Financial Stability of the Czech Insurance Companies[1]

*Lenka PŘEČKOVÁ – Iveta PALEČKOVÁ**

Abstract

Financial stability has become an important topic, especially in recent years. However, there is no consistent approach for measuring the financial stability of insurance companies. The aim of this paper is to construct the summarized financial stability index for the insurance companies and applied this index on the Czech insurance companies. We construct and applied the financial stability index separately for insurance companies that predominantly provide life insurance and non-life insurance. The financial stability index focuses on five areas. The results show that insurance companies specialised in a particular non-life insurance product are more financially stable. The research suggests that the evolution of insurance companies has been influenced by organisational changes and economic changes. During the period 2004 – 2019, the examined insurance companies did not show any problems in terms of financial stability.

Introduction

Financial stability (FS) has become a very important topic and has been the focus of attention of researchers and especially of central banks and supervisory institutions. Financial stability is a pillar for the proper functioning of financial

* Lenka PŘEČKOVÁ – Iveta PALEČKOVÁ, corresponding author, Silesian University in Opava, School of Business Administration in Karviná, Department of Finance and Accounting, Univerzitní náměstí 1934/3, 733 40 Karviná, Czech Republic; e-mail: preckova@opf.slu.cz; paleckova@opf.slu.cz

markets. Financial stability and its analysis have become one of the key tasks not only for the Czech National Bank (CNB) but also for a number of national and international institutions in recent years. Uncovering vulnerabilities in the financial sector and their links to developments in financial markets and economic developments in general can contribute to reducing the resulting risks and, ultimately, to making the financial system more resilient to shocks (CNB, 2020). Financial stability is one of the main objectives of the CNB's activities under Act No. 6/1993 Coll., on the Czech National Bank. Act No. 277/2009 Coll., on the insurance sector. It refers to the scope of supervision in the insurance sector and emphasizes the protection of policyholders, insured persons, and beneficiaries with regard to maintaining the financial stability of insurance companies. It also emphasises that the maintenance of the financial stability of insurance undertakings shall be considered in the supervision of the insurance sector in the interests of policyholders, insured persons and beneficiaries (Act No. 277/2009 Coll.).

Insurance companies are very important for the stability of financial systems, especially because they are large investors in financial markets, there are growing links between insurance companies and banks, and because insurance companies ensure the financial stability of households and firms by insuring their risks (ECB, 2009). The insurance industry is of considerable importance to the economy because households and firms can shift their risks to insurance companies meaning projects that could not be otherwise undertaken can be carried out, which ultimately contributes to economic growth. Like banks, insurance companies mobilise savings from households and firms and invest part of them in the non-financial sectors of the economy. Examining the financial stability of insurance companies has become increasingly important over the years, especially after the 2008 financial crisis. Examining the financial stability of individual insurance companies is important precisely because this sector contributes to the overall financial stability of the financial system.

The financial stability of an insurance company can be assessed by evaluating its financial health. Therefore, financial analysis tools can be used. Among the important and widely used methods for assessing financial health are ratio indicators. For insurance business, these ratios need to be modified to reflect the specifics of the insurance business. The first and key specificity is the difference between the life and non-life insurance business.

The methods of financial analysis for insurance activity are not sufficiently developed. There is a lack of a comprehensive overview of methods and the procedure of application in insurance companies. It is not possible to familiarise one-self with their recommended values. Studies dealing with financial stability issues tend to focus on the search for macroeconomic factors affecting the performance

of the insurance market or individual insurance companies. The insurance sector, as already mentioned, is specific due to the insurance business. Research projects, publications, and other works focusing on the insurance sector are sporadic and insufficient.

The insurance market does not only include insurance companies that underwrite life or non-life insurance, but also insurance companies that underwrite both life and non-life insurance. As recommended by some authors (Zweifel and Eisen, 2012; Ducháčková, 2015; Gestel et al., 2007; Korobczuk, 2007; Pulchart, 2002; Vávrová, 2014), it is necessary to evaluate life and non-life insurance differently in order to conduct the financial analysis properly. The research focuses on the overall stability of an insurance company, therefore, only insurance companies that underwrite merely non-life insurance and for which non-life insurance exceeds life insurance (i.e. non-life insurance premiums written) are included in the research. For these insurance companies, as reported in Vávrová (2014) and Korobczuk (2007), the ratios specified in the second section of the paper can be used.

The aim of the paper is to construct the summarized financial stability index for the insurance companies and applied this index on the Czech insurance companies. As an example, for application of this index were used the Czech insurance companies. The Czech financial market is bank-based and insurance companies play an important role in economy. Several of the Czech insurance companies belongs to the financial conglomeration. Therefore, this summary financial stability index could be used for general assessment of the insurance companies. The financial stability index (index FS) consists of selected ratios used in the assessment of the financial health of insurance companies. The financial stability index shall be constructed and applied separately to insurance companies that predominantly provide life insurance and consequently non-life insurance. This is due to the use of different ratios in the constructed aggregate financial stability index. Therefore, in this paper, the financial stability index shall be constructed separately for insurance undertakings with predominantly life and non-life insurance business. The financial stability of life and non-life business are analysed separately because they differ from each other, mostly in terms of individual indices, especially in costs and technical reserves. As Hodula et al. (2021) mentioned, it is better to analyse both life and non-life insurance rather than focusing on only one of them, given that insurance companies operate in the whole insurance market. While the analysis is performed separately for life and non-life, the model specifications are similar.

In line with the aim of the paper, three research questions were set. Which insurance companies exhibit the highest financial stability? Did economic changes in society and changes in the shareholder structure of insurance companies have

an impact on the financial stability of selected insurance companies in the Czech Republic? Is it possible to monitor the difference in the financial stability of specialized non-life insurance companies compared to other insurance companies without specialization?

The assessment is conducted for the period 2004 – 2019. During this period, insurance companies underwent various changes and events that may have affected the financial stability of insurance companies, as also reported in the CNB (2020). These include, for example, purchases of insurance portfolios by other insurance companies and insurance companies changing their names due to changes in ownership. The financial stability of insurance companies has also been affected by large-scale extraordinary natural disasters that occurred in 2007, 2008, 2009, 2010 and 2013 (CAIC, 2020). The extent of extraordinary natural disaster losses is reported by CAIC (2020). The financial stability was also affected by the fact that the Czech Republic became a member of the European Union (EU), but also by the economic situation in 2008 and a change in legislation in 2017.

The paper contributes to the empirical literature in several ways. Firstly, an aggregate index is proposed to measure the financial stability of insurance companies. Secondly, the paper contributes to the limited research on the financial stability of commercial insurance companies. In addition, it assesses the stability of individual commercial insurance companies, and financial health is measured using an aggregate index that can be used for comparisons across insurance companies as well as overtime.

