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Analysis of the leverage of insurance companies in BIST100

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Abstract

In addition to being an important actor for financial markets, the insurance sector plays a critical role in risk management and economic stabilisation. Therefore, while the development of the insurance sector in Turkey provides confidence for investors, it is important for the government in terms of meeting economic losses in the face of natural disasters and alleviating the burden of the government. In this context, the aim of our study is to evaluate the financial performance of insurance companies traded in BIST 100 by calculating their leverage degrees and to examine the impact of the 6 February 2023 earthquakes on the leverage degrees of insurance companies. In this context, the financial statements of insurance companies for the period 2022-2023 were analysed and the leverage degrees of the companies were calculated. Subsequently, a dependent samples t-test was conducted to measure the effect of the earthquake on the degree of leverage of the companies. As a result of the analyses, it was determined that the average operating degree and total leverage degree of insurance companies increased in 2023, while the average financial leverage degree decreased. In addition, it is determined that the leverage degrees of insurance companies do not differ according to the earthquake.

Keywords: : Leverage analysis, Financial Performance, Insurance Sector.

Jel codes: G22, M10

1. Introduction

The insurance sector has an important role in financial markets. Insurance is not only a system that guarantees risks and compensates for damages, but also a system that contributes to the development of the economic system by providing financial resources by directing premium income to investments (Bayramoğlu and Başarır, 2016). The development of the insurance sector in Türkiye gains importance in terms of ensuring economic stability at the macro level and risk management, as well as reducing the burden of the government by compensating economic losses in the face of natural disasters.

Although insurance cannot prevent an earthquake from occurring, it plays an important role in compensating the economic losses that occur after an earthquake. Until the 1999 Marmara earthquake, the model in which the state assumed the risk through different regulations and shared it with the whole society was used. As of 2000, this practice was terminated and compulsory earthquake insurance was introduced as a means of sharing the earthquake risk and the Turkish Catastrophe Insurance Pool (TCIP) started to operate in Türkiye (Demirci, 2023; Şahin and Pehlivan, 2007). TCIP has paid 35.9 billion liras of damage payments since its establishment until the earthquakes of 6 February 2023. The 6 February earthquakes alone account for 96 per cent of this figure (AA,



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2025). The total cost of the 6 February earthquakes to the Turkish economy was 104 billion dollars (Trt Haber, 2025).

The 6 February earthquakes significantly impacted individuals' and public authorities' perspectives on the insurance sector and its practices. This has paved the way for a reassessment of insurance awareness and risk management approaches. Some studies carried out after the earthquake also support this. In his study examining the reasons for individuals to have Compulsory Earthquake Insurance (CEI) after the earthquake, Yörükbulut (2023) found that 32.3% of the participants had CEI because they were affected by the 6 February earthquakes and to cover potential damage from future earthquakes. This constituted the highest proportion of all the reasons given. Similarly, the compulsory earthquake insurance rate of the Turkish Catastrophe Insurance Pool increased by 2.7 per cent within a year (Ntv, 2025). On the other hand, the impact of the earthquakes was not limited to individuals, but was also reflected in public policies. As a matter of fact, within the scope of the Medium Term Plan for 2024, targets for the expansion of compulsory catastrophe insurances were included in government policies (Türkiye Sigorta Birliği, 2024).

Considering the developments at individual and public level, the prediction that the earthquake will have significant effects on the insurance sector and affect the performance of insurance companies has guided the purpose of this study. In this context, studies examining the performance of insurance companies reveal that those in the BIST100 are the most frequently studied (Tayyar et al., 2018). Therefore, the purpose of this study is to conduct a comparative performance analysis by determining the leverage degrees of six insurance companies traded in BIST100 and to examine the impact of the 6 February earthquakes on the leverage degrees of the companies.

2. Literature Review

A review of the literature reveals that operating, financial and total leverage levels of enterprises from different sectors have been analysed.

Beyazgül et al. (2022) analysed the operating, financial and total leverage of European football clubs. They also investigated the impact of the Covid-19 pandemic on the operating, financial and total leverage of the clubs. As a result of the study, it was determined that the operating and total leverage degrees differed statistically significantly in the pre and post-pandemic period.

Dayı (2019), examined whether there is a relationship between sales revenues and operating leverage of airline companies. As a result, a positive relationship was found between the sales revenues of airline companies and the operating leverage value.

Omağ (2015), analysed the degree of financial leverage of certain manufacturing sector enterprises between 2009-2013. According to the results of the research, textile manufacturing and paper manufacturing sectors have the highest level of financial leverage utilisation.

