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ANALYSIS OF FACTORS AFFECTING PROFITABILITY OF INSURANCE COMPANIES IN TURKEY: PANEL DATA APPROACH

Ph. D. DISSERTATION

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ONAY SAYFASI

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PLAGIARISM PAGE

I hereby declare that all information in this thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all materials and results that are not original to this work; otherwise I accept all legal responsibility. 23.12.2019

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ABSTRACT

Analysis of Factors Affecting Profitability of Insurance Companies in Turkey: Panel Data Approach

Profitability is important for insurance companies as it is indicator of whether they are able to continue their activities and fulfill their obligations to policyholders. In recent years, economic conditions all over the world and the market conditions peculiar to Turkey has been causing volatility in profitability of insurance companies.

The aim of this study is to find out most important firm-specific and macroeconomic variables affecting profitability of insurance companies in Turkey considering the differences of life and non-life sectors.

The study for life insurance companies covers the period between 2006 and 2017 for 16 life insurance companies. ROA and ROE are used as measures of profitability. According to the dynamic panel data model results, lagged value of ROA and ROE, premium growth rate, age, GDP growth rate, interest rate and pension activity have positive impact on profitability while expense ratio, leverage ratio and liquidity have negative impact.

The study for non-life insurance companies covers the period between 2006 and 2017 for 21 companies. ROA is used as measure of profitability. According to the fixed effects panel data model results, size, liquidity, investment yield, age, GDP growth rate and interest rate have positive impact on profitability while premium growth rate, loss ratio, leverage ratio and solvency have negative impact.

Keywords: Insurance, panel data, profitability, ROA, ROE

ÖZET

Türkiye'deki Sigorta Şirketlerinin Karlılığını Etkileyen Faktörlerin Analizi: Panel Veri Yaklaşımı

Sigorta şirketlerinin faaliyetlerini sürdürebilmesi ve sigortalılara karşı yükümlülüklerini yerine getirebilmesi açısından önemli bir ölçüt olan karlılık, ekonomik şartların ve iklim değişikliklerinin etkisiyle tüm dünyada sigorta şirketlerinin finansal performansının kötüleştiği ve Türkiye'de piyasaya özgü şartlar nedeniyle yüksek dalgalanmaların görüldüğü bir ortamda daha önemli bir hal almıştır.

Bu çalışmanın amacı Türkiye'deki sigorta şirketlerinin karlılığını etkileyen en önemli firmaya özgü ve makroekonomik değişkenleri bulmaktır. Çalışma hayat sektörü ve hayat-dışı sektör için ayrı ayrı yapılmıştır.

Hayat sektörü için yapılan çalışma 2006-2017 dönemini ve 16 hayat sigorta şirketini kapsamaktadır. Aktif karlılığı (ROA) ve özsermaye karlılığı (ROE) karlılık ölçütü olarak alınmıştır. Dinamik panel veri modeli sonuçlarına göre aktif karlılığı ile özsermaye karlılığının bir yıl gecikmeli değerleri, prim büyüme oranı, yaş, Gayrisafi Yurtiçi Hasıla (GSYİH) büyüme oranı, faiz oranı ve bireysel emeklilik faaliyeti ile karlılık arasında olumlu yönde ilişki tespit edilmiş, masraf oranı, kaldıraç oranı ve likidite ile karlılık arasında olumsuz yönde ilişki tespit edilmiştir.

Hayat-dışı sektörü için yapılan çalışma 2006-2017 dönemini ve 21 hayat-dışı sigorta şirketini kapsamaktadır. Aktif karlılığı karlılık ölçütü olarak kullanılmıştır. Sabit etkiler panel veri modeli sonuçlarına göre karlılık ile büyüklük, likidite oranı, yatırım getirisi, yaş, GSYİH ve faiz oranı arasında olumlu yönde; prim büyüme oranı, hasar prim oranı, sermaye yeterliliği oranı ve kaldıraç oranı arasında olumsuz yönde ilişki tespit edilmiştir.

Anahtar Kelimeler: Aktif karlılığı, özsermaye karlılığı, panel veri, sigorta

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LIST OF ABBREVIATIONS

DASK: Mandatory Earthquake Insurance

EVA: Embedded Value Approach

GMM: Generalized Method of Moments

MM: Franco Modigliani and Merton Miller

OECD: Organization for Economic Co-operation and Development

ROA: Return on Assets

ROE: Return on Equity

ROI: Return on Investment

ROIC: Return on Invested Capital

VIF: Variance Inflation Factor

WACC: Weighted Average Cost of Capital

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1. INTRODUCTION

Insurance have been providing protection for people against damages of unwanted events such as flood, car accident, earthquake or storms for years. People transfer the risks stemming from unwanted events to insurance companies in exchange for premiums. Insurance companies create pools through collected premiums and indemnify the people exposed to unwanted events from these pools.

Insurance has been very effective way of risk transfer because of its functions. By paying affordable premiums during comfortable times people mitigate negative effects of unwanted events via insurance. In this way, insurance makes people get rid of anxieties, make plans more bravely. Insurance helps entrepreneurs develop new businesses by giving security. By creating huge funds via premiums and channeling them through financial markets, insurance finances those who need funds for creating new businesses or expanding existing businesses. Insurance prevents socioeconomic losses via products such as unemployment insurance, reduces number of unwanted events by encouraging people to take precautions, generates employment, provides income in the form of tax for government, enhances international trade via product types such as export insurance. As a result, insurance sector contributes to economic growth and welfare (Öner Kaya, 2015).

Because of these benefits, insurance is given much importance by all parts of society. Insurance industry has reached an enormous size in the world in 2018 with the premium production of 5 trillion U.S. Dollars. Insurance industry in developed countries produced huge amounts of premium such as 1.4 trillion U.S. Dollars for United States which is ranked number one in total premium volume in 2018 (Swiss Re, 2019). Developing countries, on the other hand, work to produce strategies to develop insurance markets.

Premium production in Turkey reached to 54.6 billion TL in 2018. In an exchange, 126.9 trillion TL coverage that is 34 times GDP of Turkey was provided to insureds by insurers (Ministry of Treasury and Finance, 2019). The size of Turkish insurance market is rather small compared to that of the developed countries. Turkey is ranked 63 in insurance density (premium per capita) and 72 in penetration (premiums as of GDP) in 2017. Total written premium in 2017 was 12 billion dollars. Insurance industry in Turkey is also rather

small compared to banking industry, which is around 21 times greater than insurance industry in terms of assets. These figures tell us that the industry has great growth potential. The development of insurance in Turkey has passed troubled phases. Determination of premiums based on competition instead of statistical methods, inaccurate distribution of dividends, underdevelopment of actuary science and that intermediaries did not transfer the premiums they collected from policyholders to insurers in the 1990s caused bankruptcy of some insurers in the beginning of 2000s. The regulations related to financial sector due to the European Union accession process were beneficial to insurers.

Importance of Turkish insurance sector has been more viable recently because of the remarkable number of factors affecting the sector profitability. The analysis of the industry showed that traffic insurance has an important place. The global financial crisis in 2008, removal of government control in traffic insurance premium tariffs in 2008, considerable foreign capital injection, intense competition, the change of estimation method of technical reserves for IBNR (Incurred But Not Reported) required by regulation, the verdicts of Supreme Court about coverage of traffic insurance, the withdrawal of licenses of two insurance companies, the implementation of ceiling on traffic insurance premiums, the creation of Risky Insureds Pool at traffic insurance and the large increases in minimum wage set by the government (30% increase in 2016 and 26% increase in 2019) had great impact on insurance industry profitability.