The paper is structured as follows. The next section presents the theoretical background and a brief review of empirical studies related to the topic under investigation. The third section describes the variables used in the research and their expected impact on the financial health of insurance companies. The empirical framework and empirical results are presented in the fourth section. The final section provides a summary and conclusion.

1. Theoretical Background

The insurance sector has traditionally been considered a relatively stable segment of the financial system. This is mainly because the balance sheets of most insurance companies are composed of relatively illiquid liabilities, which protect insurance companies from the risk of rapid liquidity shortages. Insurers are not generally seen to be a significant potential source of systemic risk. One of the main reasons for this view is that insurers are not interlinked to the same extent as banks are, for instance, in interbank markets and payment systems.

However, the insurance sector can be a source of financial system vulnerability and insurer failure. In addition, the traditional view that insurance companies pose a limited systemic risk can be challenged, as this statement does not consider the fact that the interaction between insurance companies, financial markets, banks, and other financial intermediaries has grown in the past and still continues to grow. From the perspective of financial stability, this interaction now plays a very important role. It is important to note that insurance companies, given their risk mitigation role and their often-long-term investment horizons, also support financial stability (ECB, 2009). Moreover, the relationship between insurance sector behaviour and systemic risk is less direct than in the case of the banking sector. Due to their very long-term liabilities, life insurers are less sensitive to short-term fluctuations in market prices and thus less vulnerable to temporary liquidity crises. The insurance sector can also act as a countercyclical force in the financial system, absorbing short- to medium-term shocks to some extent. However, under certain conditions, it can contribute to an increase in systemic risk.

The fundamental difference between the insurance and banking sector lies in the structure of the balance sheet. In general, the average maturity of liabilities in the case of insurance companies is longer than the maturity of their assets, which makes them much less vulnerable to customers. In addition, insurance companies are not as strongly linked through the interbank market and payment systems as banks. They do not participate directly in payment systems, nor are they the main transmission channel for monetary policy.

Financial stability is not easy to define, as evidenced by the lack of a widely accepted definition. According to the available empirical literature, financial stability can be defined as a situation where the financial system can withstand shocks without processes that distort the allocation of savings and investment and payments in the economy. As Trichet (2005) showed, this definition indicates that in the presence of instability, the financial system is unable to perform its fundamental role – to provide the financing needed to support real economic processes.

In the empirical literature, several studies investigated the financial stability of Czech insurance companies. E.g., Rybyšarová and Lelek (2009) assessed the financial stability of the Czech insurance industry, although the financial stability was measured using several indicators. The authors found that the Czech insurance market was strongly financially stable in 2005 – 2006. The authors concluded that the problem for insurance companies was the enormous amount of external capital, meaning that many insurance companies had a poor capital ratio. Furthermore, Dvořák et al. (2016) argued that the Czech insurance companies are not a significant source of systemic risk in the Czech Republic because they focus on

traditional insurance products, limit the mismatch between the duality of their assets and insurance liabilities, and have a conservative composition of their investment portfolios. Ziemele and Voronova (2013) evaluated Solvency II as a tool to achieve financial stability in the insurance industry in selected EU countries and found that Solvency II, when implemented, reveals the true financial health of insurance companies and improves transparency and trust in the industry.

To measure financial stability, the authors used several methods. In general, financial stability is assessed by using several indicators of the financial health of insurance companies. Rybyšarová and Lelek (2009), for instance, used solvency and return on equity, which are indicators that are generally accepted as indicators of the financial stability of insurance companies and are included in the Solvency II study conducted by the European Commission. Joo (2013) measured financial stability using solvency for non-life insurance companies. Some authors have used Z-scores to measure financial stability, e.g. Pavić Kramarić et al. (2019) used this indicator to assess the financial stability of selected Central and Eastern European countries. The authors found that each of the analysed insurance markets revealed its characteristics and provided factors that influenced financial stability. Also, Al-Dalaien and Alhroob (2017) used Z-score to assess the financial performance of insurance companies.

Most of the studies regarding the development of a summary indicator of financial stability focus on the development of a summary indicator for the banking sector, which is the most important part of the financial system in terms of financial stability. For example, Geršl and Heřmánek (2008) constructed an aggregate financial stability index for the Czech banking sector. As mentioned above, however, insurance companies also play an important role in the stability of the financial system. To the authors' knowledge, there is no study that measures the stability of insurance companies in the Czech market using an aggregate index.

Few of the studies mentioned above deal with the financial stability of Czech insurance companies. Although the financial stability of the entire financial system is examined by the CNB, it does not deal with the financial stability of individual financial institutions. Therefore, the paper focuses on the financial stability of individual commercial insurance companies, with financial stability measured using a summary financial stability index.

2. Methodology and Data

The dataset in this paper consists of 31 commercial insurance companies operating in the Czech market and covers the period 2004 – 2019. The insurance companies are divided into two groups. There are 20 insurers with a predominance

of non-life insurance, which are listed, including the market share and the ratio of non-life insurance (average values for the period under study, or the period of operation in the period under study) in Table 1; and 11 insurance companies with a predominance of life insurance, which are listed in Table 2. Data from the statistics of the Czech Association of Insurance Companies (CAIC) are used for the calculations. For insurance companies that were not members of the CAIC, data from the annual reports of insurance companies are used. All data are reported on an unconsolidated basis.

In the period 2004 – 2019, some insurance companies ceased operations or were acquired by another insurance company or started operating in the Czech insurance market after 2004. These facts are also reflected in the selection of insurance companies. Due to the homogeneity of the data, the following insurance companies are not included in the survey. The insurance company Exportní garanční a pojišťovací společnost, a.s., which is a credit insurance company focusing on non-marketable political and commercial risks associated with the financing of exports of goods, services, and investments from the Czech Republic and is owned by the state, is not included. Due to the unavailability of annual reports and therefore data, the insurance companies Chartis Europe S.A., AIG EUROPE, S.A., and Triglav pojišťovna, a.s. are not included in the research.

