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Non-financial reporting as a determinant of financial efficiency of insurance companies[1]

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Abstract. The growing ecological, social and environmental awareness of the society leads to the situation where the necessary determinants of success of a company are no longer good financial results only, but also image-related aspects, which affect the way of corporate reporting. Non-financial reporting is a response to the needs of stakeholders of insurance companies for new information on environmental and social issues which are related to the implementation of the idea of corporate social responsibility (CSR). It is treated as one of the dependent variables that affect financial efficiency measured with the rate of return on equity (ROE). The aim of the study presented in this paper is to assess the impact of non-financial reporting on the financial efficiency of insurance companies on the Polish insurance market. A representative group of 43 insurance companies operating on the Polish market in the years 2004–2019 was examined in the framework of the research. The statistical data came from the database of the Polish Chamber of Insurance (Pol. Polska Izba Ubezpieczeń – PIU). The assumption that non-financial reporting has a statistically significant effect on ROE was adopted as the research hypothesis, and it was verified by a panel model constructed for this purpose. The study confirmed the research hypothesis, which will contribute to the development of a theory which assumes that CSR activity affects financial results of companies.
Keywords: insurance, insurance market, financial efficiency of insurance companies, non-financial reporting, corporate social responsibility, CSR

JEL: G22, G32, M21

Raportowanie niefinansowe jako determinanta efektywności finansowej zakładów ubezpieczeń

Streszczenie. Rosnąca świadomość społeczna dotycząca zagadnień ekologicznych, społecznych i środowiskowych powoduje, że niezbędnymi determinantami sukcesu przedsiębiorstwa są nie tylko dobre wyniki finansowe, lecz także względy wizerunkowe, co wpływa na kształt sprawozdawczości. Odpowiedzią na zapotrzebowanie interesariuszy zakładów ubezpieczeń na

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informacje dotyczące zagadnień środowiskowych i społecznych – co ma związek z realizacją idei społecznej odpowiedzialności biznesu (ang. *corporate social responsibility* – CSR) – jest sprawozdawczość niefinansowa (raportowanie niefinansowe). Jest ona traktowana jako jedna ze zmiennych zależnych oddziałujących na efektywność finansową mierzoną stopą zwrotu z kapitału własnego (ang. *return on equity* – ROE). Celem badania omawianego w artykule jest ocena wpływu raportowania niefinansowego na efektywność finansową zakładów ubezpieczeń funkcjonujących na polskim rynku. Badanie przeprowadzono na reprezentatywnej grupie 43 zakładów ubezpieczeń działających w latach 2004–2019. Dane finansowe uzyskano z bazy danych Polskiej Izby Ubezpieczeń (PIU). Sformułowano następującą hipotezę badawczą: raportowanie niefinansowe ma statystycznie istotny wpływ na efektywność finansową zakładów ubezpieczeń mierzoną wskaźnikiem ROE. W celu jej weryfikacji skonstruowano model panelowy. Badanie potwierdziło prawidłowość postawionej hipotezy, co przyczyni się do rozwoju teorii zakładającej wpływ podejmowanych działań społecznie odpowiedzialnych na wyniki finansowe podmiotów gospodarczych.

Słowa kluczowe: ubezpieczenia, rynek ubezpieczeniowy, efektywność finansowa zakładów ubezpieczeń, raportowanie niefinansowe, społeczna odpowiedzialność biznesu, CSR

1. Introduction

Non-financial reporting is a relatively new issue in the area of insurance companies reporting. The obligation to prepare and present non-financial information was introduced in the European Union in 2017 (Ustawa z dnia 15 grudnia 2016 r. o zmianie ustawy o rachunkowości, which is the Act of 15 December 2016, amending the Accounting Act, and Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014, amending Directive 2013/34/EU as regards the disclosure of non-financial and diversity information by certain large undertakings and groups).

The purpose of non-financial reporting is to maintain proper relations with stakeholders. It might also strengthen and improve the image of the insurance company and affect consumer decisions, improving in the long run the company's financial efficiency. The benefits of preparing non-financial statements are not universally recognised, however, as suggested by research conducted so far, e.g. Bukowski and Lament (2021a), Mittal et al. (2008), Sobczyk (2016) or Surroca et al. (2010), all rather indicating their neutrality.