Akcanlı and Erem (2013) analysed the operating and financial leverage of manufacturing enterprises operating in BIST. As a result of the analysis, it was determined that the sectors with the lowest average operating leverage in 2011 were metal goods, machinery and equipment sectors, while the sectors with the highest financial leverage were paper and paper products and printing and publishing sectors.

Karadeniz (2012), analysed and compared tourism companies in BIST and Central Bank of The Turkish Republic Hotels and Restaurants sector in terms of operating, financial and total leverage. When the degrees between 2002 and 2009 are calculated, it is determined that the operating and financial leverage degrees of insurance companies traded in BIST are lower than the sector. It is also found that the average total leverage of the companies is negative.

There is no study in the literature that measures the effect of the 6 February 2023 earthquakes on the performance of insurance companies. Therefore, the study is expected to contribute to the literature in this respect.

3. Methodology

In the study, net income, net sales revenue and earnings before interest and tax data obtained from the annual financial statements of six insurance companies traded in BIST100 between 2022 and 2023 are used. The data of the insurance companies within the scope of the research were obtained from the annual reports published on the official websites of the companies (Anadolu Sigorta, 2024; Ray Sigorta, 2024; Anadolu Hayat, 2024; Ak Sigorta, 2024; Türkiye Sigorta, 2024; Agesa, 2024). The six insurance companies analysed within the scope of the research and their codes are presented in Table 1.

Table 1: Insurance companies covered by the research.

Code	Insurance Company
ANSGR	ANADOLU SİGORTA
RAYSG	RAY SİGORTA
ANHYT	ANADOLU HAYAT EMEKLİLİK
AKGRT	AK SİGORTA
TURSG	TÜRKİYE SİGORTA
AGESA	AGESA HAYAT EMEKLİLİK

The study has two objectives. The first one is to analyse the operating, financial and total leverage of six insurance companies traded in BIST100 for the years 2022-2023. Three different degrees of leverage are calculated to assess the financial performance of insurance companies. These consist of operating leverage (DOL), financial leverage (DFL) and total leverage (DTL). The DOL degree expresses the relationship between sales and earnings before interest and tax and is calculated by the following formula (Beyazgül et al., 2022);

$$DOL = \frac{\text{Percentage Change in Profit Before Interest and Taxes}}{\text{Percentage change in sales}}$$

The Financial Leverage (DFL) degree expresses the relationship between earnings before interest and tax and net income and is calculated by the formula below (Tevfik and Tevfik, 2018);

$$DFL = \frac{\text{Percentage Change in Net Profit}}{\text{Percentage Change in Profit Before Interest and Taxes}}$$

Total Leverage (DTL) degree is calculated by multiplying DOL and DFL degrees and measures the effect of the change in sales on the profitability of the enterprise. DTL degree is calculated by the following formula (Karadeniz, 2012);

$$DTL = \frac{\text{Percentage Change in Profit Before Interest and Taxes}}{\text{Percentage change in sales}} \times \frac{\text{Percentage Change in Net Profit}}{\text{Percentage Change in Profit Before Interest and Taxes}}$$

The second objective of the study is to conduct a difference analysis to analyse whether the 6 February 2023 earthquakes have a statistically significant effect on the leverage of insurance companies. Normality analysis was performed to decide whether parametric or non-parametric methods would be used for the difference analysis. Since the data were normally distributed, dependent samples t test was applied.

Statistical analysis was carried out using SPSS package programme and significance level was taken as 0.05.

4. Findings

The DOL, DFL and DTL ratings of 6 insurance companies traded in BIST 100 for the years 2022-2023 are calculated and shown in Table 2 below.

Table 2: Insurance companies' dol, dfl and dtl ratings

Insurance Company	2022			2023		
	DOL	DFL	DTL	DOL	DFL	DTL
Anadolu Sigorta	1,27	1,15	1,46	14,10	0,94	13,22
Ray Sigorta	0,12	1,03	0,13	-21,30	1,33	-28,27

Anadolu Hayat Emeklilik	1,16	1,06	1,23	2,61	0,84	2,20
Ak Sigorta	-0,71	0,58	-0,41	23,05	0,94	21,77
Türkiye Sigorta	-0,02	1,13	-0,03	6,57	1,07	7,06
Agesa Hayat Emeklilik	0,88	1,25	1,10	1,19	0,50	0,59
Mean	0,45	1,03	0,58	4,37	0,94	2,76

When the DOL ratings in Table 2 are analysed, it is seen that the DOL ratings of Ak Sigorta and Türkiye Sigorta are negative in 2022. It is observed that the DOL degrees of the companies other than these companies are positive. A one-unit increase in sales decreases Ak Sigorta's earnings before interest and tax by -0.71 and Türkiye Sigorta's earnings before interest and tax by -0.02. In 2022, Ak Sigorta has the lowest DOL rating. The highest DOL rating belongs to Anadolu Sigorta with 1.27. In addition, the average DOL rating for 2022 is 0.45, and except for the companies with negative values and Ray Sigorta, all other companies are above the average.