T a b l e 1

Insurance Companies with a Predominance of Non-life Insurance in Czechia in the Period 2004 – 2019

	Name of insurance companies	Abbreviation of insurance company	Market share (%)	Non-life insurance share (%)
1.	Allianz pojišťovna, a.s.	ALLIANZ	8.06	72.48
2.	AXA pojišťovna a.s.	AXA	0.79	100.00
3.	BNP Paribas Cardif pojišťovna, a.s.	CARDIF	1.33	86.13
4.	Colonnade Insurance S.A., organizační složka	COLONNADE	0.40	100.00
5.	Česká pojišťovna ZDRAVÍ a.s.	CP ZDRAVÍ	0.27	100.00
6.	Česká podnikatelská pojišťovna, a.s., Vienna Insurance Group	CPP	4.75	73.91
7.	D.A.S. Rechtsschutz AG, pob. pro ČR	DAS	0.20	100.00
8.	Direct pojišťovna, a.s.	DIRECT	0.51	100.00
9.	ERV Evropská pojišťovna, a.s.	ERV	0.24	100.00
10.	Generali Česká pojišťovna a.s.	GCP	26.11	66.23
11.	HALALI, všeobecná pojišťovna a.s.	HALALI	0.01	100.00
12.	HDI Versicherung AG, organ. složka	HDI	0.23	100.00
13.	Hasičská vzájemná pojišťovna, a.s.	HVP	0.34	97.93
14.	Kooperativa pojišťovna, a.s.	KOOP	22.08	73.26
15.	MAXIMA pojišťovna, a.s.	MAXIMA	0.19	93.74
16.	Pojišťovna Patricie a.s.	PATRICIE	5.74	67.32
17.	Pojišťovna VZP, a.s.	PVZP	0.31	100.00
18.	Slavia pojišťovna a.s.	SLAVIA	0.35	100.00
19.	UNIQA pojišťovna, a.s.	UNIQA	3.60	77.34
20.	Wüstenrot pojišťovna a.s.	WUST	0.29	100.00

Source: Annual reports of insurance companies and CAIC's statistics; authors' calculations.

T a b l e 2

Insurance Companies with a Predominance of Life Insurance in Czechia in the Period 2004 – 2019

Name of insurance companies		Abbreviation of insurance company	Market share (%)	Life insurance share (%)
1.	AEGON pojišťovna, a.s.	AEGON	0.75	100.00
2.	Aviva životní pojišťovna, a.s.	AVIVA	0.63	100.00
3.	AXA životní pojišťovna a.s.	AXA ZP	1.74	91.46
4.	Basler pojišťovna, pobočka pro ČR	BASLER	0.04	100.00
5.	ČSOB pojišťovna, a. s.	CSOB	7.38	56.71
6.	ERGO pojišťovna a.s.	ERGO	0.27	60.28
7.	Komerční pojišťovna, a.s.	KP	3.94	93.01
8.	MetLife Europe d.a.c., pobočka pro ČR	METLIFE	1.70	91.08
9.	NN Životní pojišťovna N.V., pob. pro ČR	NN	3.99	100.00
10.	Pojišťovna České spořitelny, a.s	PCS	5.44	94.07
11.	Wüstenrot, životní pojišťovna, a.s.	WUST ZP	0.20	100.00

Source: Annual reports of insurance companies and CAIC's statistics; authors' calculations.

In order to be able to create and calculate the financial stability index of insurance companies, it is necessary to calculate ratios for insurance companies with a predominance of non-life insurance and insurance companies with a predominance of life insurance.

The following ratios were calculated for insurance companies with a predominance of non-life insurance. The Combined Ratio (COR) was calculated for cost evaluation. COR is the sum of Expense Ratio (ER) and Claims Ratio (CR). The Solvency Ratio (SR) was calculated for solvency evaluation. The technical provisions of insurance companies are assessed using three indicators. There are Reserve Ratio (RR), Technical Coverage Ratio (TCR), and Insurance Financial Leverage (IFC). The liquidity area was evaluated using indicators Liquidity Ratio (LR). There are two indicators for profitability assessment: Return on Assets (ROA) and UPA indicator, which used the result (balance) of a technical account for calculation. (Ducháčková, 2015; Gestel et al., 2007; Korobczuk, 2007; Kozak, 2011; Majtánová et al., 2006; Pulchart, 2002; Vávrová, 2014).

The following ratios were calculated for insurance companies with a predominance of life insurance. Claims Ratio (CR) was calculated for cost evaluation. The Solvency Ratio (SR) was calculated for solvency evaluation. The technical provisions of insurance companies are assessed using Insurance Financial Leverage (IFC). The liquidity area was evaluated using indicators Liquidity Ratio (LR). There are two indicators for profitability assessment: Return on Assets (ROA) and UPA indicator, which used the result (balance) of a technical account for calculation (IMF, 2005).

Using data from available CAIC statistics or annual reports of insurance companies, ratio indicators and corresponding sub-indexes (costs, solvency, technical

provisions, liquidity, and profitability) are calculated. Using sub-indexes, the resulting summary FS index is calculated for each insurance company and each year of the selected period 2004 – 2019. Subsequently, the average values of summary FS indexes for individual insurance companies are calculated. Then the trend of development is assessed. Subsequently, the average values of FS indices for individual insurance companies are calculated. The calculation shall be performed separately for the group of insurance companies with a predominance of non-life insurance and separately for the group with a predominance of life insurance. Then the development trend is assessed. Insurance companies are compared according to the average values of the summary FS index. Insurance companies with the highest financial stability are searched for in the group of insurance companies with a predominance of non-life insurance and in the group with a predominance of life insurance. In the evaluation of financial stability, economic changes, changes in legislation, and changes in the shareholder structure of insurance companies are considered. Attention in the evaluation is also specially focused on insurance companies specializing in a certain non-life insurance product.

2.1. Construction of the Summary Financial Stability Measures

A relatively simple summary financial stability index of financial institutions can be constructed as a weighted average of sub-indicators of the financial health of a financial institution (Geršl and Heřmánek, 2008). The construction of the aggregate FS index follows the OECD (2008) method. The procedure for constructing the index is as follows. The proposed aggregate index considers five areas for assessing the financial stability of insurance companies. These are profitability, liquidity, costs, technical provisions, and solvency. The individual indicators in each area are briefly described above. The selection of indicators in each area of assessing the financial stability of insurance companies is based on Kwon and Wolfrom (2016) and IMF (2005), who defined financial health indicators for insurance companies, where the indicators are divided into categories that are appropriate for life and non-life insurance companies. Variables were chosen based on their reliability, measurability, and data availability.

The researchers used different methods to determine the weights for the variables included in the index. However, Van den End (2006) shows that there is very little difference between the same weights and the weights determined by econometric analysis. We use the different weights method across indicators to highlight the importance of these areas for the stability of the insurance companies (Table 3). The index emphasises the importance of solvency and liquidity and then profitability by assigning higher weights to these two areas in the case

of life and non-life insurance. These proposal weights are supposed by Komárková and Kučera (2021) or Rybyšarová and Lelek (2009). Therefore, in order to aggregate the variables into a single index, each indicator is first normalized. That is, before aggregation, individual indicators are normalized to achieve equal variance and to allow comparability across variables (Morris, 2010). Several methods of normalization can be used; we use the empirical normalization method. According to this method, indicator values range between 0 and 1, where a value of 0 represents the lowest (worst) indicator value, while a value of 1 represents the highest (best) indicator value. The formula used for normalisation is as follows:

$$I_{it}^n = \frac{I_{it} - Min(I_i)}{Max(I_i) - Min(I_i)}$$

where I_{it}^n represents the normalised indicator at time t; I_{it} is the value of indicator i at time t; $Min(I_i)$ a $Max(I_i)$ are the minimum and maximum values of the indicator over the analysed period.