It can be assumed that in the future, the scope of such reporting and the principles of its presentation will change. This is due to two circumstances. First of all, the research on the quality of information presented in non-financial statements points to the need for its (at least) partial standardisation, in order to ensure its comparability, as asserted by e.g. Jonas (2017) and Lament (2017). Secondly, there were legislative initiatives undertaken in April 2021 at the EU level, aimed at introducing some standard for non-financial reporting (Proposal for a Directive of the European Parliament and of the Council amending Directive 2013/34/EU,

Directive 2014/95/EU, Directive 2006/43/EC and Regulation (EU) No. 537/2014, as regards corporate sustainability reporting).

According to Lament (2019b), research on non-financial reporting by insurance companies can be divided into two main groups:

- qualitative – adopting the analysis of the content of non-financial statements as a research method;
- quantitative – examining the impact of socially responsible activities and their presentation in the form of non-financial reports on the financial results of insurance companies.

The subject of this research falls within the scope of the second group. The aim of the study presented in this paper is to assess the impact of non-financial reporting on the financial efficiency of insurance companies on the Polish insurance market. The above-mentioned goal led to the formulation of the research question whether there is a relationship between non-financial reporting and the financial performance of insurance companies.

2. Directions of research on non-financial reporting in insurance companies

Insurance companies are entities of public trust. This necessitates image-related considerations, and as a result, involves undertaking actions positively influencing the companies' image. Such actions include the implementation of the idea of corporate social responsibility (CSR) and reporting on socially-responsible activities (non-financial reporting). Reporting is an important tool for an economic entity to communicate with its clients and other stakeholders. Changing economic conditions as well as the clients' needs for information influence the scope and principles of the presentation of corporate reports.

One of the important elements shaping the way of such reporting is the growing ecological, social and environmental awareness of the society, which means that the necessary determinants of a business's success are not only good financial results, but also clients and other stakeholders' perception of the company (which involves image-related considerations). Therefore, following a suitable information policy whose usual element is non-financial reporting, becomes a must. The same necessity for non-financial reporting occurs when we assume that the valuation of an enterprise and its assets is based on its market value, whose large part is constituted by intangible and non-financial assets.

From the accounting point of view, non-financial reporting is necessitated by the information needs of clients and stakeholders and information policies of economic entities, both of which are ways of adapting to the changing needs of the market.

Non-financial reporting is then a response to the changes taking place in the socio-economic sphere and accounting system, which result from the growing importance of ethical issues in the contemporary accounting system. It moreover responds to the needs for new information on environmental and social issues resulting from the implementation of the idea of CSR expressed by stakeholders of insurance companies. Reports in this area are referred to as Environment Social Government (ESG) reports.

Having established that insurance companies are entities of public trust, it is not surprising that they are interested in presenting information that positively affects their image, as it should translate into their improved financial results. However, the relationship between undertaking CSR activities and the financial results of business entities is not easy to verify, and is still subject to scientific research, the results of which have not so far indicated clear connections between the two, as demonstrated for example by Lu et al. (2022).

Research on non-financial reporting in insurance companies, which was already mentioned before, can be divided into two main areas (Lament, 2019b):

1. Qualitative research, which uses the analysis of the content of non-financial statements as a research method. Qualitative research indicates the broad scope and diversity of the forms of presenting non-financial information. The scientific discussion in this area focuses on the dilemmas of standardising non-financial reports, as shown for example in Jonas (2017), Krištofík et al. (2016) and Lament (2017). These problems are to some extent addressed by the amendment to Directive 2014/95/EU, which puts forward more detailed non-financial reporting requirements in accordance with the mandatory EU sustainability reporting standards. The EU non-financial reporting standards are expected to be adopted by October 2022.
2. Quantitative research aimed at analysing the measurement of the achievements in the field of CSR and their relationship with financial results. The analysis of literature on the subject shows that the conducted research focuses on three main issues relating to non-financial reporting: financial results – in terms of improving the effectiveness of businesses, e.g. Bukowski and Lament (2021a, 2021b), Lament (2019b), Ngatia (2014) or Yadav et al. (2016), the value of an insurance company in relation to its perception by potential investors, e.g. Winman (2021), and financial stability in terms of solvency, e.g. Chiaramonte et al. (2020). A detailed scope of the above-mentioned studies, the research methods used and their results are presented in Table 1.