So that insurers can keep providing coverage and meet their obligations to policyholders, they need sound financial performance. Profitability is constantly used as a measure of financial performance. It is among targets of financial managements. International institutions such as OECD, NGOs and companies such as Swiss Re give place to profitability in their reports because of its importance. Potential investors, lenders, current stockholders, clients, regulators and the management benefit profitability for different purposes. Potential investors utilize profitability in investment decision-making process and judge management. Lenders check profitability of companies to decide whether to extend credit for the company or not. Current stockholders try to understand how well the company is managed and whether it is rational to keep stocks of the company and try to decide how to allocate capital efficiently. Current and potential clients look at the probability of the company to see if it is able to meet its obligations and decide whether it is wise to buy the company's products. The regulators evaluate the company's financial

viability and capacity to meet its obligations. Managements make use of profitability measures in various business lines and markets for measuring efficiency and decision making process.

2008 global financial crisis and its ongoing effects, low interest rate environment and increasing natural disasters because of global warming have been negatively affecting insurance industry profitability in recent years. For those reasons and its importance, insurance company profitability has been attracting attention of scholars in recent years.

There are different measures as indicators of profitability. Return on Assets (ROA), Return on Equity (ROE), Technical Profitability Ratio, Profit Margin, Return on Invested Capital (ROIC) and Embedded Value Approach (EVA) are important profitability measures used by different stakeholders. ROA and ROE are frequently used as indicator of profitability in studies as the data needed to calculate these measures are easy to find and calculation of them is not difficult.

Literature review on the profitability of Turkish insurance sector has shown that there is no remarkable number of studies regarding the issue despite its importance. Three studies were come across regarding determinants of profitability of insurance industry in Turkey. (Doğan, 2013) examined the influence of firm-specific factors on the profitability of insurance companies listed on the Istanbul Stock Exchange for the period 2005-2011 by employing multiple regression and correlation methods. (Öner Kaya, 2015) investigated the firm-specific factors affecting the profitability of 24 non-life insurance companies operating in Turkey for the period 2006-2013 by using static panel data models. (Öner Kaya & Kaya, 2015) investigated the firm-specific factors affecting the profitability of 17 life insurance companies operating in Turkey for the period 2008-2013 by using static panel data models.

The aim of this thesis is to examine the factors affecting insurance company profitability in Turkey. We believe that detecting these factors will help managers of insurers, investors, regulators and potential policyholders in making their decisions. For this purpose, this thesis is seeking the answer of this question: Which factors affect profitability of insurance companies in Turkey?

The hypotheses of this thesis are:

1) H_0: There are significant relationship between life insurer profitability and firm-specific factors and macroeconomic factors.

2) H_0: There are significant relationship between non-life insurer profitability and firm-specific factors and macroeconomic factors.

This study differentiates from previous studies as it covers greater time span (2006-2017), includes macroeconomic variables in addition to firm-specific factors and employs both static and dynamic panel data models.

In the second chapter of this thesis we will discuss and try to understand insurance concept. In the third chapter, we will discuss the concept of profitability. The fourth chapter will cover the analysis of Turkish insurance industry in detail. The literature review will be covered in the fifth chapter. In chapter six, the empirical analysis will be performed employing the panel data models. The chapter seven will cover the conclusions and recommendations where the findings and the analysis are evaluated.

2. THEORETICAL AND CONCEPTUAL FRAMEWORK OF INSURANCE

Insurance is very important for society in order to be protected against negative effects of undesired events and continue living comfortably. So that insurance exists insurers have to continue their activities. Profitability is a measure of insurance company financial performance to assess if it is able to survive. It is very important to understand the basics of insurance to delve into profitability concept. For this reason, theoretical and conceptual framework of insurance is examined in this chapter.

2.1. Definition of Insurance

There have been lots of unwanted events such as death, accident, flood etc. since the existence of human being. People have always been exposed to the risk of happening of these events. When these events happen, people could encounter irrevocable results. The possibility or thought of occurrence of these events cause anxiety in people and people try to take measures in order to avoid risks. The most common way of avoiding risks is insurance.

There are various definitions of insurance in literature. In general, those definitions focus on “risk transfer” and “pooling”.

Insurance is transfer of risk in return of a monetary value (Çipil, 2013). People pay small amounts of money called premium to an insurer and insurer undertakes the risk. When the risk happens, insurer indemnifies the insured. In this way, insured gets rid of risk.

“Insurance is a system of gathering homogeneous people and compensating from the pool those people paid into when a damage occurs” (Kırkbeşoğlu, 2014, p. 46). By paying small amounts of money to the system, funds are collected in a pool and a huge amount of money is created. When the risk happens, the losses are paid by the pool.

(Dror & Piesse, 2014, p. 24) define insurance as “a concept involving a contract under which an insurer shall pay specific pre-defined compensation when financial

damages are caused by pre-defined cost-generating events, in exchange for up-front payments of a premium by the insured."

2.2. Definition of Risk

Risk is very important in defining insurance as insurance has emerged against risks. In other words, if there was no risk there was no insurance either.

Risk is generally defined as uncertainty of a danger. (Dumanoğlu & Gedikoğlu, 2004, p. 5) defines risk as "Occurrence probability of an undesired event". To be able to mention about risk there has to be an undesired event that could cause loss and probability of that event. We cannot know happening time of some events and whether they will happen such as accident. Some events such as death has a probability of one which means it will happen certainly but the risk originating from death is caused by the time of death which is unknown.

The sources of risk are as follows (Pekiner, 1981, p. 3);

- Social Risk Sources: Theft, sabotage, accidents etc.
- Physical Risk Sources: Fire, natural events etc.
- Economical Risk Sources: Events emerging after capital activities.

Risks can be classified as speculative risks and pure risks. At speculative risks there is probability of loss when the event happens and there is also probability of gaining high profit if the event does not happen. Stock market investments and gambling can be stated as speculative risk examples. These events could cause both gain and loss. Pure risks, on the other hand, could cause only loss or zero gain. In other words, there is no probability of gain at pure risks. As insurance is a guarantee instrument and it is not an instrument of enrichment, speculative risks are generally out of insurance coverage.

Another discrimination of risk is whether it is diversifiable (particular) or non-diversifiable (fundamental) risk. Causes and results of losses generate the difference. Diversifiable risks affect only one or few people such as car accident. They can be alleviated or eliminated by diversification such as creating a portfolio of financial instruments having different risk characteristics. Non-diversifiable risks affect whole community, economy or a large number of people such as economic downturn, hurricane etc. Nondiversifiable risks cannot be eliminated or alleviated by diversification.

“Nondiversifiable risks such as floods and widespread unemployment are difficult to insure privately because the characteristics of an ideal insurable risk are not easily met” (Rejda & McNamara, 2014, p. 6). Coping with nondiversifiable risks are generally responsibility of governments such as social insurances, subsidies.

As it can be understood from above, not all the risks are in the scope of insurance. The following conditions must be met in order that insurance covers risks;

- Loss must be random,
- Risk must be justifiable and quantifiable,
- Premium must be countable and met by insured,
- Large number of people having similar characteristics have to come together (Law of large numbers),
- Risk must be legal.

2.3. Principles of Insurance

There are 6 principles of insurance in literature. These principles are the main rules for an insurance contract to be made. They are explained below.