Prior to the final aggregation, the data underwent a process of normalisation and weighting to ensure that the values of the averages are equal and that the evolution of the indicators has the same impact on the index. Thus, for the COR indicator, the value of the indicator was subtracted from the value of 1 to ensure that the lowest value was the best. For each of the technical provisions values, the results were adjusted to match the recommended values, i.e. RR should be less than 100 – 150%, TCR greater than 150% and IFC less than 350%, i.e. 1.5 was subtracted from the decimal value and 3.5 was subtracted from the actual value of the insurance company. For liquidity, the value of the insurer has been subtracted from 1. The ROA and UPA values have been retained in decimal to reflect the fact that the highest value is the best value for financial stability. Moreover, for insurance companies with predominated life insurance, for the ER indicator, the value of the indicator was subtracted from the value of 1 to ensure that the lowest value was the best.

The average values in the areas of cost, technical provisions, and profitability, where there are multiple indicators for a given area, are first averaged using the equal-weight variance method, which is the most common and most widely used method in the empirical literature. The summary financial stability index is constructed as a weighted sum of the selected indicators. Finally, the aggregate financial stability index is calculated for each insurance company for each year. The main categories of the index, their weights, the selected indicators, and their expected impact on the financial stability index are presented in Table 3.

T a b l e 3
Determination of the Summary Index of Financial Stability

Area	Weight (%)	Variables	Life insurance	Non-life insurance	Expected impact on the financial stability
Costs	17	ER	x		−
		COR		x	−
Technical reserves	17	RR		x	+
		TCR		x	+
		IFC	x	x	+
Solvency	24	SR	x	x	+
Liquidity	24	LR	x	x	−
Profitability	18	ROA	x	x	+
		UPA	x	x	+

Source: Authors' calculation.

3. Empirical Analysis and Results

We demonstrate the application of the financial stability index on the Czech insurance companies, therefore we presents the results of the individual insurance companies to show the comparison of the financial stability. For selected insurance companies (see Tables 1 and 2), the average summary FS indices for the period 2004 – 2019 are calculated and the ranking is evaluated according to their amount. The assessment is performed separately for non-life insurance companies and separately for life insurance companies. The average values and development trends (increase ↑ or decrease ↓) are provided in Tables 4 and 5. Highlighted insurance companies are companies with the highest index and are therefore rated the best in financial stability. The overall results of financial stability for the period 2004 – 2019 are presented in Appendix No. 1 and 2.

3.1. Evaluation Insurance Companies with a Predominance of Non-life Insurance in Czechia in the Period 2004 – 2019

The insurance companies with the highest summary FS index include HALALI, ČP ZDRAVÍ, HDI, MAXIMA, CARDIF, PVZP, ERV, and DAS. All insurance companies are insurance companies specializing in a particular insurance product. A brief description of specialized insurance companies is given below.

The insurance company HALALI has been active on the insurance market since 1993. Primarily, the insurance company was founded to insure activities in the exercise of hunting law, insuring especially members of the Czech-Moravian Hunting Union, z. s. Since 2010, the majority owner has been the Czech Hunting Union, o.s. (53.30%).

CP ZDRAVI specializes in private health and sickness insurance and has been active in the insurance market since 1993. Until the end of 2018, it was a wholly-owned subsidiary of GCP. In 2019, GCP acquired the whole insurance portfolio. The insurance company HDI has been operating in the Czech market since 1993. Until 2006, it operated as Gerling general insurance joint-stock company. HDI belongs to the holding HDI Gerling International Holding AG Hannover, which is under the umbrella of the Talanx AG Hannover group. HDI specialises in industrial risks and prepares tailor-made insurance products for industrial companies.

MAXIMA has been active in the insurance market since 1994. Since 2015, its majority shareholder has been Mella Holdings B.V. (Netherlands). This year MAXIMA has started to focus more on products for strategic partners such as Air Bank and O2. It focuses on health insurance for foreigners.

T a b l e 4

Average Values of Summary Index of Financial Stability in Period 2004 – 2019 for Insurance Companies with a Predominance of Non-life Insurance

Insurance company	Average value of index FS	Rank by index FS	Increase↑ or decrease↓ of index FS
ALLIANZ	0.533765	13	↓
AXA	0.509455	19	↑
CARDIF	**0.552933**	**5**	↓
COLONNADE	0.506171	20	↑
CP ZDRAVÍ	**0.563912**	**2**	↑
CPP	0.530276	16	stable
DAS	**0.540086**	**8**	↑
DIRECT	0.520023	17	↓
ERV	**0.550602**	**6**	stable
GCP	0.533570	14	stable
HALALI	**0.564724**	**1**	↓
HDI	**0.556460**	**3**	stable
HVP	0.536470	10	stable
KOOP	0.536577	9	stable
MAXIMA	**0.556222**	**4**	↓
PATRICIE	0.536348	12	stable
PVZP	**0.544116**	**7**	↓
SLAVIA	0.536453	11	↓
UNIQA	0.533550	15	↓
WUST	0.512938	18	↑

Source: Annual reports of insurance companies and CAIC's statistics; authors' calculations.