Table 1. Non-financial reporting and financial results of insurance companies – research review

Author	Year	Scope of the research	Research methods	Research results
F. Olowokudejo, S. A. Aduloju, S. A. Oke	2011	Research on the relationship between CSR and the effectiveness of the organisation on the example of insurance companies from Nigeria. The analysed CSR activities were: business ethics, activities for the benefit of consumers, activities in the field of environmental protection and social activities. The effectiveness of the organisation was measured by: increase in sales, financial results (profitability), operational efficiency, financial stability, the image of the insurance company, employee morale, innovations.	Surveys and their statistical analysis. Pearson's test – analysis of 100 questionnaires.	A positive correlation was found between socially responsible activities and the effectiveness of the organisation. Profitability was positively correlated with business ethics, actions taken for the benefit of consumers and actions for the natural environment. Sales were positively correlated with business ethics, actions taken for the benefit of consumers and actions for the natural environment. Financial stability was positively correlated with business ethics and actions taken for the benefit of consumers. Operational efficiency was positively correlated with actions taken for the benefit of consumers. The image of an insurance company was positively correlated with activities for the benefit of consumers. Employee morale was positively related to business ethics and environmental activities. Innovations were positively correlated with activities for the benefit of consumers. The undertaken social activities were positively correlated with activities for the benefit of consumers and environmental activities.

Table 1. Non-financial reporting and financial results of insurance companies – research review (cont.)

Author	Year	Scope of the research	Research methods	Research results
S. W. Ngatia	2014	Examination of the relationship between the undertaken CSR activities and their reporting and the financial results of insurance companies. The financial results were measured by the ROA ratio (asset profitability ratio). Insurance companies were divided into two populations: insurance companies that prepare non-financial reports and insurance companies that do not prepare such reports. 51 insurance companies, operating in 2009–2013, were examined as of 31 December 2013.	Descriptive statistics. ANOVA test. Pearson's test.	Negative correlation was observed between socially responsible activities and their reporting and financial results of insurance companies measured with the ROA ratio –0.086.
R. K. Yadav, R. Jain, S. Singh	2016	The impact of CSR activities and their reporting on the decisions of consumers and employees in life insurance companies operating in India. Research on the impact of the above on the brand and on attracting new consumers.	Questionnaire research. 80 policyholders and 80 employees of life insurance companies were examined.	CSR activities undertaken by insurance companies influence the decisions of consumers and employees. New clients take into account the image of the insurance company as a socially responsible entity when making their decisions. 20% of the respondents believed non-financial reporting had some influence on the product brand, 50% believed the influence was very strong, and 9% expressed uncertainty as to the exact influence. 35% of the respondents believed non-financial reporting had some influence on financial results, 40% believed the influence was very strong, and 12% expressed uncertainty as to the exact influence. 22% of the respondents believed non-financial reporting had some influence on sales, 27% believed it was very strong, and 17% expressed uncertainty as to the exact influence.

Table 1. Non-financial reporting and financial results of insurance companies – research review (cont.)

Author	Year	Scope of the research	Research methods	Research results
M. Lament	2019	Research on the relationship between the undertaken CSR activities and the financial results of insurance companies from the Polish insurance market in 2004–2016. The dependent variable (explained feature) were financial achievements, illustrated by the ROE ratio. Non-financial reporting was adopted as one of the dependent variables. It was moreover assumed that the assessment of the financial achievements of insurance companies is influenced by: the dynamics of the gross written premium, the dynamics of the gross technical provisions, the dynamics of investments, the retention rate, the loss ratio, the investment profitability ratio, the acquisition cost ratio, the combined ratio, the gross financial result, the net financial result, the technical result, ROA (return on assets) and ROS (return on sales).	Econometric models – panel models with random effects. The models were estimated by means of the universal least squares method using the Nerlove transformation.	Non-financial reporting in the area of socially responsible activities does not affect the financial results of insurance companies.

Table 1. Non-financial reporting and financial results of insurance companies – research review (cont.)

