

DETERMINANTS OF REINSURANCE COSTS FOR TURKISH NON-LIFE INSURANCE COMPANIES*

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ABSTRACT

Purpose- Reinsurance is one of the most common practices in the insurance sector, however, it is not free of charge. The insurance companies have to bear some costs to assure the reinsurers for sharing the risks of potential losses. The objective of this article is to explore the firm-level factors that may affect the cost of reinsurance to an insurance company. In order to achieve the objective, the relationship between reinsurance cost and financial and technical ratios, which are good monitoring tools for insurance companies, has been analyzed.

Methodology- The relationship between reinsurance cost and financial and technical ratios has been analyzed using panel data analyses. The data was obtained from the official website of the Insurance Association of Türkiye (IAT). The data set include variables for 26 non-life companies for the period of 2009 - 2021. Two separate models have been developed; one model with financial ratios and the second model with technical ratios. The analyses are also repeated by uncovering the COVID-19 period and the 2018 currency crisis.

Findings- The findings of the study revealed that the financial ratios, namely return on assets and debt ratio; technical ratio as retention ratio all have a negative significant effect on reinsurance cost. That is the higher the profit, debt level, and retention ratio, the more reluctant the insurance companies are to bear insurance costs and carry most of the risks. Such variables have a negative effect on reinsurance costs with a higher significance level, even after uncovering the recent COVID-19 pandemic and 2018 currency crisis periods. When COVID-19 and 2018 currency crisis periods are excluded from the data set, Net Combined Ratio becomes an additional significant factor affecting the reinsurance costs.

Conclusion- As long as there is an insurance sector, there must be a reinsurance sector alongside. Companies from both sectors need to go hand in hand in order to eliminate the possible future severe damages in case of fire, flood, or earthquake. However, reinsuring an insurance contract would generate costs like every transaction in this economic system. The findings indicate that determinants of reinsurance cost are as follow; return on asset, debt ratio, and retention ratio. This result would help management teams of insurance companies foresee the cost of reinsurance when they monitor closely the ratios. In other words, the management team of an insurance company could control and handle the condition of reinsurance contracts that generate cost.

Keywords: Reinsurance cost, insurance, firm performance, panel data analysis, ratio analysis.

JEL Codes: G22, L25, C23

1. INTRODUCTION

People face uncertainty and risks throughout their lives. Uncertainties and risks can cause losses unexpectedly. Thus, personal savings are subject to losses and future living standards may be endangered. Throughout history, to prevent or compensate for such future material losses, some charitable foundations or entrepreneurs have started to cover the damages of the others by establishing similar institutions, like insurance companies, with their current meaning. However, the insufficiency of these unorganized activities and the increasing demand from individuals or corporates for protection against risks have led to the emergence of the insurance sector.

The emergence of the insurance sector has caused the damages to be met from the funds created by the insurance companies. The insurance activity had started with the focus on activities of marine transportation and continues to develop

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with insurance in all other branches (Morris, 2018). The insurance sector has gained a prominent place in social life, both in terms of enabling safe investment and trade, as well as the benefits and externalities that provides in terms of funding function in financial markets.

Although insurance corporations are established to cover the potential losses incurred by insured parties, they also need additional insurance to ensure their ability to meet possible claims. Thus, insurance companies also insure their potential risks, which gives a raise to reinsurance.

The insurance itself and re-insurance of course are not free of charge. While the insured need to pay premiums to the insurance company, the insurance company also bare some costs to assure the re-insurer company shares the risks of potential losses. While the amount of premiums paid by the insured is related to the level of exposure, the cost of reinsurance may be related to several other factors including the nature of risks to be shared, and the financial and technical position of the insurance company.

It is aimed this article to explore the firm-level factors that may affect the cost of reinsurance to the insurance company. In this study, the relationship between reinsurance cost and the financial and technical position of the insurance companies has been examined for 26 non-life insurance companies in the period 2009-2021 (13 years). The findings of the panel data analyses revealed that Return on Asset and Debt Ratio on the financial side and the Retention Ratio on the technical side are the factors affecting the cost of reinsurance.