CARDIF is an insurance company specialising in credit insurance and has been active in the Czech market since 1996. It offers its products in the form of bank insurance. The insurance company is owned by the French company BNP PARIBAS CARDIF S.A. (100%). The insurance company ERV specializes in travel insurance and has been operating in the Czech market since 1992. It is owned by Europaeiske Rejseforsikring A/S, Denmark (75%), Europäische
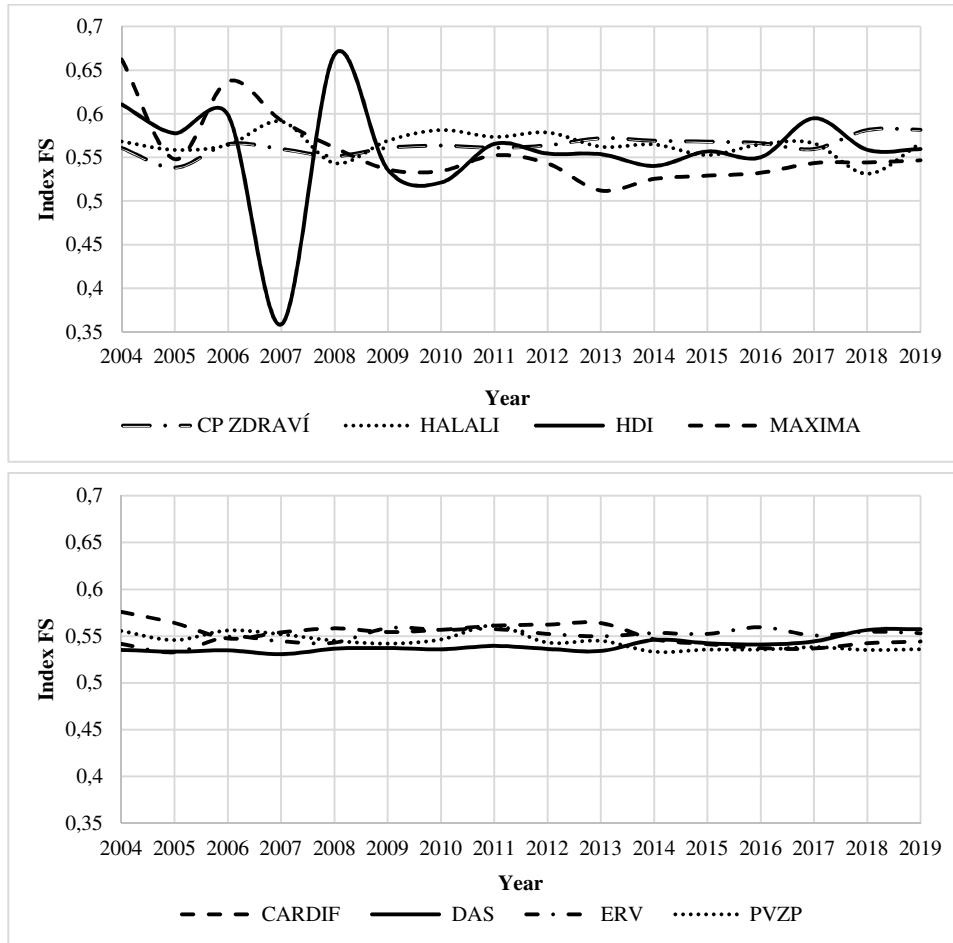
Reiseversicherung AG, Germany (15%) and Europäische Reiseversicherung AG, Austria (10%). The insurance company PVZP focuses on foreigners' health insurance and health risk insurance but is also the largest retailer of travel insurance. It has been active in the market since 2004 and is owned by the General Health Insurance Company of the Czech Republic (100%). The insurance company DAS is a specialist legal protection insurance company and has been in business since 1995. Since 2014, DAS has been operating in the Czech Republic as D.A.S. Rechtsschutz AG, branch for the Czech Republic.

The graph in Figure 1 shows the development of the FS index of insurance companies with the highest FS index. The upper graph contains the first to the fourth order of insurance companies. The lower graph contains the fifth to the eighth order of insurance companies. For all specialized insurance companies, a decline in financial stability can be observed in 2005 or after 2005. This may have been caused by the accession of the Czech Republic to the EU, which may have led to an increase in competition and a decrease in written premiums. It is also possible to record a decline in financial stability in all specialized insurance companies in 2008 (2009, 2010), which is due to economic developments in the Czech Republic. By comparing the development of insurance companies in the upper and the lower graph, it is clear that a more stable development of financial stability is for insurance companies in the fifth to eighth order.

According to the previous description of the insurance companies, it is evident that shareholder changes have occurred in some of the evaluated insurance companies: In the insurance company CP ZDRAVI in 2018, in HDI in 2006, in MAXIMA in 2015, and in DAS in 2014. These changes were reflected in an increase in the FS index for all insurers except DAS (see Figure 1). The evolution of the aggregate FS index was most stable for the insurers DAS, ERV, and PHPP. For the insurer MAXIMA, a decrease in the FS index can be observed over the period under review, as well as significant fluctuations (see Figure 1). MAXIMA reached its lowest value in 2013. This decrease was due to the increase in the cost index (ER and CR). In this year, MAXIMA Insurance Company changed its branch and also focused on changing its corporate identity and graphic design, and there were also significant natural damages (floods). Similarly, fluctuations are evident for the HDI insurance company (see Figure 1). For HDI, there was a significant fluctuation in the overall FS index in 2007, mainly due to a significant increase in technical provisions and a large liquidity surplus. This year also saw the merger with GERLING, as well as a large-scale natural disaster (windstorm). These facts appear to have had an impact on the development of financial stability. A further decline in HDI's insurance business can be seen in 2010 when significant natural disasters occurred again.

F i g u r e 1

**Development of Summary Index FS of Insurance Companies with the Highest
FS Index in Czechia**

Source: Annual reports of insurance companies and CAIC's statistics; authors' calculations.

For the other insurers which were not ranked in the top eight, a decline in the
aggregate FS index can also be observed in or after 2005. This may also be due
to the accession of the Czech Republic to the European Union. Similarly, a de-
cline in financial stability can be observed for the other insurance companies in
2008 (2009, 2010), which may be due to the economic development in the society.
Some of the other insurance companies have also undergone shareholder changes
or the purchase of insurance portfolios of other insurance companies. The insur-
ance company ALLIANZ acquired the insurance company WUST in 2016 and it
is possible to observe an increase in FS. The insurance company GCP became
part of Generali PPF Holding in 2008 and in 2015 there was a change in the

shareholder structure. In the financial stability of GCP, an increase in the FS index can be observed after these ownership changes. In 2007, the insurance company KOOP bought the insurance portfolio of Winterthur pojišťovna a.s. and again an increase in financial stability can be observed after this change.

3.2. Evaluation of Insurance Companies with a Predominance of Life Insurance in Czechia in the Period 2004 – 2019

The insurance companies with the highest summary FS index include MET-LIFE, ERGO, PCS, and KP. A brief description of specialized insurance companies is provided below.

T a b l e 5

Average Values of the Summary Index of Financial Stability in Period 2004 – 2019 for Insurance Companies with a Predominance of Non-life Insurance

Insurance company	Average value of index FS	Rank by index FS	Increase↑ or decrease↓ of index FS
AEGON	0.606307	9	↑
AVIVA	0.536684	10	↓
AXA ŽP	0.687202	5	↑
BASLER	0.295361	11	↑
CSOB	0.683349	7	stable
ERGO	**0.773303**	**2**	↑
KP	**0.694763**	**4**	stable
METLIFE	**0.789536**	**1**	↓
NN	0.673592	8	↓
PCS	**0.714710**	**3**	↓
WUST ZP	0.685373	6	↓

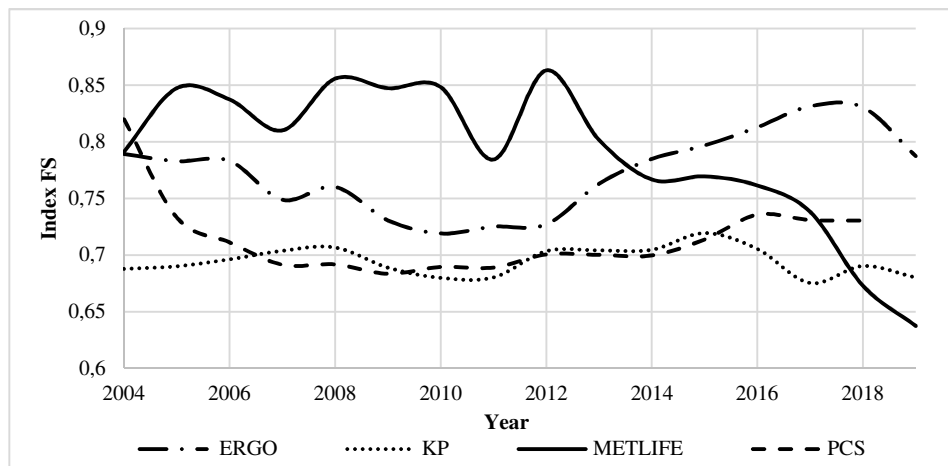*Source*: Annual reports of insurance companies and CAIC's statistics; authors' calculations.