Author	Year	Scope of the research	Research methods	Research results
L. Chiaramonte, A. Dreassi, A. Paltrinieri, S. Piserà	2020	94 listed insurance companies operating in Anglo-Saxon countries were examined. The study covered the period of 2008–2018. The study examined the influence of the undertaken Environment Social Governance (ESG) activities on the stability of insurance companies.	pooled ordinary least square (POLS) regression method with time and country fixed-effects (WF).	The undertaken ESG activities had a positive effect on the stability of the surveyed insurance companies.
A. J. Winman	2021	Seven listed insurance companies operating in the US in the field of motor insurance were surveyed in the framework of the research. The study covered the period of 2015–2019. It examined the impact of CSR activities (charity expenditure) on the value of insurance companies. The applied measure was the profit / share price ratio – earnings per share (EPS).	Econometric models – the multiple linear regression method.	Financing charity activities did not statistically significantly affect the value of the insurance company measured by the profit / share price ratio –EPS.

Source: authors' work based on Chiaramonte et al. (2020), Lament (2019a), Ngatia (2014), Olowokudejo et al. (2011), Winman (2021), Yadav et al. (2016).

Analysis of the research examining the influence of non-financial reporting on the financial efficiency of insurance companies shows that it is a barely explored topic, and does not clearly indicate the direction of this influence. The positive impact of non-financial reporting on the financial efficiency of insurance companies was observed by Olowokudejo et al. (2011) and Yadav et al. (2016). The negative influence, on the other hand, was reported by Ngatia (2014) and Lament (2019b). It should, however, be noted that the analysed studies were conducted with the use of various methodologies. The research carried out by Olowokudejo et al. (2011) and Yadav et al. (2016) was questionnaire studies, and therefore qualitative in nature, with some degree of subjectivity, whereas Lament (2019b) and Ngatia (2014) used econometric modelling.

The above-mentioned research does not clearly show the direction of the influence of non-financial reporting on the financial efficiency of insurance companies. However, bearing in mind that non-financial reporting has a positive effect on other financial aspects of the functioning of insurance companies, i.e. the value of a company and its financial stability, which was confirmed by the research by Chiaramonte et al. (2020) and Winman (2021), the research hypothesis adopted here is that non-financial reporting affects the financial efficiency of insurance companies.

3. Research method

The research used panel statistical data (balanced panel) on the results of insurance companies operating in Poland in the years 2004–2019 from the Polish Chamber of Insurance (Pol. Polska Izba Ubezpieczeń – PIU). The research was carried out using Statistica 13 and GRETL software. The selection of the surveyed insurance companies was purposeful. The research covered insurance companies operating throughout the entire period under examination. Therefore, insurance companies which started or ceased operations in the course of the analysed period were not taken into account. The characteristics of the surveyed insurance companies are presented in Table 2.

Table 2. Characteristics of the studied insurance companies on the Polish insurance market in the years 2004–2019

Specification	Studied insurance companies	Insurance companies studied by			
		range of activities (branches)		form of business	
		life insurance (branch I)	non-life insurance (branch II)	joint stock	mutual
Number of insurance companies	43	20	23	35	8
Structure in %	100.0	46.5	53.5	81.4	18.6

Source: authors' work based on data from the PIU.

The forms of operations of Poland-based insurers and their activities are not uniform. The available forms of operation for insurance companies on the Polish market are joint stock companies and mutual insurance companies. The main difference between the two is that in the case of the latter, the main purpose of the activity is not to generate profit, but to create the possibility of mutual insurance for a specific group of entities. Although this is quite a significant difference, the areas of activity and decision-making processes are very similar for both types of insurers.

Insurance companies might also be grouped according to the type of products they offer. There are several differences between branch I and branch II insurance companies (offering life insurance and non-life insurance, respectively), and the specificity of insurance products they offer affect the principles of their financial management and financial results (Bukowski & Lament, 2021c; Lament, 2019a).

Life insurance companies, as entities concluding long-term contracts, are obliged to achieve a certain rate of return on investments and are more exposed to financial risk in the form of market and credit risk. This risk is mainly related to assets and the management of the investment portfolio (Doan, 1998; Stroiński, 2003; Williams et al., 2002). The subject of insurance in branch I is the protection against the financial consequences of the insured person's death or reaching a certain age, as well as deposit activity, where the value of the benefit depends on the savings accumulated in the insured person's account.