- **Insurable Interest:** Because insurance contract covers the monetary interest on insured good, insured must be exposed to a legally valid monetary loss when subject matter of insurance is damaged or lost. It means there has to be a benefit for the insured to make an insurance contract.
- **Utmost Good Faith:** Before and during the contract, both parties have to display utmost good faith towards each other. From insured’s perspective, this means giving all and correct information related to the subject matter. From insurer’s perspective, it means giving all and correct information about conditions of the contract and meeting responsibilities when risk happens.
- **Indemnity:** Main target of an insurance contract is to restore the economic situation of policyholder to the situation before the event. It means compensation should not cause any gain or loss for the policyholder.
- **Subrogation:** Subrogation means passing insured person’s right of ownership to insurer after insurer compensates insured for the loss. Hereby, insurer will be able to demand the compensation from third parties causing the damage.

There are 3 purposes of subrogation principle (Rejda, 2001, p. 89):

1. Preventing insured person to get compensation both from insurer and the people causing damage.
2. Ensuring insurer to claim compensation amount it paid to insured from the people causing the damage.
3. Decreasing indemnity amount in general.

- **Contribution to the loss (Double Insurance):** When insured has more than one insurance contract on the same subject matter, he has the right to demand compensation from any insurance company. If an insurance company fully compensates the insured, then it has the right to demand the proportionate contribution from other insurance companies. Thereby, when an insured is fully compensated by one insurer, then the insured cannot apply to other insurers which will prevent the insured to make profit out of insurance contract. In order this principle to be valid, there are 3 conditions (Gupta, 2008, p. 24):

1. Contracts must cover the same danger
2. Contracts must cover the same subject matter
3. Affected person or property in contracts must be the same insured.

- **Principle of Causa Proxima (Nearest Cause):** If sequential events bring about the loss and insurance policy does not cover all the causes, the nearest cause is needed to be find out to be able to pay the loss. If the proximate cause is one of the causes determined in the contract, then the insurance company is obliged to compensate the insured. For instance, if an insured has fire coverage but not earthquake and his office burns because of earthquake, then the insured cannot be compensated. Because earthquake coverage which is proximate cause of fire is not covered in the contract.

2.4. Functions of Insurance

Insurance mechanism provides funds to the ones exposed to risks by collecting premiums from the insured persons who want to be protected against risks. By doing this, it contributes to lots of people, entities or industries in different ways.

First; by reducing risks and uncertainty insurance provides predictability and safety. When one knows that he will be compensated when an undesired event happens, he gets

rid of anxieties and lives more comfortably. Then, when an undesired event happens, people can continue their life as if there was no negative event. From entities' perspective, it ensures them to make decisions more bravely and contributes to establishment of new entities and development of current entities.

Second; by collecting small amounts of money which is called premium and creating huge funds, insurance becomes an important savings resource. These resources are channeled to financial markets by investing in stocks, bonds and other financial instruments. These funds are used by entities in different industries and become sources of investments. Thus, industries can develop by making new investments. Life insurance, especially investing in long-term financial instruments, is a great source of investments in developed countries. Moreover, insurance companies help capital markets to evolve by operating as financial intermediary (Genç, 2002).

Third; by insurance types such as unemployment, insurance mechanism prevents socioeconomic losses. Precautions that are taken and the features such as making discount if there was no accident in former contract term prevent undesired events to happen.

Fourth; actors, operating in insurance sector such as insurance companies or intermediaries, generate employment. These actors also pay tax to government.

Fifth, export credit insurance which serves as guarantee to the issuer of credit, eases issuing of export credits. Transportation insurance reduces risks in overseas transportation. All these help international relations and trade to develop.

2.5. Insurance Types

The first discrimination of insurance is whether it is social or private. The insurance applications provided by governments to a wide range of citizens such as health and unemployment are called social insurances. The coverage of this study is private insurances.

Private insurance is discriminated as life insurances, property insurances and liability insurances.

2.5.1. Life Insurance

"Life insurance provides protection in the event of untimely death, illnesses, and retirement" (Saunders & Cornett, 2012, p. 476). Originally, life insurance's main value proposition was death protection. Today, life insurers offer products that cover many risks such as disability, illness, longevity. It also helps individuals finance retirement via pension and annuity products. Around 85% of global life insurance premiums in 2016 were underwritten through life insurance products combining both risk protection and wealth accumulation. This figure makes these products the most important source of income for life insurance sector (Swiss Re, 2017). Conversely, 91% of life insurance premium in Turkey was generated in life insurance products which do not include savings element (term life insurance). Life insurance products can be classified in accordance with the type of protection or benefit.

The first type of life insurance products is Term Life Insurance. Main function of Term Life Insurance which is the closest to pure life insurance is to pay beneficiary a certain amount of compensation fixed in the contract when insured dies during the coverage period. If the insured does not die in the term of the insurance policy, the insured losses all the rights attained with the insurance policy. It benefits the people who are deprived of dead person's monetary support. Term Life Insurance does not include savings element.

Whole Life Insurance provides protection for the entire life of the insured contrary to Term Life Insurance providing protection for a certain period. In other words, coverage period in Whole Life Insurance is the entire life of the insured. Death time of the insured is not limited to a specified period and it is certain that the insurance company will pay the compensation as long as the beneficiary does not avoid paying periodic premiums. Premium payments in the early years are higher in Whole Life Insurance contrary to those in Term Life Insurance.

Endowment Life Insurance is an insurance which savings element is added to term life insurance. Insured person gets a certain amount (face amount) of payment after an endowment date (savings element of the insurance). If he dies before the endowment date beneficiaries get a certain payout (term life insurance part of the insurance).

Credit-Life Insurance protects the lender if the borrower dies before repaying the debt. In this case, insurer pays the lender unpaid balance of the debt.

Annuity products pay out a fixed stream of payments to individuals, primarily used as an income stream for retirees in exchange for a sole payment or payments done in several years in the accumulation phase. Annuities function in the opposite way of life insurance basics. “While life insurance involves different contractual methods to build up a fund and the eventual payout of a lump sum to the beneficiary, annuities involve different methods of liquidating a fund over a long period of time, such as paying out a fund’s proceeds to the beneficiary” (Saunders & Cornett, 2012, p. 480). Death benefit in the accumulation phase and periodical payments in the retirement phase can be guaranteed in annuity contracts, depending on their structure (Swiss Re, 2012).

Health Insurance covers sickness-related expenses, if the insured has health problems covered in the contract during the contract term.

Personal accident insurance pays the losses of the insured, if the insured is injured or gets sick in one of the circumstances covered in the contract during the contract term. If the insured is permanently injured, a fixed amount is paid to the insured. If the insured dies, a fixed amount is paid to the beneficiary.

2.5.2. Property Insurance

In this type of insurance, subject matter of insurance contract is a property and insurance protects insured persons against financial losses of property damage. Kasko, fire, earthquake, agriculture and transportation are some of the examples of property insurance. All types of property, right and receivable whose monetary value can be calculated and determined beforehand are subject matter of property insurance (SEGEM, 2009).

2.5.3. Liability (Casualty) Insurance

Liability insurance is a type of insurance in which liabilities of insured persons against third parties are covered in the contract. Insurer compensates losses of third parties caused by activities of insured. This type of insurance is quite important because third parties who do not have any responsibility or mistake in undesired event are compensated.

As the payment responsibility is transferred to a supervised insurer, whether the insured's financial situation is good or bad is not important. For this reason, most of liability insurances are mandatory in many countries. Motor Vehicle Mandatory Third Party Liability Insurance (Traffic Insurance) is an example for this type of insurance which is made mandatory by Road Traffic Law in Turkey.