METLIFE Insurance Company has been operating in the Czech Republic since 1991 under the name of První Americko-česká pojišťovna, a.s. Its founder was Alico (American Life Insurance Company). In 2002 it operated exclusively as a life insurance company. Since 2010 it has become a part of the American insurance company MetLife, Inc. In 2015, MetLife Insurance Company, Inc. merged with MetLife Europe Limited, a member of the MetLife Group, which was incorporated in Ireland. Another historic milestone in METLIFE was the acquisition of Aviva Life Insurance Company, a.s. (known as Commercial Union until 2002) in 2012. ERGO Insurance Company operated in the Czech Republic from 1994 to 2011 under the name VICTORIA pojišťovna, a.s. ERGO is a member of the international ERGO Group. The shareholders of the company are Austrian companies ERGO Austria International AG (75.93%) and ERGO Versicherung AG (24.07%). The insurance company PCS has been operating in the Czech insurance market since 1992 as Živnostenská pojišťovna, a.s with Czech capital. In 2000, it entered Erste bank (4% share). In 2003, it sold its non-life portfolio to

KOOP insurance company and since 2004 it has focused on selling life insurance. Since 2008 it has been part of the VIG insurance group and is owned by VIG AG Wiener Versicherung Gruppe (90%), KOOP (5%), and Česká spořitelna (5%). In 2019, the company merged with KOOP. KP Insurance Company has been active in the insurance market since 1995 as a subsidiary of Komerční banka (100%). Since 2005, it has been majority-owned (51%) by SOGECAP, S.A. (France), and another 49% of shares are owned by Komerční banka, a.s.

The graph in Figure 2 shows the development of the FS index of insurance companies with the highest FS index (four best insurance companies).

F i g u r e 2

Development of Summary Index FS of Insurance Companies with the Highest FS Index in Czechia

Source: Annual reports of insurance companies and CAIC's statistics; authors' calculations.

For insurance companies with the highest financial stability index (except KP), a decline in financial stability can be observed in 2005 or after 2005. This development can also be observed in other insurance companies (AXA ZP, CSOB, NN). This may have been caused by the accession of the Czech Republic to the EU. It is also possible to observe a decline in financial stability in all specialized insurance companies in 2008 (2009, 2010), which is due to economic developments in the Czech Republic. A similar development is also evident in case of other insurance companies (AVIVA, AXA ZP, WUST ZP, NN).

The insurance companies which were assessed also underwent shareholder changes in the period under review. As can be seen from the previous description of the four most stable insurance companies, changes occurred in METLIFE in 2010, 2012, and 2015; in ERGO in 2011; in PCS in 2008 (2019); and in KP in 2005. As can be seen in Figure 2, there is a decline in financial stability in these

years for all insurance companies (except KP). In the insurance company KP, an increase in FS can be observed in the period 2005 – 2008.

The other insurance companies which were not ranked in the top four also experienced changes in their shareholder structure during the period under review. Prior to 2007, AXA ZP operated as Winterthur. The acquisition of Winterthur by AXA Group started in 2006 and was completed in 2007. In 2007, this insurance company experienced a sharp decline in the FS. In 2012, CSOB insurance company underwent a change in shareholding and from 2012 to 2014, FS continued growing. NN Insurance Company operated as ING Insurance Company until 2013, with a noticeable decline in FS between 2013 and 2018. However, a significant decrease in FS can be observed for NN Insurance Company throughout the period under review.

Conslusions

The aim of the paper was to construct the summarized financial stability index for the insurance companies and applied this index on the Czech insurance companies. The overall results show that during the period 2004 – 2019 the analysed insurance companies did not show any problems in terms of financial stability. The findings on the financial stability of insurance companies in the Czech insurance market confirm the conclusions in the financial stability reports published annually by the CNB. This finding also supports the conclusions of the study by Dvořák et al. (2016) or Rybyšarová and Lelek (2009), who found that the situation in the insurance market is highly financially stable. Moreover, in this paper we measured the financial stability and financial health of individual insurance companies using complex indicator. This result can help the management of individual bank as well as the regulatory authorities and other parties to analyse and compare the financial stability of insurance companies.

In line with the aim of the paper, three research questions were set. Which insurance companies exhibit the highest financial stability? It was found that the insurance companies HALALI, CP ZDRAVI, HDI, MAXIMA, CARDIF, PVZP, ERV, and DAS show the highest financial stability among the insurance companies with a predominance of non-life insurance. All insurance companies are specialised in a particular non-life insurance product. Each insurance company has a small share in the Czech insurance market (up to 1.40%). It was also found that METLIFE, ERGO, PCS, and KP have the highest financial stability among insurance companies with a predominance of life insurance. The insurance company PCS ranks second (5.44%) and KP ranks third (3.94%) in terms of the size of share in the Czech insurance market.

Did economic changes in society and changes in the shareholder structure of insurance companies have an impact on the financial stability of selected insurance companies in the Czech Republic? The research found that changes in the shareholder structure and economic developments have an impact on financial stability. It was found that the accession of the Czech Republic to the EU is likely to have caused a decline in financial stability, as competition has increased and thus premiums written have fallen. In addition, there was a decline in financial stability probably caused by the economic developments in 2008 and financial stability in insurance companies declined. A change in financial stability can also be observed in insurance companies that experienced shareholding changes. In particular, an increase in financial stability can be observed in insurance companies with a predominance of non-life insurance. For insurance companies with a predominance of life insurance, the shareholding changes mainly led to a decrease in financial stability.

Is it possible to monitor the difference in the financial stability of specialized non-life insurance companies compared to other insurance companies without specialization? An assessment of the development of financial stability in the period 2004 – 2019 found that the most stable insurance companies are those specialised in a particular non-life insurance product.