Non-life insurance companies, on the other hand, conclude short-term contracts and are mostly exposed to insurance risk. The effects of such contracts are more difficult to foresee than in the case of life insurance. Additionally, their financial results depend mainly on the degree of insurance contracts implementation (loss ratio). The subject of insurance in branch II is property interest in the form of a property and property rights, as well as other personal insurance (Borda, 2006; Williams et al., 2002).

Table 3 presents the share of the surveyed insurance companies in the total number of insurance companies operating on the Polish insurance market in the years 2004–2019.

Table 3. The share of the studied insurance companies in the total number of insurance companies on the Polish insurance market

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of insurance companies on the Polish insurance market																
Total	**79**	**68**	**68**	**69**	**65**	**66**	**65**	**61**	**59**	**58**	**56**	**57**	**61**	**61**	**60**	**59**
By range of activities																
Branch I	37	31	32	32	29	30	30	28	28	27	26	27	27	27	26	25
Branch II	42	42	36	37	36	36	35	33	31	31	30	30	34	34	34	34
By form of business																
Joint stock	70	58	59	60	56	57	57	53	51	50	48	47	50	50	49	48
Mutual	9	10	9	9	9	9	8	8	8	8	8	10	11	11	11	11
Share of the studied insurance companies in the total number of insurance companies in %																
Total	**54.4**	**63.2**	**63.2**	**62.3**	**66.1**	**65.1**	**66.1**	**70.5**	**72.9**	**74.1**	**76.8**	**75.4**	**70.5**	**70.5**	**71.7**	**72.9**
By range of activities																
Branch I	54.1	64.5	62.5	62.5	68.9	66.7	66.7	71.4	71.4	74.1	76.9	74.1	74.1	74.1	76.9	80.0
Branch II	54.8	54.8	63.9	62.2	63.9	63.9	65.7	69.7	74.2	74.2	76.7	76.7	67.6	67.6	67.6	67.6
By form of business																
Joint stock	50.0	60.3	59.3	58.3	62.5	61.4	61.4	66.0	68.6	70.0	47.9	74.5	70.0	70.0	71.4	72.9
Mutual	88.9	80.0	88.9	88.9	88.9	88.9	100.0	100.0	100.0	100.0	100.0	80.0	72.7	72.7	72.7	72.7

Source: authors' work based on data from the PIU.

The assessment of the share of the surveyed insurance companies in the total number of insurance companies operating on the Polish insurance market in 2004–2019 shows that:

- the total number of insurance companies that were assessed ranged from 54.4% to 80% of all insurance companies operating in a given year;
- the number of insurance companies operating in branch I (life insurance) that were assessed ranged from 54.1% to 80% of all insurance companies operating in this branch in a given year;
- the number of insurance companies operating in branch II (non-life insurance) that were assessed ranged from 54.8% to 76.7% of all insurance companies operating in this branch in a given year;
- the number of insurance companies operating in the form of a joint stock company that were assessed ranged from 47.9% to 74.5% of all insurance companies operating in such a legal form in a given year;
- the number of insurance companies operating in the form of a mutual insurance company that were assessed ranged from 72.7% to 100% of all insurance companies operating in such a legal form in a given year.

Therefore, it can be assumed that the surveyed insurance companies constitute a representative sample, and the results of the conducted research can be generalised to all insurance companies operating on the Polish insurance market.

Non-financial reporting was adopted as a measure of achievements informative about the undertaken socially-responsible activities. As mentioned before, non-financial reporting is believed, on the one hand, to improve or strengthen the company's relations with the internal and external environment, and on the other, to affect the company's reputation and the level of risk, and thus influence its financial efficiency.

To achieve the research goal, an econometric model was constructed. The return on equity (ROE) was adopted as the dependent variable (explained feature) representing financial efficiency. The conducted studies of the literature dealing with factors influencing financial results of insurance companies confirm there is a wide range of such factors. The ones most frequently mentioned were: the size of the insurance company, financial liquidity, the value of liabilities, capital structure and asset risk and growth (Lament, 2019b, p. 227). These all are the elements related to the financial management of an insurance company.