2.6. Reinsurance

(Insurance Information Institute, 2018) defines Reinsurance as "Reinsurance is insurance for insurance companies. It's a way of transferring or ceding some of the financial risk insurance companies assume in insuring cars, homes and businesses to another insurance company, the reinsurer."

Insurance companies transfer their risk via reinsurance when they have too much exposure to a potentially costly event. In this situation that event could cause the company to go bankrupt if it is unable to cover the losses and it was not protected via reinsurance.

Sometimes insurers make use of reinsurance mechanism when they want to lower their liability potential to reduce the amount of capital they are required to maintain in reserves. Regulation requires insurers to have sufficient capital in reserves to pay the possible claims associated with their issued policies. Even if their insurance company goes under, consumers' losses will be covered thanks to this regulation.

Reinsurer pays commission to insurance company in this mechanism. When insurer transfers the risk to reinsurer, insurer acts like an intermediary. When loss happens, customers apply to insurance company and gets compensation from it.

2.7. Coinsurance

Coinsurance generally means that same risks are insured by more than one company. More than one company take risks and are responsible for the losses. When the loss emerges, insurance companies participate in the expenses according to their share. Sometimes insurance risks are shared between insured and insurer. For example, when a loss happens, insurance company pays 80% of the expenses, 20% is paid by the insured. This implementation is also called coinsurance.

Insurance companies use this mechanism to insure huge risks which they cannot undertake alone. In this situation responsibility and premiums are shared among insurance companies proportionately. Thus, insurance company is not deprived of potential profit even if the risks are too high.

3. THEORETICAL AND CONCEPTUAL FRAMEWORK OF PROFITABILITY

In this chapter, profitability will be defined, the ratios used to measure profitability and the drivers of profitability both firm-specific and macroeconomic will be examined in detail.

3.1. Definition of Profitability

It is very important for companies to perform financially well in order to continue their activities or grow. Companies having good financial performance can cope with difficulties, attract capital for growth opportunities and hence, maximize shareholder wealth.

Profitability measures financial performance of firms. It demonstrates how well a company has performed financially in previous periods and gives an insight about the company's future outlook. Potential investors, lenders, current stockholders, clients, regulators and the management of company benefit profitability for different purposes. Potential investors utilize profitability in investment decision making process and to judge management. Lenders check profitability of companies to decide whether to extend credit for the company or not. Current stockholders try to understand how well the company is managed and if it is logical to keep stocks and they try to decide how to allocate capital efficiently. Current clients look at the probability of the company if it is able to meet its obligations. Potential clients decide whether it is wise to buy the company's products. Regulators evaluate the company's financial viability and capacity to meet its obligations. Managements make of use profitability measures in various business lines and markets for measuring efficiency and decision making process.

"A profitability measurement baseline is one of the most valued time-phased tools used by firms to determine their growth and overall financial health over a given period of time and can also be used to compare similar firms across the same industry or to compare industries or sectors in aggregation" (Nyairo, 2015, p. 3).

In order to create stable insurance markets which benefit and protect policyholders, proper financial performance is a must (Pavic Kramaric, Miletic, & Pavic, 2017). Insurers having favorable financial performance are the firms that have low risk of bankruptcy and the strength to meet their responsibilities. In areas where private life insurance substitutes or complements public social safety provisions steering, financial stability of insurers is more important (Swiss Re, 2012).

From accounting perspective, profitability means ability to create profit. Profit, also called net income, is an accounting measure calculated as subtracting expenses, taxes and preferred dividends from revenues. Generating profit is very important for companies. Policyholders and shareholders consider profit essentially in decision making process of supplying funds into insurance firms. "One of the objectives of management of insurance companies is to attain profit as an underlying requirement for conducting any insurance business" (Lee, 2014, p. 682).

In spite of being widely used, evaluating a company's financial performance through profit has some disadvantages. According to accounting principles, the risks undertaken is not considered when generating profit as profit is accrual based instead of cash based (Sayılgan, 2010). In other words, it does not reflect the risks of generating profit. But, understanding the risks is very significant since it tells us whether the company will be able to continue to create profit in the future. If the company takes high risks, making a risky investment or taking too much loan etc., then its probability of bankruptcy will increase. Additionally, profit does not reflect how much cash company has in hand. For instance, company could sell too many goods in exchange for receivables and then it may not be able to get cash in short-term or forever. Moreover, profit is not able to display long-term outlook of a company. As the risks undertaken and value creation are not understood by evaluating only profit, it is not possible to interpret future of company.

Despite some disadvantages, profit from the accounting perspective is very important for firms. A firm generating loss in consecutive periods is hard to survive unless it is financially strong. A company has to generate profit in order to distribute dividend to shareholders. Profit is also easy to calculate from income statement of a company. Income statement is mandatory to prepare in almost all countries and it is published.

For those reasons stated above, other measures based not only on accounting data such as Embedded Value Approach are also used to grasp profitability in addition to the measures based solely on accounting data such as return on equity and operating margin.

Finally, researchers, administrators and regulatory authorities have had remarkable interest on the factors that determine firm profitability because of its importance (Nyairo, 2015).

3.2. Profitability Measures

In this part of the thesis the most common measures of profitability used in the literature will be studied.

3.2.1. Return on Equity

Return on Equity (ROE) is one of the widely used profitability ratios in international standards. It is calculated as dividing net income by common shareholder's equity. Net income used in the formula is the income after preferred stock dividends have been paid.

$$\text{ROE} = \frac{\text{Net Income}}{\text{Common Shareholder's Equity}}$$

Figure 1. ROE formula

It displays how much profit has been generated by one unit of equity and it is indicator of how efficiently equity is used. The greater the ROE, the better the company performs. It is utilized by comparing other companies' ratios or industry average. It is easy to calculate and it enables investors to measure performance across different industries. For example, an investor can compare an insurance company's ROE with returns from stocks, bonds or other financial instruments before deciding to invest his funds.

ROE of non-life insurance companies operating in the nine most developed markets in the last decade, accounting for 73% of world non-life insurance premiums and being home to most of the globally operating insurers, was relatively low at 6.5%. The global financial crisis and extraordinary high catastrophe losses in 2011 and 2017 happened in

this time span. Over the long run, insurers have performed similarly with firms in other sectors. ROE of global non-life insurance sector dropped to 6% from 7% in 2016 because of natural catastrophe losses in the US, soft underwriting conditions and low investment yields (Swiss Re, 2018a).

3.2.2. Return on Assets

Return on Assets (ROA) is another widely used performance ratio. It is calculated by dividing net income by total assets.

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$$

Figure 2. ROA formula

It shows how much profit has been generated by one unit of asset and it is indicator of how efficiently assets are used. The greater the ROA, the better the company performs. It is utilized by comparing other companies' ratios or industry average and it is easy to calculate.

3.2.3. Technical Profitability Ratio

Technical Profitability is the profitability of an insurance company generated from its core insurance activities. It is calculated by dividing underwriting profit by gross written premiums.

$$\text{Technical Profitability Ratio} = \frac{\text{Underwriting Profit}}{\text{Gross Written Premiums}}$$

Figure 3. Technical profitability ratio formula

Underwriting profit which is also called technical result or technical profit is calculated as subtracting claims and expenses related to core business from net insurance premiums acquired from insurance contracts. Net insurance premiums are calculated by subtracting premiums transferred to reinsurance companies from gross written premiums.

Technical profitability ratio is an accurate measure of efficiency of an insurer's underwriting activities. Underwriting income of an insurer may fluctuate within periods with natural and other disasters such as earthquakes, floods and fires leading to huge underwriting losses.