In 2023, except Ray Sigorta, the DOL rating of other companies increased. It is also observed that Ak Sigorta has the highest DOL rating. While Ak Sigorta had the lowest DOL value in 2022, it had the highest DOL value in 2023. In addition, Anadolu Sigorta has also managed to exceed the previous year's level with a DOL of 14.10. In 2023, the average DOL value is 4.37, significantly higher than in 2022. Therefore, it is understood that a one-unit increase in average sales in 2023 increases earnings before interest and tax by 4.37 times. However, if there is a decline in sales, earnings before interest and tax will decrease by 4.37 times. Therefore, it is understood that the operating risk also increases. In addition, considering that Ray Insurance significantly decreased the average with a rating of -21.30, it is understood that if this exceptional company is excluded, the average will increase even more in 2023.

When the DFL values in Table 2 are analysed, it is seen that all six insurance companies have a positive rating in 2022. Therefore, it is understood that a one-unit increase in earnings before interest and taxes of these six companies positively affects their net profits. Therefore, it is seen that the DFL level has a positive effect. In 2022, Agesa Hayat Emeklilik company has the highest DFL level and Ak Sigorta company has the lowest DFL level. Considering that the average DFL rating for 2022 is 1.03, it is seen that the ratings of all companies except Ak Sigorta are above average. In 2023, similarly, it is seen that all six companies have positive DFL ratings. Therefore, it is understood that net profits are positively affected in 2023 and the positive effect of the DFL level continues. In 2023, Ray Sigorta has the highest DFL rating and Agesa Hayat Emeklilik has the lowest DFL rating. In 2023, it is observed that the DFL ratings of the other four insurance companies, except Ray and Ak Sigorta, decreased slightly. In 2023, Ak Sigorta increased its DFL rating by approximately 50 per cent, while Agesa Hayat Emeklilik decreased it by 60 per cent. In 2023, the average DFL value decreased compared to the previous year to 0.94 and the DFL degrees of other insurance companies except Anadolu Hayat Emeklilik and Agesa Hayat Emeklilik are equal to or above the average. The financial risk of insurance companies decreased relatively in 2023. In 2022, a one-unit increase in earnings before interest and taxes changes the net profit of companies by 1.03 times on average, and in 2023, it changes by 0.94 times with a slight decrease.

When the DTL ratings in Table 2 are analysed, it is observed that Ak Sigorta and Türkiye Sigorta received negative ratings in 2022, while the other four companies received positive ratings. Therefore, it is understood that a one-unit increase in the sales of these two companies negatively affects their net profits. In 2022, Anadolu Sigorta has the highest DTL rating, while Ak Sigorta has the lowest DTL rating. In 2022, the average DTL rating of the companies was determined as 0.58. Accordingly, except for the two companies with negative values and Ray Sigorta, all other companies have a rating above the average. In 2023, it is observed that only Ray Sigorta has a negative DTL value and has experienced a significant decrease compared to the previous year with a DTL rating of -28.27. On the contrary, Ak Sigorta has the highest DTL value in 2023 compared to its negative DTL value in the previous year. The company with the lowest DTL rating is Ray Sigorta. In 2023, the average DTL value of companies increased more than 4.5 times compared to the previous year and reached 2.76. In 2023, except for Ray Sigorta, Anadolu Sigorta and Agesa Hayat Emeklilik, three other insurance companies had above average DTL values. DTL rating expresses total risk, which is the sum of operational and financial risk. In 2022, three companies and in 2023, all six insurance companies have higher DOL ratings than DFL ratings, regardless of whether their DOL ratings are negative or positive, indicating that total risk consists mostly of operating risk.

4. 1. Difference Analysis Results

It is tried to determine whether the DOL, DFL and DTL degrees of insurance companies traded in BIST 100 differ according to the 6 February 2023 earthquakes. For this purpose, firstly, it was checked whether the DOL, DFL and DTL degrees of six insurance companies for 2022 and 2023 are normally distributed. Normality test results are presented in Table 3.