The literature investigating the relationship between the cost of reinsurance with financial and technical ratios has been examined and summarized in the second section of the study, including the effects of the COVID-19 pandemic on the insurance sector. In the third section, the methodology and data utilized are introduced. In the fourth section, the empirical findings are presented. The study is completed with the conclusion section where the empirical analysis results are evaluated.

2. LITERATURE REVIEW

The insurance companies are trying to achieve a balance between the amount of capital invested and reinsurance purchased because such balance affects the capital requirements (Altuntas et al., 2018). In this manner, the demand for reinsurance is a capital structure problem (Cummins et al., 2021). While the capital structure preferences affect the demand for reinsurance, the demand for reinsurance affects the cost of reinsurance that is born by the insurance company.

Existing literature analyzed several factors that may affect the demand for insurance including the general economic factors and firm-level factors. Firm-level factors are mostly examined in terms of financial and technical ratios or the position of the insurance sector.

Among studies, which examine the insurance companies' financial position and the reinsurance, Lee and Lee (2012), Mayers and Smith (1990), Cole and McCullough (2006), and Adams et al. (2008) document that insurance companies with higher ROA tend to have fewer reinsurance contacts, resulting in less reinsurance cost. Furthermore, Berger et al. (1992) present evidence that insurance company performance is positively connected to the proportion of liquid assets; implying that liquid insurance businesses with sufficient liquidity reinsure less (Chen & Wong, 2004). Hence, Lee and Urritia (1996) and Lee and Lee (2012) also find a negative and highly significant relationship between liquidity and reinsurance. Moreover, from the reinsurer perspective, Cole and McCullough (2006) suggest that liquidity in the reinsurer part could be evidence of excess cash circulation, which leads to giving more reinsurance supply.

While most of the studies discover similar relation between insurer performance and reinsurance, the evidence about the relationship between financial leverage and demand for reinsurance is mixed. According to Garven and Tennant (2003) and Hoyt and Khang (2000), reinsurance financing is essentially a replacement for insurers' equity, and there is a strong positive association between leverage and reinsurance. Carneiro and Sherris (2005) also discovered substantial evidence of a positive link between financial leverage and reinsurance demand. While Lee and Lee (2012) and Aunon-Nerin and Ehling (2008) find no substantial influence on reinsurance costs, Zou et al. (2003) discover a strong negative link.

From the technical point of view of the insurance companies, huge casualties will reduce the total reinsurance availability and raise reinsurance rates. Reinsurance enhances cash flow predictability and reduces profit fluctuations (Weiss & Chung, 2004). Cole and McCullough (2006) and Cummins et al. (2021) found a negative relationship between reinsurance cost and reinsurance demand. On the contrary, Hoerger et al. (1990) show the existence of a positive relationship, stating that increase in reinsurance price, thus cost, will result in a decrease in reinsurance demand. On the other hand, Lee and Lee (2012) found no significant relation.

Lee and Lee (2012) discovered a substantial positive relationship between reinsurance cost and underwriting risk, implying that insurers with higher underwriting risk are more likely to buy more reinsurance. In the same vein, Winter (1991), Doherty and Garven (1993), and Browne and Hoyt (1995) found a highly positive significant relationship between the combined ratio and insolvency rate, which leads increase in the need for reinsurance, thus reinsurance cost. Cole and McCullough (2006) found that the combined ratio is negatively correlated to the price, thus increasing the demand for reinsurance contracts. It is expected for insurers to move toward the reinsurance market at a lower price.

As mentioned by Altuntas et al. (2018), several factors other than firm-level factors are affecting the demand for reinsurance; the recent COVID-19 pandemic is one example of those factors. The COVID-19 pandemic has certain consequences on real-life as well as on economic activities such as supply chain disruptions, business close-downs, decrease in job creation, and increases in the unemployment rate. Although the economic effects of the pandemic are evident for all countries and sectors, such effects may not be disruptive for all, while some sectors turn pandemics into an opportunity, some sectors come to the point of bankruptcy.