3.2.4. Profit Margin

Profit margin is the profit a company generates per unit of premiums. It is calculated as operating profit/loss divided by net written premiums.

$$\text{Operating Margin} = \frac{\text{Operating Profit/Loss}}{\text{Net Written Premiums}}$$

Figure 4. Profit margin formula

It is commonly used in insurance industry and allows an easy comparison across products (Swiss Re, 2012).

3.2.5. Return on Invested Capital

ROIC is used to assess how efficient a company allocates the capital under its control to profitable investments. It shows us how well the company uses its funds to generate profit. It is calculated by dividing net income minus dividends to total capital. Total capital can be found by subtracting non-operating assets from the sum of book value of debt and equity.

$$\text{ROIC} = \frac{\text{Net Income} - \text{Dividends}}{\text{Total Capital}}$$

Figure 5. ROIC formula

3.2.6. Embedded Value Approach

In order to give more detailed information regarding insurance value creation and profitability, various embedded value approaches have been developed supplementing

traditional accounting-based financial reporting. Long-term outlook of a company is reflected by Embedded Value (EV) concepts and it considers the relative riskiness of different business lines. EV aims to calculate net cash flows generated by the business written over the lifetime of contracts in-force (Swiss Re, 2012). "The idea of EV calculation originates from valuation literature and can be traced back to Anderson (1959)" (Diers et al., 2012, p. 4).

"The EV is the valuation of a company's current in-force value without taking into account its capacity to generate new business" (Tremblay, 2006, p. 4). Value of in-force business is defined as future profits related to the business already sold (Willis Towers Watson, 2016). In other words, "The value of in-force business is the present value of the amounts generated by the in-force that will be distributable to the shareholders in the future" (Tremblay, 2006, p.4-5). Briefly, EV displays value of a company and future cash flows from existing insurance contracts are estimated to calculate EV without considering its capacity to generate new business.

"The change in EV shows whether value has been created or destroyed during the period" (Willis Towers Watson, 2016, p. 15). Assumptions have to be made such as future interest rates, mortality to calculate EV.

Being calculated based on assumptions and the difficulties in calculation are disadvantages of EV. However, taking into account risk and giving a long-term outlook are its advantages.

3.3. Firm-Specific Drivers of Profitability

In this part of the thesis, firm-specific drivers of profitability will be examined. Firm-specific drivers are expected to have significant impact on profitability as profitability changes over insurers.

3.3.1. Loss Ratio

"Loss ratio, which is also expressed as the underwriting risk in the relevant literature, demonstrates the effectiveness of the underwriting activities of insurance companies" (Öner Kaya, 2015, p. 517). Loss ratio is one of the most important determinants of insurers

since it includes both the claims payments expected to be the biggest source of cost and the insurance premiums expected to be the biggest source of income to the insurance company. It is calculated by diving incurred claims to net premiums (earned premiums).

$$\text{Loss Ratio} = \frac{\text{Incurred claims}}{\text{Net premiums earned}}$$

Figure 6. Loss ratio formula

As seen from the formula above, increase in claims raises loss ratio which is not good for insurers. There are several factors that affect level of claims.

Probability/realization of risks the insurer has undertaken is one of the biggest important reasons of fluctuations in claims. If the insurer provides coverage for high risky events then the probability of claims payments increases. Catastrophes having huge negative effects to the society such as tornadoes, hurricanes in the U.S. or floods and hails in Turkey cause sudden huge increases in claims which could make insurer financially weak. Changes in insured behavior affect probability of risks. While driving more carefully or getting driving lessons diminishes car accidents, using mobile phone increases car accidents and hence, claims.

Technology usage in insurance such as telematics, a device which is mounted on insured's vehicle and records the driving behavior of the driver, decreases claims. Knowing that premiums will increase in the next insurance contract if he drives fast and carelessly and does not obey driving rules, the insured person tries to enhance his driving behavior. Additionally, fraud risk has decreased with the usage of telematics devices (Swiss Re, 2018a).

Conversely, increasing healthcare and car repair costs because of advances in medicine and automotive technology have been causing rises in severity of claims (Swiss Re, 2018a).

Fluctuations in insurance product sales also affect claims level. When the sales increase, claims are also expected to increase which is stemmed from the rise in risks.

Moral hazard, adverse selection and fraud are other factors that affect claims. “Moral hazard occurs when people with insurance use more services then they would if they did not have coverage only because they know that they are protected” (Radermacher, et al., 2006, p. 68). For example, an insured having health insurance could go to hospital for the diseases he did not care before or the diseases whose importance level is low as the expenses are compensated by insurer or a farmer having agriculture insurance may not try to increase the productivity of his crops.

“Adverse selection occurs when the risk profile of the group insured is worse than what would be expected in the general population” (Radermacher et al., 2006, p. 68). As the insurer does not have enough information about target group (adverse selection) it insures high-risk-profile people unwillingly. Therefore, insured risks in the pool get higher than expected and costs exposed endanger insurer’s future. For example, that people having HIV/AIDS and cancer whose cure costs are high conceal their sickness will generate high costs for the insurer.

Fraud is that insured people cause undeserved compensation by giving wrong information to the insurer. According to (Radermacher et al., 2006, p. 69) “health insurance is particularly prone to fraud throughout the world, whatever the clients’ income levels” and fraud evolves in several forms:

– the client, for example, obtaining treatment for persons not covered by the insurance scheme through impersonation,

– the health service provider, who might, for example, submit false claims or inflate genuine claims by claiming for more expensive drugs than those actually issued,

– the scheme administrators, including the insurer’s own staff, who might, for example, process fake claims or process genuine claims twice, possibly operating in collusion with dishonest providers,

or any combination of the above.

In addition to claims, pricing of risks by actuaries of insurers is another factor affecting loss ratio. Insurers have to set premiums levels compatible with the probability of risks.

Loss ratio in the last 20 years has been volatile because of economic factors, catastrophic losses, claims trends and to a certain extent line-specific cycles. Global catastrophe claims reached to the highest level for a year because of the hurricanes in the North Atlantic and wildfire, thunderstorm and severe precipitation events across different regions (Swiss Re, 2018a).

3.3.2. Expense Ratio

Expense ratio gives us what percentage of premium is used by insurance companies for paying all the costs of acquiring, writing and servicing insurance and reinsurance. The expense ratio shows an insurance company's efficiency without considering its claims on its policies and investment gains or losses. It is calculated by dividing the expenses related to acquiring, underwriting and servicing premiums to the net premiums earned by the insurer. Advertising, loss adjustment expenses, employee wages, commissions for the sales force, taxes on the insurer's earning are expenses which can be included in expense ratio.

$$\text{Expense Ratio} = \frac{\text{Underwriting expenses}}{\text{Net premiums earned}}$$

Figure 7. Expense ratio formula

Expense ratio is a very strong indicator of operational efficiency. Insurers can reduce expense ratio, hence increase operational efficiency, by making adjustments in their business mix, distribution channels. For example, merging with or acquiring a company or using online channels for marketing standard products such as traffic insurance to eliminate intermediary commission could reduce expenses.

(Swiss Re, 2018a, p. 9) states that;

Changing traditional distribution networks (call centres and branch distribution networks) with online, mobile or digital platforms for personal lines (car, home, travel insurance products) has reduced costs. Compared to the loss ratio, the expense ratio has been relatively stable in the last 20 years, typically ranging from 25% to 35% of premiums.