Table 3: Normality Test

Leverages	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	sd	p	Statistics	sd	p
Dol2022	,209	6	,200*	,920	6	,505
Dfl2022	,328	6	,043	,802	6	,062
Dtl2022	,248	6	,200*	,892	6	,328
Dol2023	,249	6	,200*	,942	6	,675
Dfl2023	,195	6	,200*	,961	6	,825
Dtl2023	,283	6	,145	,897	6	,355

If the sample size is less than 35, the Shapiro-Wilk test is used, while if the sample size is more than 35, the Kolmogorov-Smirnov test is used. A P value greater than 0.05 indicates that the data show normal distribution (Demir et al., 2016).

Since the sample size is less than 35 in our study, the evaluation was made according to Shapiro-Wilk. When Table 3 is examined, the p value of all leverage degrees is greater than 0.05. Therefore, it is understood that the data are normally distributed.

Since the data are normally distributed, the dependent samples t-test was used to analyse whether there is a significant difference between the DOL, DFL and DTL ratings of the six insurance companies for 2022 and 2023. The results of the analysis are presented in Table 4.

Table 4: Dependent Samples T Test Results

Leverages	Pre-Earthquake (2022) Mean	Post-Earthquake (2023) Mean	Absolute Difference Between Means	t	sd	p
DOL	,4500	4,3700	3,92	-,636	5	,553
DFL	1,0333	,9367	0,10	,584	5	,585
DTL	,5800	2,7617	2,18	-,313	5	,767

When Table 4 is analysed, it is determined that the leverage degrees of the companies do not differ statistically in terms of the pre- and post-earthquake periods since the p values of DOL, DFL and DTL degrees of six companies are greater than 0.05 at the 0.05 level of significance.

5. Conclusion

6 February 2023 earthquakes would increase the interest in insurance in Türkiye and therefore, this situation would affect the leverage degrees of the companies, which guided the purpose of the study. For this purpose, firstly, the financial statements of six insurance companies traded in BIST 100 for the years 2022 and 2023 were analysed and their DOL, DFL and DTL degrees were calculated.

As a result of the analysis, it was determined that the company with the lowest DOL rating in 2022 is Ak Sigorta, while the company with the highest DOL rating is Anadolu Sigorta. In 2023, it was determined that the DOL ratings of the companies generally increased. In 2023, Ak Sigorta, which had the lowest DOL rating in the previous year, experienced a significant increase and was found to have the highest DOL rating. The company with the lowest DOL rating was determined to be Ray Sigorta. In addition, it was determined that half of the companies received a value above the average DOL rating in 2022. In 2023, the average DOL value increased to 4.37.

When the DFL values of the companies are analysed, it is determined that in 2022, all six companies received a positive rating and Agesa Hayat Emeklilik had the highest DFL rating. In 2023, it was determined that all six companies received a positive DFL value as in the previous year and Ray Sigorta received the highest value. The company with the lowest DFL value was Agesa Hayat Emeklilik, which had the highest value in the previous year. When we look at the average of the DFL ratings, it was determined that in 2022, it was 1.03 and all companies except one company had a value above the average; in 2023, the average decreased to 0.94.

When the DTL values of the companies are analysed, it is determined that four companies have positive and two companies have negative values in 2022; Anadolu Sigorta has the highest degree and Ak Sigorta has the lowest degree. In 2023, it was determined that all companies except one company had a positive DTL rating, Ak Sigorta had the highest rating and Ray Sigorta had the lowest rating. It is noteworthy that while Ak Sigorta had the lowest DTL value in the previous year, it has the highest rating in 2023. In 2022, the average DTL rating of the companies was 0.58 and half of the companies were above the average; in 2023, the average increased to 2.76 and again half of the companies were above the average.

For the purpose of the study, it is examined whether the leverage degrees of insurance companies traded in BIST100 differ in the context of the pre- and post-earthquake period. In this context, the dependent samples t-test was applied based on the normal distribution of the data set. As a result of the analysis, since the p values are greater than 0.05, it is determined that the leverage degrees of insurance companies do not differ according to the earthquake. This finding suggests that the earthquake did not have a significant impact on the sectoral leverage structure in the short term. However, more comprehensive data sets are needed to determine how this situation will evolve in the long run.

In terms of future research, it is recommended that the annual data scope of the study be expanded and a long-term analysis be conducted. In addition, it would be useful to include other insurance companies operating outside the BIST100 in the analysis without being limited to the insurance companies in the BIST100 index in order to make sectoral generalisations. In this way, the financial resilience of the Turkish insurance sector against natural disasters can be evaluated in a more comprehensive and holistic manner.

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