Considering the impact of the pandemic on the insurance industry from two different perspectives, Babuna et al. (2020) state that with the effect of the pandemic, people around the world started to see the insurance industry and governments as a ray of hope, however, some insurance companies weakened financially because the rapid increase in the number of cases was higher than the number of recoveries. Stojkoski et al. (2021) find an aggravating effect of COVID-19 on the insurance sector for the Republic of North Macedonia; Parvathi and Lalitha (2021) and Kaur and Singh (2022) for India; Shevchuk et al. (2020) for Ukraine; Vojinović et al. (2022) for Serbia; Puławska (2021) and Cristea et al. (2021) for EU countries; Ikhwan and Rusydiana (2022) for Indonesia; Worku and Mersha (2020) for Ethiopia; Haque et al. (2021) for Bangladesh; Wang et al. (2020) for China; Babuna et al. (2020) for Ghana. On the other hand, Yıldız (2021) found a positive impact of COVID-19 on Turkey's insurance sector in terms of total written premium. In addition to that Atukalp (2021) found that after COVID-19, the health insurance increased since the number of coverages increased.

3. DATA AND METHODOLOGY

This section describes the data and methodology used in this study to examine the firm-level financial and technical factors affecting the cost of reinsurance.

3.1. Data

This study employs a balanced sample of the yearly panel data of the Turkish insurance companies. The sample consists of a balanced panel data set from 26 non-life insurance companies from 2009 through 2021 (13 years). These 26 companies are taken as a sample, because of their persistence to exist in the insurance sector, continuously. In addition to that, these 26 companies represent 93.23% of the whole sector in terms of gross premium written throughout 13 years. All data were extracted from the publicly open database given on the official website of the Insurance Association of Türkiye (IAT). Table 1 presents dependent, independent, and control variables with their descriptions.

The reinsurance cost (REC) is not just the price paid up to the reinsurance company. All reinsurance-related items, ranging from premiums to commissions, are summed up to reach the figure of the reinsurance cost of a company. Reinsurance costs may be negative or positive. As a technical term, the share of risk that the main insurer transfers to another insurer (reinsurer) is referred to as "reinsurance ceded" in the insurance business. When ceding premium would be a cost to an insurance company, ceding claims (either paid, outstanding, or CF outstanding) is taken as revenue. Table 1 presents the accounts listed that are used to calculate reinsurance cost, which is used as a dependent variable in empirical analysis.

Possible relation between firm-level financial factors and reinsurance has been examined in the literature section above. Following the literature, among the alternative firm-level, financial factors Return on Assets (ROA), Liquid Asset Ratio (LIQ), and Debt Ratio (DEB) are taken as independent variables. The insurance companies with higher ROA generally favor not making more reinsurance agreements because they are profitable and able to pay the coverage whenever the claims happen. Therefore, an increase in ROA, decreases the number of reinsurance agreements, thus reinsurance costs.

The liquidity ratio is an important sign of the soundness of the company or solvency. The insurance company with more liquid assets would be less likely to be open to the risks of possible claims shortly. Thus, if the company is liquid enough, that means the company would need fewer contracts of reinsurance than non-liquid companies would. If an insurance company has an abundance of liquid money, then its reinsurance cost will decrease because of no-demand reinsurance contracts. It is expected to have a negative relationship between being liquid and reinsurance costs.

If a company's total debt is increasing, while keeping other things constant, then the company's debt ratio is increasing. Because the probability of default for a company with more debt is higher than for a debt-free company, a high leverage ratio

(known as debt ratio) can even cause bankruptcy. So, the company needs to buy an extra cushion for the unwanted consequences of high debt. This cushion could be a reinsurance contract with another risk-bearer, which is a reinsurer. Reinsurance contracts make reinsurers share the burden of the claims from insured parties given a fixed amount of capital. Therefore, it is expected that reinsurance costs will be increasing when a company has high financial leverage. On the other hand, there is another side of the coin. If a company is facing financial constraints and has high financial leverage, it would not want to have any more costs than it already has. Thus, a company with high leverage would not make a reinsurance contract to avoid an extra cost. Thus, the relation between the leverage and the cost of reinsurance can also be negative.