3.3.3. Premium Growth Rate

Premiums are the most important source of income for insurers. Premiums are collected from clients after an insurance contract is made and invested in different kinds of instruments such as treasury and corporate bonds, stock markets, savings account. Premiums generate income for insurers till claims payments are made.

$$\text{Premium Growth Rate} = \frac{\text{Current year premium} - \text{Last year premium}}{\text{Current year premium}}$$

Figure 8. Premium growth rate formula

Premium growth depends on a lot of factors related to the society, economic conditions and company policies. Most important ones can be stated as:

- Insurance awareness,
- Trust of people in insurers because of former negative experiences,
- The belief of some Islamic people who think that conventional insurance is haram because it contains uncertainty and interest,
- Lack of Takaful insurers and products (insurance based on Islamic rules),
- Income level and economic conditions,
- Regulation,
- Lack of competent man power employed in the sector,
- Insurer willingness.

Premiums levels have to be determined in accordance with the risk levels of policyholders. Aggressive premium production which is not compatible with the risks taken could cause high loss payments, depletion of equity capital and thus financial distress costs.

Premium growth is expected to increase profitability as long as related costs are lower than generated income. For this reason, premium growth on profitability is unpredictable.

3.3.4. Liquidity

There are 2 must have conditions for a company to continue its economic activities (Sayılgan, 2010, p. 133):

- To have enough cash flow level for repayment of the capital and interest of due liabilities. If the company does not have enough cash flow, it goes bankrupt.
- To meet the benefit expectations of shareholders who put capital to the company. This condition is more flexible as shareholders could be more patient if

the future outlook is good. If the company cannot generate enough profit for shareholders and its possibility to generate in future is low, the company goes towards clearance.

For those reasons stated above, companies must hold enough cash or assets which could be quickly converted to cash without losing its value. Liquidity signifies a company's power to repay its short-term liabilities.

Current Ratio is one of the measures of liquidity. It is calculated as dividing current assets to current liabilities. It shows the ability of a company to pay its liabilities that will be paid in one year with its cash that will be obtained in one year. Current ratio should be between 1.5 and 2. Current assets are used as representative of liquidity since liquid assets are stated in this section of balance sheet.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Figure 9. Current ratio formula

While high liquidity gives power to pay short-term liabilities and hence financial strength, it may also cause waste of sources and affect company's profitability negatively. In normal economic circumstances, fixed assets generate more investment returns than current assets do (Sayılgan, 2010). Having high liquidity means surrendering more profitable investments. If a company misses more profitable investment opportunity, then it will generate less cash in the future meaning that its financial strength will be affected negatively. The balance should be established considering financial strength and profit opportunities.

3.3.5. Leverage Ratio

Capital structure is one of the most interesting issues in the financial literature. There are lots of valuable theories trying to explain which type of capital is the best for a company reducing its Weighted Average Cost of Capital (WACC). Capital structure refers to the combination of sources used in financing of a company.

Explanation of capital structure started with Irrelevance Theory introduced by Professors Franco Modigliani and Merton Miller (MM) who gained Nobel Price. “Modern Capital Structure Theory began in 1958, when MM published what has been called the most influential finance article ever written” (Brigham & Ehrhardt, 2011, p. 610). Based on some strong assumptions, MM concluded that when there is no tax, a firm’s value is not affected by its capital structure. Later MM relaxed the assumption of no tax in their follow-up paper published in 1963. The paper concluded that because of tax-shield effect of debt, WACC decreases as debt is added which means the optimal capital structure is 100% debt.

Pecking Order Theory states that because of the presence of floatation costs and asymmetric information a firm should raise capital internally by reinvesting its net income and selling its short-term marketable securities (Brigham & Ehrhardt, 2011). Then, it should sell proper assets, use debt and preferred stock. Common stock should be the last option.

Trade-off Theory states that the value of a levered firm is equal to the value of an unlevered firm plus the value of any side effects, which include the tax shield and the expected costs due to financial distress (Brigham & Ehrhardt, 2011). According to this theory there is a trade-off between tax advantage and increasing probability of financial hardship resulting from debt repayments.

Traditional Approach briefly states that company has only one optimal capital structure and the company can reduce its WACC by using debt to some degree. After a certain debt level, the liquidity risk of company will be too high and WACC will rise.

Capital structure of insurance companies differs from that of non-financial firms. While non-financial firms are financed by lenders and stockholders insurance companies are financed by lenders, stockholders and policyholders (customers). Insurance companies assign technical provisions for probability of paying claims resulting from policies sold. Liabilities of insurance companies mostly consist of technical provisions (82% for non-life insurers, 73% for life insurers in 2018 in Turkey). Non-financial firms are certain to repay interest and principle in exchange for using debt and the time of repayment is fixed. However, insurance companies pay back policyholders in the form of claims only if the risks covered in the policies happen and the time of payment is uncertain. Equity capital

plays buffer role in the event that net claims incurred exceed premiums plus investment return.

Thus, leverage ratio gives us the capital structure and financial soundness of a company. It is calculated by dividing liabilities to capital. It shows us what percentage of capital is acquired by liabilities. Total liabilities consist of short term liabilities and long term liabilities. Total capital consists of total liabilities and equity.

$$\text{Leverage Ratio} = \frac{\text{Total Liabilities}}{\text{Total Capital}}$$

Figure 10. Leverage ratio formula

3.3.6. Size

There are different indicators measuring size of a company. Some of these indicators are number of employees, amount of its sales for a period or amount of its assets at a point in time. All of these are used as indicators of size in empirical research depending upon the researcher. Major insurance companies are expected to respond quickly to changes in the market conditions compared with small companies, diversify the risks they accept in an effective way, employ more qualified labor power in an easier way, and in particular, benefit from the economies of scale concerning labor cost (Shiu, 2004).

3.3.7. Age

Age of the company is expected to affect profitability in both positive and negative ways. Experience and corporate reputation increase with an increase in age of a company. Moreover, firms develop their capital and brand names as time passes (Kakani et al. 2001).

3.3.8. Other Firm-Specific Drivers

Other drivers of profitability which have been often taken into account in literature are solvency, premium retention ratio and diversification. It is possible to address and test other factors but we will limit them with those above.

As stated in the first chapter, insurance is a risk transfer mechanism. Insurers get premiums in return for the risks they undertake. However, if there is an unbalance between the premiums acquired and the risks undertaken insurers could not be able to meet their obligations. For this reason, regulators inspect insurance companies' ability to meet their obligations regularly.

"The solvency of an insurance firm refers to its ability to pay claims" (Charumathi, 2013, p. 3). Greater solvency ratios are indicators of financial strength and greater ability to meet responsibilities. Regulators determine minimum solvency ratios for insurers to supervise financial soundness of insurers. Insurers have to keep higher equity capital in order to increase their solvency ratio.

Prospective policyholders are more interested in financially sound insurance companies (Reshid, 2015). Greater solvency enables good reputation for insurers and increases their sales which could raise profitability. However, greater solvency may be costly for insurers as holding sources in reserve funds could prevent productive use of sources.

As stated in the second chapter, insurers transfer some of their premiums to reinsurers for some reasons such as to reduce their exposure to potentially costly events or the amount of capital they are required to maintain in reserves, to stabilize their earnings and to increase underwriting capacities.

Premium retention ratio shows the amount of premiums insurer retains. It is calculated as dividing net written premium to gross written premiums.

$$\text{Premium Retention Ratio} = \frac{\text{Net written premium}}{\text{Gross written premium}}$$

Figure 11. Premium retention ratio formula

While transferring risks to a reinsurer has advantages such as reducing risk and earning commission, it prevents insurer's potential to earn profit from its core business and to grow which would lead to numerous advantages to a company. "For this reason, insurance companies are required to determine an appropriate retention level and establish

a balance between decreasing insolvency risk and reducing potential profitability" (Shiu, 2004, p. 1101&1084).