According to the literature search, it is evident that the topic is not sufficiently researched. New possibilities and important areas for further research have been revealed when preparing this article. Follow-up research could focus on the years in which the described factors changed as well as insurance companies that succumbed to the changes, specifically CP – merger with Generali insurance company; here it seems advisable to focus on the post-merger development in the following years. The creation of an index of financial stability and evaluation of insurance companies in the Czech insurance market opens up further research opportunities in other insurance markets. The developed financial stability index for insurance company rating will be applied to the Slovak insurance market. The results from the Czech insurance market will be compared with insurance companies operating in Slovakia. As the Czech and Slovak markets were created by the division of the common market within the Czech and Slovak Federative Republic, there is a possibility of further research focusing on finding similarities in the financial stability of those insurance companies that have the identical owner in both countries. However, it would also be appropriate to apply the index to other Central and Eastern European countries. Furthermore, in future research, the determinants of the financial stability of the insurance companies will be examined. We will estimate the macroeconomic and insurers' specific determinants using the dynamic regression analysis. This analysis shall further examine the factors influencing the financial stability of insurers.

References

AL-DALAIEN, B. O. A. – ALHROOB, M. N. H. (2017): Financial Performance Analysis of Jordanian Insurance Companies Using the Altman Z-score Model. International Journal of Academic Research and Development, *2*, No. 1, pp. 24 – 29.

CAIC (2020): Mimořádné živelní škody. Available at: <http://www.cap.cz/statisticke-udaje/ostatni>.

CNB (2020): Zprávy o finanční stabilitě 2004 – 2019. Available at: <https://www.cnb.cz/cs/financni-stabilita/zpravy-fs/>.

DUCHÁČKOVÁ, E. (2015): Pojištění a pojišťovnictví. Praha: Ekopress. ISBN 978-80-87865-25-5.

DVOŘÁK, M. – GRONYCHOVÁ, M. – HAUSENBLAS, V. – KOMÁRKOVÁ, Z. (2016): Could the Czech Insurance Sector Be a Source of Systemic Risk? [Thematic Article in the Financial Stability Report 2015/2016.] Praha: Czech National Bank. Available at: <https://www.cnb.cz/export/sites/cnb/en/financial-stability/.galleries/fs_reports/fsr_2015-2016/fsr_2015-2016_article_i.pdf>.

ECB (2009): Financial Stability Review December 2009. Frankfurt am Main: European Central Bank. Available at: <https://www.ecb.europa.eu/pub/pdf/fsr/financialstabilityreview200912en.pdf>.

GERŠL, A. – HEŘMÁNEK, J. (2008): Indicators of Financial System Stability: Towards an Aggregate Financial Stability Indicator? Prague Economic Papers, *17*, No. 2, pp. 127 – 142. Available at: <https://doi.org/10.18267/j.pep.325>.

GESTEL, T. V. – MARTENS, D. – BAESENS, B. – FEREMANS, D. – VANTHIENEN, J. (2007): Forecasting and Analyzing Insurance Companies' Ratings. International Journal of Forecasting, *23*, No. 3, pp. 513 – 529. Available at: <https://doi.org/10.1016/j.ijforecast.2007.05.001>.

HODULA, M. – JANKŮ, J. – ČASTA, M. – KUČERA, A. (2021): On the Macrofinancial Determinants of Life and Non-life Insurance Premiums. The Geneva Papers on Risk and Insurance – Issues and Practice. Available at: <https://doi.org/10.1057/s41288-021-00249-z>.

IMF (2005): Financial Sector Assessment: A Handbook, the International Bank for Reconstruction and Development. Washington, DC: World Bank and the International Monetary Fund.

JOO, B. A. (2013): Analysis of Financial Stability of Indian Non-life Insurance Companies. Asian Journal of Finance and Accounting, *5*, No. 1, pp. 306 – 319. Available at: <https://doi.org/10.5296/ajfa.v5i1.3366>.

KOMÁRKOVÁ, Z. – KUČERA, A. (2021): Makroobezřetnostní nástroje pojišťovacího sektoru. In: FRAIT, J. (ed.): Tématický článek o finanční stabilitě, 1/2021. Prague: Czech National Bank. Available at: <https://www.cnb.cz/export/sites/cnb/cs/financni-stabilita/.galleries/tematicke-clanky-o-financni-stabilite/tcfs_2021_01_cz.pdf>.

KOROBCZUK, L. (2007): Informační výstupy pojišťoven: Analýza výroční zprávy. Available at: <bivs.as4u.cz/filemanager/files/file.php?file=7369>.

OECD (2008): Handbook on Constructing Composite Indicators. Methodology and User Guide. Paris: OECD Publishing.

KWON, W. J. – WOLFROM, L. (2016): Analytical Tools for the Insurance Market and Macro-Prudential Surveillance. OECD Journal: Financial Market Trends, *1*, pp. 1 – 47. Available at: <http://dx.doi.org/10.1787/fmt-2016-5jln6hnvwdzn>.

MAJTÁNOVÁ, A. – DAŇHEL, J. – DUCHÁČKOVÁ, E. – KAFKOVÁ, E. (2006): Pojišťovnictví – teorie a praxe. Praha: Ekopress.

MORRIS, V. C. (2010): Measuring and Forecasting Financial Stability: The Composition of an Aggregate Financial Stability Index for Jamaica. Economics in Emerging Economies, *6*, No. 2, pp. 1 – 19.

KOZAK, S. (2011): Determinants of Profitability of Non-life Insurance Companies in Poland during Integration with the European Financial System. Electronic Journal of Polish Agricultural Universities, *14*, No. 1, pp. 53 – 66.

PAVIĆ KRAMARIĆ, T. – MILETIĆ, M. – KOŽUL BLAŽEVSKI, R. (2019): Financial Stability of Insurance Companies in Selected CEE Countries. Business Systems Research, *10*, No. 2, pp. 163 – 178. Available at: <https://doi.org/10.2478/bsrj-2019-025>.

PULCHART, V. (2002): K ziskovosti neživotního pojištění – pohled na dlouhodobé trendy ve světě. Pojistný obzor, *79*, No. 10, pp. 4 – 5.

RYBYŠAROVÁ, M. – LELEK, T. (2009): Financial Stability of the Czech Insurance Business. E+M Economics and Management, *1*, pp. 68 – 76.

VAN DEN END, J. W. (2006): Indicator and Boundaries of Financial Stability. [DNB Working Paper, No. 97.] Amsterdam: De Nederlandsche Bank.

VÁVROVÁ, E. (2014): Finanční řízení komerčních pojišťoven. Praha: Grada.

ZWEIFEL, P. – EISEN, R. (2012): Insurance Economics. Berlin: Springer Science & Business Media.

ZIEMELE, J. – VORONOVÁ, I. (2013): Financial Stability of the EU's Insurance Companies. Economics and Management, *18,* No. 3, pp. 436 – 448. Available at: <https://doi.org/10.5755/j01.em.18.3.4780>.

TRICHET, J. C. (2005): Financial Stability and the Insurance Sector. The Geneva Papers on Risk and Insurance – Issues and Practice, *30*, pp. 65 – 71. Available at: <https://doi.org/10.1057/palgrave.gpp.2510021>.