Table 1: List of Variables

Dependent Variable	Description
REC - Reinsurance Cost	<p>Illustrates the cost of reinsurance for insurance companies that are calculated as the sum of all the reinsurance-related items such as premiums, claims, expenses, or reserves. The accounts used to calculate REC include:</p> <ol style="list-style-type: none"> 1. Ceded Premiums 2. Ceded Unearned Premium Reserve (UPR), and Carried Forward (CF) UPR 3. Ceded Unexpired Risk Reserve (URR) and CF URR 4. Ceded Claims (Paid, Outstanding, CF Outstanding) 5. Ceded Discount and CF Discount 6. Received and Paid Commissions 7. Ceded Technical Income or Expense 8. Ceded Recoveries and Salvage and Their Receivables 9. Ceded Mathematical Reserves and CF Mathematical Reserves 10. Ceded Equalization Reserve 11. Ceded Financial Risk Reserves 12. Ceded Other Technical Reserves
Independent Variables	
Financial Ratios	
ROA – Return on Assets	It indicates how a company efficiently and effectively uses its assets to generate income.
LIQ – Liquid Asset Ratio	It shows the proportion of liquid assets out of total assets.
DEB – Debt Ratio	It estimates how easily an organization could pay its debts using its profit.
Technical Ratios	
RET – Retention Ratio	It measures how much of the risk is carried by an insurer rather than passed on to reinsurers in terms of premiums.
REP - Reinsurance Price	It is calculated as dividing ceded premium minus received commissions (from reinsurers) by reinsurance share of claims.
COR – Net Combined Ratio	It gives a comprehensible, overall analysis in terms of profitability. More than 100% is non-advantageous.
Control Variables	
LEQ - Equity Capital	It is the natural logarithmic equivalent of a company's equity.
LBC - Line-of-Business Concentration	It is calculated by finding every company's part of the Herfindahl-Hirschman index.

Possible relation between firm-level technical factors and reinsurance has also been examined in the literature section above. Following the literature Retention Ratio (RET), Reinsurance Price (REP), and Net Combined Ratio (COR) are taken as independent variables for representing technical factors. The more the insurance company cedes its premiums, the more reinsurance cost increases. If this RET is low, that means the principal subsistence of the insurance company, premiums, mostly goes to the reinsurer. In the case of poorly made reinsurance contracts or risk-averse companies, the income will be turned out to be low because of the low retention rate. On the contrary, the insurance company would choose not to make a reinsurance contract, bringing a 100% retention rate as an extreme example. In this case, the insurance company takes all the risks on them and cancels out the reinsurance cost. Therefore, having a high retention rate would decrease the reinsurance cost. It is expected that as the cost of reinsurance increases, the amount of reinsurance demand will decrease. In other words, when the reinsurance price increases, the reinsurance cost will increase, too. On the other hand, COR is an indicator of profitability for insurance companies, when it is increasing, the demand for reinsurance contracts is also increasing alongside it. It can be studied and looked upon as two components. If Net Loss Ratio is about to increase over time, that means the insurance company needs to have the cash to pay claims or need reinsurance contracts for covering the

possible future claims. If the Net Expense Ratio, on the other hand, is increasing, the company's cash belongings are canalized to operational costs rather than claim payments. Therefore, the company needs to find an extra fund to cover possible losses or make a reinsurance contract since its money is gone for operational expenses. In summary, when Net Combined Ratio increased, the demand for, therefore cost of, reinsurance increased.

The less reinsurance that insurance firms desire, the more focused they are on the line of business (Chidambaran et al., 1997; Mayers & Smith, 1990). Lee and Lee (2012), Cole and McCullough (2006), Garven and Tennant (2003), and Mayers and Smith (1990) suggest the negative impact of line-of-business concentration on a firm's reinsurance cost is highly significant. Because when an insurance company is highly concentrated on one line of business, it can soundly and healthily predict the risks in new businesses, thus does not seek any reinsurance to secure itself.