Insurers should consider their underwriting risk and equity while determining this ratio. First, the level of underwriting risk should be assessed and then determine if there is enough equity for that risk level. "Insurers can keep premium retention ratio high if their equity is enough and there is no problem in terms of external sources" (Genç, 2002, p. 16).

3.4. Macroeconomic Drivers of Profitability

Macroeconomic indicators are expected to have impact on insurer profitability since they affect income of insurers. In this part of the thesis, they will be examined in detail.

3.4.1. GDP Growth

During high GDP growth periods, unemployment is expected to decrease and stock market is expected to perform well. In this way, demand for insurance products and stock market return for insurers rise. Therefore, GDP growth is expected to affect profitability positively.

(Christophersen & Jakubik, 2014) found that there is significant relationship between insurance companies' premiums and economic growth. (Nissim, 2010) also asserts that the overall economic activity affects insurers' growth, because available income affects the demand for insurance products. (Beck & Webb, 2003) stated that increasing income might be the reason why people assign some of income to retirement and buy insurance products related to investment.

3.4.2. Interest Rate

When interest rates increase, investment income of insurance companies also increases as they heavily invest in interest-bearing financial instruments. Conversely, the theoretical insurance pricing models promote the expectation of a negative relationship between risk-free interest rate and underwriting margin (Haley, 2007). Insurance pricing theory suggests that interest rates and insurance prices have a (theoretically) negative relationship. When interest rates are high, insurers reduce prices to collect more premiums

and invest these funds in interest-bearing instruments, which is called cash flow underwriting. While more investment income affects profitability positively, reduced prices affect negatively. Moreover, increased claims inflation reduces profitability (Swiss Re, 2018a).

(Boubaker & Sghaier, 2012) state that during the inflationary periods, the effect of the interest rate on the non-life insurance premiums is confirmed positive but in deflationary periods, the non-life insurance premiums are negatively related to interest rate.

Additionally, when the general level of interest rates increases non-financial firms could go bankrupt because of having difficulty to reach funds and high cost of debt which will eventually lead to reduction in insurance demand. For these reasons, interest rate impact on insurance company profitability is mixed.

3.4.3. Inflation

High inflation in an economy causes uncertainty and opportunism impacting production and trade activities negatively. As a result, while high inflation cause small number of people to generate extremely high profits, it reduces employment, deteriorates income distribution therefore reduces purchasing power of individuals. Moreover, high inflation is a factor increasing liabilities of insurance companies and claims costs compared with premiums collected in advance. For example, Oil price shocks of 1973 and 1978 increased loss rates on all P&C property policies (Saunders & Cornett, 2012).

Low inflation, on the other hand, is a signal of low economic growth and leads to low interest rates which deteriorates investment yield of insurance companies.

3.4.4. Stock Market Index

Stock Market is both source of income and indicator of economic growth. Increases in Stock Market Indexes generate higher income for insurance companies having stocks in their portfolio. When Stock Market is bullish, it generally means economy is in good condition, therefore having positive impacts on insurers.

3.4.5. Exchange Rate

Exchange rate is very important for countries having huge current account deficits. For these countries, inflation also increases due to the changes in exchange rates. The increase in prices of imported goods used in repair process in claims such as car parts causes increase in loss ratio of insurers. High volatility in exchange rates cause uncertainty reducing economic activity.

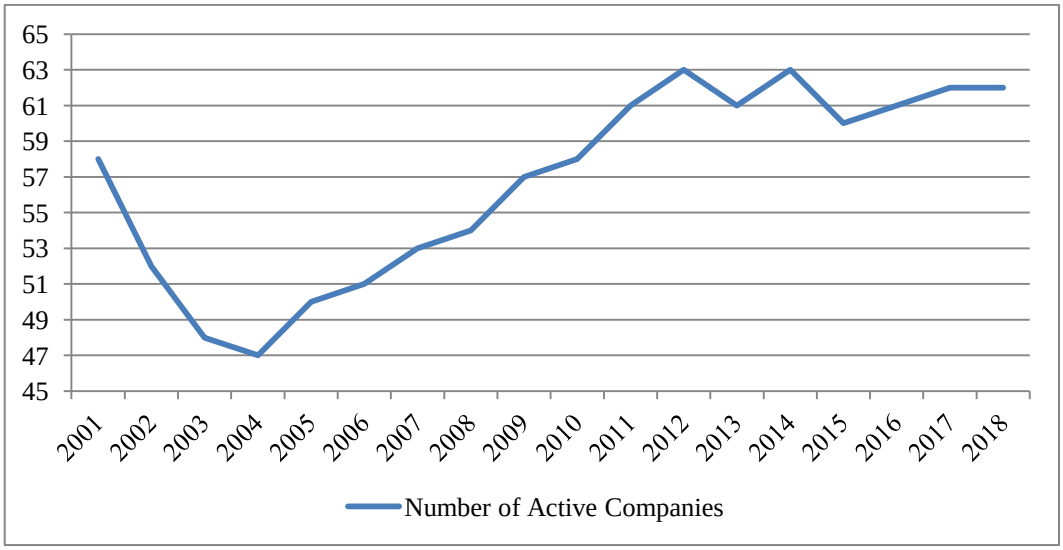
On the other hand, insurers that deposit premiums in foreign exchange savings accounts benefit increases in exchange rates.

4. TURKISH INSURANCE INDUSTRY

In this part of the thesis, Turkish insurance industry is examined in detail. General and financial assessment of the industry, comparison with the world markets and recent developments are covered.

4.1. General Assessment of Turkish Insurance Industry

There are 63 active insurance, reinsurance and pension companies in Turkish insurance industry at the end of 2018. The number of companies operating in the industry, which was 62 in 2002, 54 in 2005, has reached to 61 in 2013 and has been quite steady in the last 6 years.



Source: Ministry of Treasury and Finance Annual Report About Insurance and Private Pension Activities 2018

Figure 12. Number of active companies in Turkish insurance industry

59 of 62 companies operating in 2018 are stock companies, 1 of them is mutual company and 2 of them are the branches of international companies. Out of those 62 companies, 38 of them are non-life insurance companies, 5 of them are life insurance companies, 17 of them are life&pension companies and 2 of them are reinsurance companies.

Table 1. Number of active companies in the industry

Year	Non-life	Life	Life&Pension	Reinsurance	Total
2013	36	6	18	1	61
2014	38	5	19	1	63
2015	36	4	19	1	60
2016	37	4	18	2	61
2017	38	4	18	2	62
2018	38	5	17	2	62

Source: Ministry of Treasury and Finance Annual Report About Insurance and Private Pension Activities 2018

High growth potential has been drawing attention of foreign investors in Turkish insurance industry. The ratio of foreign capital, which was around %7.5 in 2002, reached to %71.94 peak level in 2013 and has been almost steady for 5 years. The number of companies whose equity consists of minimum %51 foreign share reached to 42 in 2018 from 12 in 2003. Progress of foreign capital is shown in Table 2.

