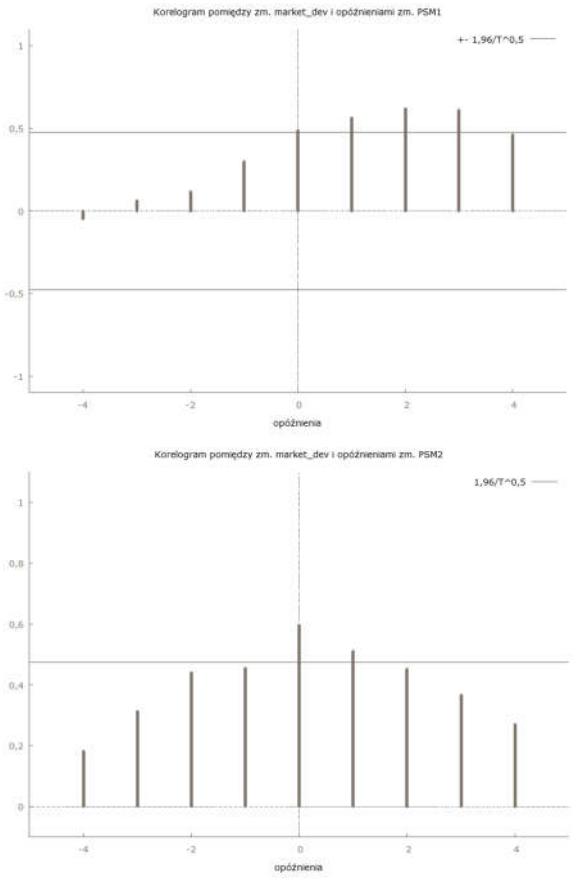


Figure 4. Correlograms between market_dev changes and delays of PSM, PSM1 and PSM2 changes
Source: Own study using Grelt software

Conclusions

The development of insurance market, including non-life insurance market, is characterized by great complexity. This phenomenon can be seen as a series of transformations occurring in this area, conditioned by many different factors. Particular factors may affect the development of insurance market in both positive and negative ways. In the case of non-life insurance, economic factors play a very important role. Their importance increases with the level of economic development. In turn, the conditions for economic development (or economic growth) should be accompanied by an appropriate configuration of economic indicators, which is called macroeconomic stabilization. These indicators directly and indirectly affect the development of the insurance market. The study analyzed the correlation between these categories. However, the changes in time of constructed

synthetic index describing the development of Polish no-life insurance market and PSM index used to analyze macroeconomic stabilization were assessed separately.

Based on the analysis of the synthetic indicator of development of the Polish non-life insurance market it was found that in the period studied it is characterized by a growing trend. Average annual dynamics of changes amounted to nearly 9%. However, the change between the beginning and the end of the period is almost 130%. The growth is also characterized by macroeconomic stabilization of the Polish economy. The PSM indicator increased in the examined period by 157%. Internal balance (PSM1) increased by 190%, while external balance (PSM2) by 117%. The average annual dynamics of change in PSM exceeded 7%, which is similar to the case of a synthetic indicator of development of the Polish non-life insurance market.

After examining the relationship between the two variables it was shown that in the analyzed period there are statistically significant relationships between them. The strength of correlation between changes in the constructed synthetic indicator of the development of the Polish non-life insurance market, and the development of indicators PSM, PSM1 and PSM2 (describing macroeconomic stability of the Polish economy) was assessed as medium to high. The examined correlation relationships show that the Polish non-life insurance market reacted faster to external factors than to domestic conditions. Changes in the insurance market as a result of changes in stabilization determined by internal factors were most visible after two years.

The main aim of the research was to examine the relationship between the development of the Polish non-life insurance market and changes taking place in the sphere of macroeconomic stabilization. According to the research aim, the research hypothesis was formulated: There are statistically significant relationships between changes in the Polish non-life insurance market and changes in the macroeconomic stability of the Polish economy.

On the basis of the research it can be said and the goal has been realized and the hypothesis has been verified positively.

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