Companies with no sound equity structure would be more likely to be funded by loans. The more loans borrowed; the higher default risks arose. That situation, naturally, leads to the craving for more reinsurance (Lewis & Murdock, 1996). Likewise, smaller insurance companies are also at higher default risks and possibly become insolvent. Thus, they need to avoid broad claims and require reinsurance contracts more than big companies need. Therefore, they improve their own risk of engaging efficiency. Thence, their demand for reinsurance becomes high. It is expected to have a negative relationship with size and reinsurance cost. One-unit improvement in a company's equity resulted in less demand for reinsurance. That would decrease the reinsurance cost. Studies suggested that reinsurance is negatively related to the company's size or in this case, the natural logarithmic of the equity (Garven & Tennant, 2003; Powell & Sommer, 2007; Adams, 1996). In the study by Lee and Lee (2012), the result suggested there is no significant relationship between the size and reinsurance cost.

Based on the explanations above, the hypothesis of this study is presented in Table 2.

Table 2: Hypotheses

Technical Ratio Model		Financial Ratios Model	
<i>H0:</i>	Reinsurance cost is not affected by technical ratios	<i>H0:</i>	Reinsurance cost is not affected by financial ratios
<i>H1:</i>	Reinsurance cost is affected by technical ratios	<i>H1:</i>	Reinsurance cost is affected by financial ratios

Table 3 presents the basic statistics of the dependent variables and explanatory variables. Reinsurance cost has a mean of 0.1568 and a standard deviation of 0.2473. Some variables have been winsorized at 1% and 99% for eliminating outliers and normalized from -1 to 1 (from 0 to 1 when there is no negative value in the variable) with the target of adapting the range to the other independent variables.

Table 3: Descriptive Statistics

Variables	Mean	Median	Standard Error
REC	0.1568	0.1265	0.2473
ROA	0.4979	0.8117	0.5288
DEB	0.5101	0.5182	0.1747
LIQ	0.5730	0.5991	0.2352
RET	0.5508	0.5760	0.2215
COR	0.1955	0.1576	0.1457
REP	0.2377	0.2319	0.1848
LBC	0.2234	0.0958	0.2680
LEQ	0.1143	0.0502	0.2303

Tables 4 and 5 below show the correlation between dependent, independent, and control variables with the Pearson correlation statistics.

According to both tables below, REC is positively correlated with ROA, RET, REP, LBC, and LEQ, only negatively correlated with COR. There are no significantly high correlations among independent variables with no more than a 70% correlation level.

Table 4: Correlation Matrix for Financial Ratios and Control Variables

	REC	ROA	DEB	LIQ	LBC	LEQ
REC	1.0000					
ROA	0.1333**	1.0000				
DEB	0.0608	-0.3447***	1.0000			
LIQ	0.0536	0.1003*	-0.0361	1.0000		
LBC	0.4059***	0.2470***	-0.0534	0.0260	1.0000	
LEQ	0.3756***	0.4059***	-0.2299***	0.1484***	0.6407***	1.0000

*Significant at 0.10 level; **significant at 0.05 level; *** significant at 0.01 level.

Table 5: Correlation matrix for technical ratios and control variables

	REC	RET	COR	REP	LBC	LEQ
REC	1.0000					
RET	0.0980*	1.0000				
COR	-0.1856***	-0.2638***	1.0000			
REP	0.0913*	0.0135	-0.2105***	1.0000		
LBC	0.4059***	0.2738***	-0.2592***	0.0735	1.0000	
LEQ	0.3756***	0.1269**	-0.2724***	0.0185	0.6407***	1.0000

*Significant at 0.10 level; **significant at 0.05 level; *** significant at 0.01 level.

3.2. Methodology

This study uses panel data for analysis. One of the main advantages of panel data analysis, which reduces the disadvantages of time series analysis by combining it with the cross-section analysis method, is that the obtained estimates provide more information and are more effective. Another advantage is that panel data analysis combines cross-section and time-series observations to have a larger number of observations, thus enabling more reliable predictions to be made.

In the upcoming panel data analysis, two separate models arose: Financial Ratio Model and Technical Ratio Model. Because these ratios are two different concepts, it was beneficial to look at the relationship with reinsurance cost, separately; so that the effects would be more precise.