In international comparisons, macroeconomic variables are undoubtedly important measures of financial results. This is confirmed by research conducted for example by Kozak (2011), Kramaric et al. (2017) or Ortyński (2016).

It also seems that the financial performance of insurance companies as institutions of public trust is significantly influenced by image-related factors. This assumption was confirmed by the results of studies conducted by Ngatia (2014), while Yadav et al. (2016) and Lament (2019b) showed there was no relationship between the financial results of insurance companies and image-related issues presented in CSR reports.

When analysing the financial efficiency of insurance companies, it is worth paying attention to their classification in terms of business activity and the resulting different risk profiles that affect their financial results, as demonstrated by the BION supervisory assessment conducted by the Polish Financial Supervision Authority (Komisja Nadzoru Finansowego, 2020), the research conducted by the Geneva Association (2010) on risk profiles in insurance, and by the research on the impact of risk profiles on the financial results of insurance companies (Lament, 2019a).

The model explains the financial effectiveness of insurance companies measured by ROE as dependent on 14 independent variables:

RNF – non-financial reporting – dummy variables, where $R_{i,t} = 1$ means non-financial reporting and $R_{i,t} = 0$ means lack of non-financial reporting,
WB – gross financial result,
WN – net financial result,
WT – technical insurance result,

ROA – return on assets,
ROS – return on sales,
DS – income of policyholder's dynamics,
DR – dynamics of technical provisions,
DL – dynamics of investments,
WR – retention ratio,
WS – net loss ratio,
RL – profitability of investments,
KA – share of acquisition costs in gross written premium,
Z – combined ratio.

Methods of calculating these variables are shown in Table 4.

Table 4. Methods of calculating the analysed variables

Variable	Variable designation	Method of calculating the variable
ROE	$ROE_{i,t}$	net profit in PLN/year · 100 / equity in PLN/year
RNF	$RNF_{i,t}$	dummy variables, where $R_{i,t} = 1$ means non-financial reporting and $R_{i,t} = 0$ – lack of non-financial reporting
ROA	$ROA_{i,t}$	net profit in PLN/year · 100 / assets in PLN/year
ROS	$ROS_{i,t}$	net profit in PLN/year · 100 / gross written premium in PLN/year
Income of policyholder's dynamics	$DS_{i,t}$	gross written premium in the current year in PLN/year · 100 / gross written premium in the previous year in PLN/year
Dynamics of technical provisions	$DR_{i,t}$	technical provisions in the current year in PLN/year · 100 / technical provisions in the previous year in PLN/year
Dynamics of investments	$DL_{i,t}$	investments in the current year in PLN/year · 100 / investments in the previous year in PLN/year
Retention ratio	$WR_{i,t}$	net written premium of reinsurance in PLN/year · 100 / gross written premium in PLN/year
Net loss ratio	$WS_{i,t}$	net claims and benefits paid net of reinsurance in PLN/year +/– change in provisions against outstanding claims and benefits of reinsurance in PLN/year · 100 / net earned premium of reinsurance in PLN/year
Profitability of investments	$RL_{i,t}$	profit of investments in PLN/year · 100 / investments in PLN/year
Share of acquisition costs in gross written premium	$KA_{i,t}$	acquisition costs in PLN/year · 100 / gross written premium in PLN/year
Combined ratio	$Z_{i,t}$	net claims paid of reinsurance in PLN/year + net costs of insurance activities of reinsurance in PLN/year + net other technical costs of reinsurance in PLN/year + dividend paid in PLN/year · 100 / net earned premium of reinsurance in PLN/year

Source: authors' work.

Key descriptive statistics that characterise the variables are shown in Table 5.