A p p e n d i x   1

Results of the Summary Index of Financial Stability of Insurance Companies with a Predominance of Non-life Insurance on the Czech Market in 2004 – 2019

Insurance company	2004	2005	2006	2007	2008	2009	2010	2011
ALLIANZ	0.538940	0.538533	0.542763	0.544929	0.543176	0.537836	0.532867	0.534985
AXA						0.440699	0.469787	0.497137
CARDIF	0.575781	0.564090	0.547504	0.553984	0.558280	0.554421	0.556719	0.561229
COLONNADE								
CP ZDRAVI	0.560737	0.538250	0.565096	0.559563	0.551530	0.561003	0.563551	0.560957
CPP	0.529241	0.528410	0.524347	0.529981	0.534005	0.529722	0.531478	0.531891
DAS	0.535291	0.533331	0.534815	0.530699	0.536465	0.537273	0.535913	0.539484
DIRECT	0.526455	0.546734	0.530877	0.521348	0.530118	0.527081	0.522767	0.529217
ERV	0.541725	0.532741	0.549234	0.544446	0.543011	0.558519	0.556712	0.557554
GCP	0.520681	0.528878	0.536696	0.537183	0.535714	0.537631	0.536802	0.530113
HALALI	0.568186	0.558532	0.564304	0.591109	0.543421	0.569135	0.581343	0.573377
HDI	0.610694	0.577660	0.598254	0.358512	0.667811	0.535821	0.521158	0.565411
HVP	0.552849	0.540050	0.533004	0.526441	0.535818	0.532036	0.529920	0.530808
KOOP	0.536880	0.539127	0.535983	0.536990	0.539405	0.539213	0.538578	0.539580
MAXIMA	0.662223	0.547924	0.637276	0.592203	0.561204	0.536157	0.534421	0.552379
PATRICIE	0.554247	0.546826	0.539688	0.532903	0.537311	0.535243	0.536195	0.530818
PVZP	0.555524	0.545738	0.556015	0.551889	0.545106	0.541964	0.546420	0.561367
SLAVIA	0.568179	0.570845	0.538321	0.542727	0.539906	0.532404	0.543096	0.527591
UNIQA	0.542756	0.538588	0.535415	0.540471	0.539499	0.538483	0.526790	0.536210
WUST						0.527502	0.497165	0.507966

	2012	2013	2014	2015	2016	2017	2018	2019
ALLIANZ	0.524645	0.528770	0.525535	0.527286	0.522387	0.528000	0.538147	0.531437
AXA	0.507850	0.492512	0.517505	0.530567	0.531706	0.531941	0.543217	0.541082
CARDIF	0.562370	0.563910	0.546598	0.541455	0.537230	0.536732	0.542384	0.544250
COLONNADE					0.408306	0.528590	0.550539	0.537248
CP ZDRAVI	0.563812	0.571839	0.569173	0.568011	0.566337	0.559700	0.581357	0.581671
CPP	0.531934	0.528345	0.529811	0.528500	0.528433	0.531813	0.534951	0.531558
DAS	0.536318	0.534072	0.545972	0.542485	0.540970	0.544359	0.556577	0.557345
DIRECT	0.502771	0.495626	0.474272	0.531518	0.529085	0.496610	0.525023	0.530861
ERV	0.552314	0.549728	0.553253	0.552336	0.559551	0.550715	0.554698	0.553092
GCP	0.529994	0.530509	0.529485	0.535171	0.537548	0.537180	0.537869	0.535676
HALALI	0.578487	0.562286	0.564726	0.552657	0.564898	0.565976	0.531221	0.565921
HDI	0.554315	0.553577	0.540207	0.556828	0.550133	0.594816	0.558680	0.559484
HVP	0.527893	0.525351	0.536467	0.537228	0.536257	0.535103	0.541090	0.563209
KOOP	0.540107	0.534815	0.532739	0.537398	0.530497	0.530618	0.540059	0.533236
MAXIMA	0.543044	0.512002	0.525288	0.528939	0.532272	0.543429	0.544222	0.546578
PATRICIE	0.527256	0.514652	0.524237	0.534403	0.530630	0.522207	0.531549	0.583410
PVZP	0.543101	0.544991	0.533209	0.535595	0.535541	0.538210	0.535222	0.535961
SLAVIA	0.509770	0.521903	0.524824	0.525231	0.532625	0.539024	0.532126	0.534681
UNIQA	0.526535	0.523618	0.529100	0.528859	0.525527	0.532481	0.537744	0.534721
WUST	0.506114	0.498049	0.521165	0.532607				

Source: Authors' calculations.

A p p e n d i x 2

Results of the Summary Index of Financial Stability of Insurance Companies with a Predominance of Life Insurance on the Czech Market in 2004 – 2019

Insurance company	2004	2005	2006	2007	2008	2009	2010	2011
AEGON				0.515577	0.545207	0.593616	0.635469	0.664456
AVIVA	0.639189	0.580711	0.570670	0.543866	0.538807	0.404908	0.476164	0.539155
AXA ZP	0.670627	0.670745	0.668955	0.587813	0.645354	0.618052	0.670565	0.688451
BASLER								0.282671
CSOB	0.684281	0.676732	0.686330	0.691339	0.687687	0.699106	0.690371	0.676929
ERGO	0.789245	0.782925	0.783104	0.748834	0.760180	0.730706	0.719086	0.725062
KP	0.687765	0.690082	0.696207	0.703767	0.706686	0.688891	0.679856	0.680270
METLIFE	0.791216	0.847363	0.837342	0.810090	0.855716	0.847347	0.848307	0.784318
NN	0.769650	0.764232	0.770158	0.729323	0.736245	0.719772	0.712882	0.707604
PCS	0.819906	0.733182	0.711231	0.691433	0.691741	0.683522	0.689532	0.688972
WUST ZP	0.687460	0.705370	0.707476	0.706012	0.692078	0.678803	0.678951	0.693741
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
AEGON	0.646202	0.549680	0.587262	0.584933	0.637969	0.640587	0.674723	
AVIVA								
AXA ZP	0.683359	0.711298	0.719184	0.717704	0.707708	0.736623	0.745778	0.753015
BASLER	0.229882	0.334063	0.372625	0.257564				
CSOB	0.673789	0.685757	0.697910	0.689723	0.686290	0.672997	0.667829	0.666510
ERGO	0.727116	0.762920	0.784859	0.796738	0.812908	0.831363	0.830379	0.787424
KP	0.703444	0.704102	0.704685	0.719376	0.705357	0.675274	0.690319	0.680120
METLIFE	0.863104	0.801649	0.766716	0.769466	0.761456	0.738215	0.672886	0.637393
NN	0.697693	0.648797	0.634781	0.610038	0.570765	0.553575	0.542400	0.609553
PCS	0.700494	0.700135	0.699655	0.713748	0.735665	0.730929	0.730506	
WUST ZP	0.671573	0.655057	0.664184	0.683774				

Source: Authors' calculations.