After conducting the Hausman (1978) test, both models turned out to be suitable for a random effect model. The financial and technical ratio model is constructed are illustrated by equations 1 and 2.

Financial ratio model:

$$REC_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 LIQ_{it} + \beta_3 DEB_{it} + \beta_4 LEQ_{it} + \beta_5 LBC_{it} + u_{it} \quad (1)$$

Technical ratio model:

$$REC_{it} = \alpha + \beta_1 RET_{it} + \beta_2 REP_{it} + \beta_3 COR_{it} + \beta_4 LEQ_{it} + \beta_5 LBC_{it} + u_{it} \quad (2)$$

Several diagnostic tests have been conducted in order to test the model properly[†]. First of all, based on the results of the Likelihood-ratio (LR) Test, the unit effect is included in the models. As heteroscedasticity can occur because the results originate from a wide number of cross-sectional insurance companies. The result of the Levene (1961) and Brown and Forsythe (1974) tests reveal the presence of heteroskedasticity for both models. To test for autocorrelation, the Breusch and Pagan (1980) test is performed and found that there is autocorrelation for the financial and technical ratio model (no inter-unit correlation according to Friedman (1937) for the financial model; and both autocorrelation and inter-unit correlation for technical model). Accordingly, the model is estimated as a one-sided unit effect model with a random effect. Because both models have heteroskedasticity, autocorrelation, and inter-unit correlation, it's better to use Driscoll and Kraay (1998) for more robust outputs. (Tatoğlu, 2012).

D'Agostino et al. (1990) normality test has been done after testing for heteroskedasticity and autocorrelation. The test results suggest that all the variables used in the analysis are not normally distributed. Therefore, outliers have been removed from the data as stated above.

[†] The diagnostic tests mentioned in the methodology section are not reported in the article but available upon request.

4. EMPIRICAL FINDINGS

As explained in the previous section, firm-level financial factors can influence the cost of reinsurance for a company. Table 6 presents the findings of the financial ratio model.

Table 6: Results of Panel Data Analysis for Financial Ratio Model

Dependent Variable: REC				
Variables	Expected	Coefficient	Standard	t
ROA	-	-0.0180*	0.0088	-2.03
DEB	+ / -	-0.1743**	0.0693	-2.52
LIQ	-	-0.0898	0.0588	-1.53
LBC	-	-0.2583***	0.0771	-3.35
LEQ	-	-0.1836**	0.0822	-2.23
CONS		0.0712	0.0562	1.27
R-squared	0.1979	Wald chi2 (5)		140.15
Rho	0.1649	Prob>chi2		0.0000

*Significant at 0.10 level; **significant at 0.05 level; *** significant at 0.01 level.

The ROA has a weak negative effect on the reinsurance cost at a 10% significance level. This finding is in line with the empirical studies of Lee and Lee (2012), Mayers and Smith (1990), Cole and McCullough (2006), and Adams et al. (2008) that all are suggesting that an increase in ROA would decrease the reinsurance contracts, thus reinsurance cost.

The debt ratio, on the other hand, has a stronger negative effect on insurance costs, with a 5% significance. Thus, according to the findings, an increase in debt is expected to decrease reinsurance costs. It seems that the companies, which already bear a high cost of debt, are reluctant to insure additional costs in terms of reinsurance; hence reinsurance costs are decreasing as leverage is increasing. The negative effect resulting in the table above is consistent with the findings of Zou et al. (2003).

Although several studies have documented a significant negative relationship between liquidity and reinsurance (Chen & Wong, 2004; Lee & Urritia, 1996; Lee & Lee, 2012), such significant relation could not be found in this study. The findings revealed that liquidity has a negative effect on reinsurance cost but it is not significant.

Table 7 presents the findings for firm-level technical factors. The findings reveal that reinsurance cost is significantly affected by only retention ratio (RET), whereas both control variables have a significant effect. Nonetheless, no significant effect was found on the reinsurance cost for net combined ratio (COR), and reinsurance price (REP).