Table 5. Basic statistics concerning the studied variables in insurance companies on the Polish insurance market in 2004–2019

Variable	Average	Median	Minimum	Maximum	Variance	Standard deviation	P. confidence dev. std. –95.000%	P. confidence dev. std. +95.000%	Coefficient of change	Skewness	Kurtosis
ROE	7.20E–02	8.20E–02	–2.34	6.53E–01	4.75E–02	2.18E–01	2.07E–01	2.30E–01	3.03E+02	–2.62	2.32E+01
RNF	4.16E–01	0.00	0.00	1.00	2.43E–01	4.93E–01	4.69E–01	5.21E–01	1.19E+02	3.43E–01	–1.89
WB	1.58E+04	8.65E+03	–3.00E+05	5.40E+06	3.14E+11	5.61E+05	5.33E+05	5.92E+05	3.56E+02	4.89	2.66E+01
WN	1.34E+05	6.86E+03	–2.04E+05	5.11E+06	2.44E+11	4.94E+05	4.69E+05	5.21E+05	3.68E+02	5.20	3.11E+01
WT	8.92E+04	4.09E+03	–2.67E+05	2.99E+06	1.12E+11	3.35E+05	3.18E+05	3.53E+05	3.75E+02	5.15	2.89E+01
ROA	1.88E–02	1.50E–02	–4.70E–01	5.61	5.04E–02	2.25E–01	2.13E–01	2.37E–01	1.19E+03	2.26E+01	5.64E+02
ROS	–3.39E–02	3.15E–02	–3.10E+01	2.75	1.51	1.23	1.17	1.30	–3.63E+03	–2.35E+01	5.90E+02
DS	1.38	1.07	1.58E–01	7.21E+01	1.22E+01	3.49	3.31	3.68	2.53E+02	1.74E+01	3.23E+02
DR	1.86	1.10	4.79E–01	3.17E+02	1.61E+02	1.27E+01	1.21E+01	1.34E+01	6.82E+02	2.29E+01	5.56E+02
DL	1.15	1.09	5.20E–01	5.09	1.02E–01	3.19E–01	3.03E–01	3.37E–01	2.78E+01	4.87	4.29E+01
WR	8.52E–01	9.59E–01	6.60E–02	1.09	4.18E–02	2.05E–01	1.94E–01	2.16E–01	2.40E+01	–1.55	1.49
WS	6.74E–01	5.87E–01	0.00	4.88E+01	3.65	1.91	1.81	2.02	2.83E+02	2.36E+01	5.92E+02
RL	4.61E–02	4.40E–02	–9.30E–02	5.30E–01	1.25E–03	3.53E–02	3.35E–02	3.73E–02	7.66E+01	4.08	5.28E+01
KA	5.22E–01	2.13E–01	0.00	1.79E+02	4.65E+01	6.82	6.48	7.20	1.31E+03	2.62E+01	6.86E+02
Z	1.05	9.46E–01	–2.45E–01	1.53E+01	8.44E–01	9.19E–01	8.73E–01	9.70E–01	8.74E+01	9.13	1.14E+02

Note. N important = 688 for all variables.

Source: authors' work performed using Statistica 13.

4. Model and empirical results

After analysing the data, the backward stepwise regression method was used, eliminating statistically insignificant predictors and collinearity. On this basis, a panel model was constructed in the form of:

$$ROE_{i,t} = a_1 + a_2 RNF_{i,t} + a_3 WT_{i,t} + a_4 R_{i,t} + a_5 RL_{i,t} + a_6 Z_{i,t} + u_{i,t},$$

where:
$ROE_{i,t}$ – return on equity,
a_1 – free factor,
a_2–a_6 – factors,
$RNF_{i,t}$ – non-financial reporting – dummy variables, where $RNF_{i,t} = 1$ means non-financial reporting and $RNF_{i,t} = 0$ denotes the lack of non-financial reporting,
$WT_{i,t}$ – technical insurance result,
$R_{i,t}$ – retention ratio,
$RL_{i,t}$ – profitability of investments,
$Z_{i,t}$ – combined ratio,
$u_{i,t}$ – joint random factor.

The performed statistical tests showed an autocorrelation of residuals and heteroscedasticity. The autocorrelation was tested with the Durbin-Watson test, which indicated quite a significant autocorrelation.

Therefore, the weighted least squares method (WLS) was chosen as the method of estimating the panel model. The selection of the appropriate model was tested according to the Schwarz criterion and the Akaike criterion. The obtained model estimation results are presented in Tables 6 and 7.