Table 7: Results of Panel Data Analysis for Technical Ratio Model

Dependent Variable: REC				
Variables	Expected	Coefficient	Standard	t
RET	-	-0.0311*	0.0145	-2.14
COR	+	-0.1104	0.1080	-1.02
REP	+	0.0486	0.0316	1.54
LBC	-	-0.2467**	0.0974	-2.53
LEQ	-	-0.1727*	0.0912	-1.89
CONS		0.1091	0.0446	2.45
R-squared	0.1940	Wald chi2 (5)		19.74
Rho	0.1955	Prob>chi2		0.0014

*Significant at 0.10 level; **significant at 0.05 level; *** significant at 0.01 level.

The retention ratio negatively affects the reinsurance cost at a 10% significance level. This result suggests that the less an insurance company cedes its premium, the less it holds the money itself, and the less reinsurance cost incurs. In other saying, ceding a high percentage of premium to reinsurance would increase the reinsurance cost.

In the analyses presented in Tables 6 and 7, both control variables have significant effects on reinsurance cost. Line-of-business concentration has a highly significant negative effect on reinsurance costs. When a company is too much concentrated on and an expert in a specific line of business, it knows the future risk well, and would not require reinsurance contracts, accordingly. This result is in line with the empirical findings of Lee and Lee (2012), Cole and McCullough (2006),

Garven and Tennant (2003), and Mayers and Smith (1990). Equity capital has a significant negative impact on reinsurance costs as in line with the previous studies (Garven & Tennant, 2003; Powell & Sommer, 2007; Adams, 1996).

One might think that the recent COVID-19 pandemics and the currency crisis of 2018 in Turkey affect the findings presented above. To test the robustness of our findings presented above, the same analyses were carried out from 2009 to 2017.

The most significant difference between analyses for the 2009-2017 period is that the combined ratio (COR) in the technical model becomes significant at 1%. Moreover, although the ROA, DEBT, and RET factors have a similar effect on the cost of reinsurance, the significance levels are subject to increase to 1% or 5%. Similar differences are also found for control variables. While both control variables are significant for the 2009-2021 period for both analyses under financial and technical factors, for the 2009-2017 period these variables become insignificant either financial or technical factors.

Such differences can be explained by the COVID-19 effect due to the imbalances in the number of claims and premium income (for instance see, Haque et al., 2021; Puławska, 2021; Wang et al., 2020; Stojkoski et al., 2021; Worku & Mersha, 2020; Parvathi & Lalitha, 2021). Moreover, by 2019, several mergers and acquisitions have been experienced in the insurance sector. Like the establishment of Türkiye Sigorta in June 2020 by the merger of Güneş Sigorta, Ziraat Sigorta, and Halk Sigorta (Birleşme Sözleşmesi, 2020); while HDI Sigorta bought Liberty Sigorta in July 2018 and Ergo Sigorta in December 2019 (Birleşme, n.d.).

5. CONCLUSION

If there is an insurance sector, there must be a reinsurance sector alongside. Companies from both sectors need to go hand in hand to eliminate the consequences of possible future big damages in case of fire, flood, or earthquake. However, reinsuring an insurance contract would generate costs like every transaction in this economic system.

Insurance companies may prefer not to cede the written policies to the reinsurers. At first glance, it is a costless choice, however, the company must face all the risks of the policies it holds. The company, on contrary, may not want to face risk and reinsure all the policies it has written. Whenever there would be a claim, the company will not feel financial distress. However, if an insurance company reinsures all policies and ceded the premiums, then its profit potential will be limited. Consequently, this way is taken to be granted as the costliest. The management and reinsurance department of the insurance companies needs to find the optimal reinsurance contract agreement to make the most suitable, profitable, and applicable situation.

This article is aimed to show the relationship between the financial and technical ratios and reinsurance costs. Thus, the objective of this study is to reveal the effects of insurance companies' financial position (in terms of profitability, liquidity, and leverage) and technical performance (in terms of retention, combined costs, and reinsurance price) on reinsurance costs.

The findings of the study revealed that the financial ratios, namely return on assets and debt ratio; technical ratio as retention ratio all have a negative significant effect on reinsurance cost. Such effects are even significant even after uncovering the recent COVID-19 pandemics and the 2018 currency crisis periods.

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