Table 6. Results of model estimation – the WLS method

Specification	Coefficient	Standard error	*t*-ratio	*p*-value
const	3.77E+03	2.07E–02	0.812	0.8559
WT	1.73E–07	2.09E–08	8.287	<0.0001***
R	6.85E–02	2.28E–02	2.999	0.0028***
RL	2.53E–01	1.09E–01	2.327	0.0203**
Z	–2.53E–02	4.93E–03	–5.137	<0.0001***
RNF	2.74E–02	8.11E–03	3.375	0.0008***

Note. Model using 688 observations. 43 cross-sectional units included. Dependent variable – ROE. Weights based on per-unit error variances. The variable is significant at the significance level of: *** – 0.01, ** – 0.05.
Source: authors' work performed using GRETL.

Table 7. Results of model estimation – tests

Specification	Value	Specification	Value
Statistics based on the weighted data		**Statistics based on the weighted data (cont.)**	
Sum squared residuals	6.51E+02	Akaike criterion	1.93E–03
R-squared	3.01E–01	Hannan-Quinn	1.94E–03
F(6, 681)	4.88E+01	**Statistics based on the original data**	
Log-likelihood	–9.57E+02	Mean dependent variable	7.20E–02
Schwarz criterion	1.96E+–03	Sum squared residuals	2.69E+01
S.E. of regression	9.78E–01	S.D. dependent variable	2.18E–01
Adjusted R-squared	2.94E–01	S.E. of regression	1.97E–01
p-value(*F*)	7.72E–50		

Note. As in Table 6. Test for the normality of residuals: Null hypothesis: error is normally distributed. Test statistic: chi-square(2) = 501.38 with *p*-value = 1.33856E–109.

Source: authors' work performed using GRETL.

The results of the model's estimation indicated that all the independent variables are statistically significant and the signs are in accordance with the theory and hypothesis. The explanatory variables explain the variability of the explained variable in 30% when taking into account the coefficient of determination, and in 29.43% when taking into account the adjusted coefficient of determination. The RNF variable is statistically significant and affects the volatility of the ROE variable. However, this influence is much smaller than in the case of the other explanatory variables in the model, except for the Z variable.

The obtained results extend the scope of the research to non-financial reporting and its impact on the financial efficiency of insurance companies. They are consistent with the results of the studies by Olowokudejo et al. (2011) and Yadav et al. (2016). However, the two latter studies were of a questionnaire nature, so they cannot really be compared with the study described in this article due to the differences in the applied methodologies. A similar research methodology, i.e. econometric modelling, was used by Lament (2019b) and Ngatia (2014). The research results obtained in those two studies, on the other hand, found a negative correlation between the financial results of insurance companies and non-financial reporting.

Research into non-financial reporting of insurance companies is similar in scope to the research into non-financial reporting of other business entities and includes: qualitative research into non-financial information, e.g. Jonas (2017) and Lament (2017), the impact on financial results, e.g. Lament (2019b), Ngatia (2014) and Yadav et al. (2016), and the value of the economic entity, e.g. Winman (2021). It is also possible to indicate an area of research specific to insurance companies, which is the impact of non-financial reporting on the financial stability, studied for example by Chiaramonte et al. (2020).

5. Conclusions

The discussed topic has so far been barely researched in the context of the insurance market, especially the Polish one. The research conducted to date does not clearly indicate the existence of a relationship between the financial efficiency of insurance companies and non-financial reporting (RNF). The analysis of the literature indicates that there are more studies confirming the impact of RNF on the financial results of insurance companies than studies showing a negative correlation between them. The positive impact of RNF on the financial efficiency of insurance companies was demonstrated by, for example, Chiaramonte et al. (2020), Winman (2021) and Yadav et al. (2016), while the negative impact was reported by Ngatia (2014) and Lament (2019b).

However, the conducted research made it possible to positively verify the formulated research hypothesis, namely that non-financial reporting affected the financial efficiency of insurance companies operating on the Polish market in the years 2004–2019. This was done using the results of the model estimation, which indicated that the RNF variable was statistically significant.

These results might prove useful for insurance companies. The article indicates the factors of their financial efficiency and shows how non-financial reporting affects it. The paper presents the authors' original research into a representative group of insurance companies that can be generalised to the population of entities. The study will contribute to the development of research into factors of the financial effectiveness of insurance companies.

The study presented above indicates that the undertaken subject needs further research, which should be conducted mainly by means of quantitative and econometric methods. Further research should focus on improving the research methodology and, in particular, on the selection of econometric modelling methods.

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