Table 2. Share of foreign capital

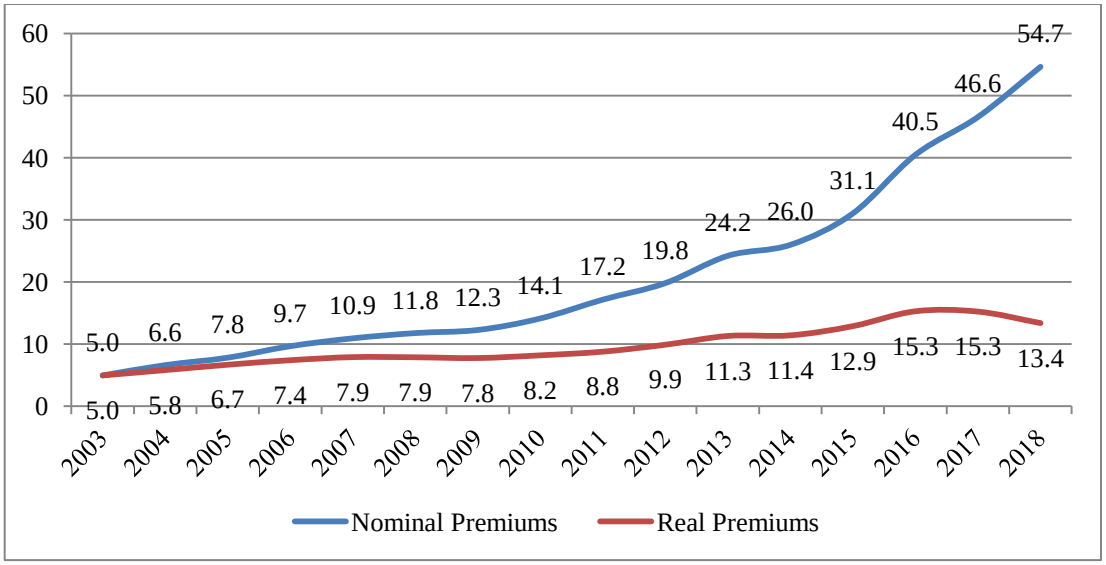
Year	Domestic	Foreign
2002	92.50%	7.5%
2008	48.63%	51.37%
2013	28.06%	71.94%
2018	32.11%	67.89%

Source: Ministry of Treasury and Finance

Nominal premium production of insurance industry in 2018 is 54.6 billion TL. The nominal premium production has been rising in an average annual rate of 18.75% since 2003 which was 4.96 billion TL. The real premium production, on the other hand, has been rising in an average annual rate of 7.93% since 2003. Figure 13 shows the progress of premium production.

In Turkey, insurance activities are classified as life and non-life, in line with the regulation in the World. Insurance companies can operate either in life or no-life branches. Share of non-life premium production in total production has been very high in comparison to life for years. In 2018, 87.3% of total gross premium is underwritten in non-life branches, 12.7% was underwritten in life branches. While life premiums' share in total premiums was about 20% in 2003, with the launch of private pension system, it declined

for years until 12% between years 2014 and 2016. Due to life insurance related to the individual loans, it has risen to the level of 14.7% in 2017 (Ministry of Treasury and Finance, 2017). It decreased to 12.7% in 2018 because of the decline in loans.

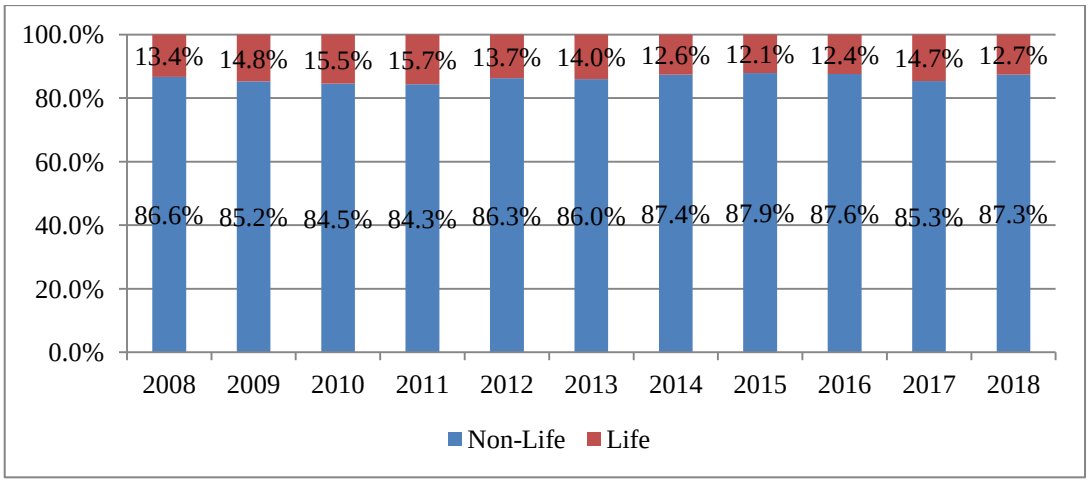


Source: Ministry of Treasury and Finance

Figure 13. Gross written premium production (Billion TL)

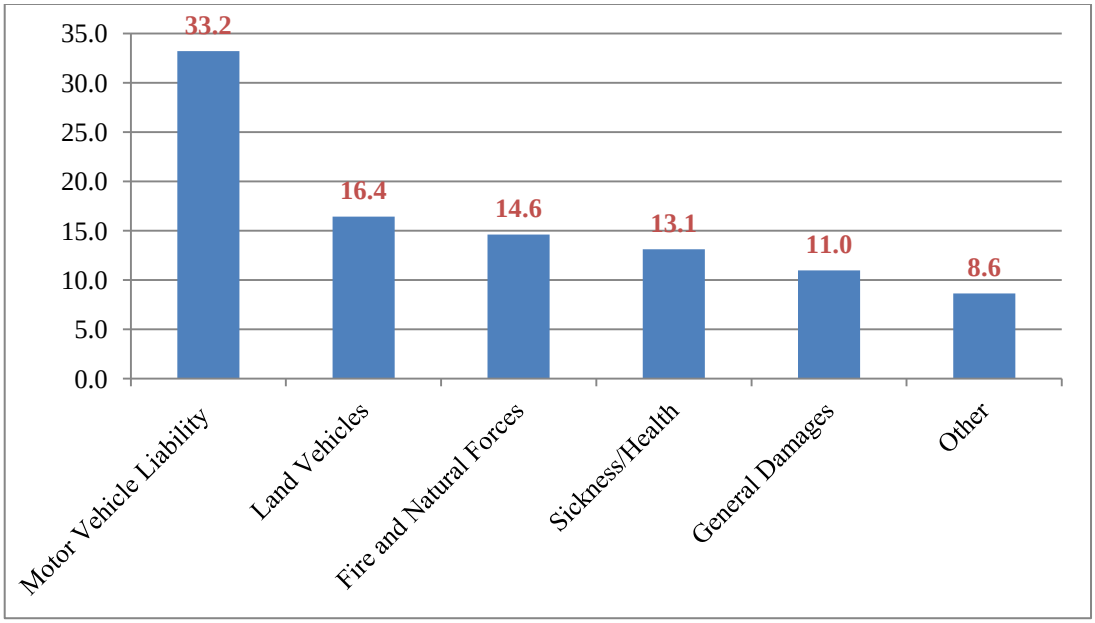
Motor Vehicle Liability branch consists of mandatory third party liability insurance (traffic insurance), facultative third party liability insurance and green card. Traffic insurance gets the highest share in this branch which is 94.3% and total premium production. The reason why traffic insurance gets the highest share in total premium is that ownership and usage of motorized land vehicles are associated with high risks and the regulator obligates it in line with the most countries in the World. In most of the developing countries, Motor Vehicle Liability branch has been the main factor of development of insurance sector.

Land Vehicles branch, also called as Kasko, is the second premium generating branch with the share of %16.4 in 2018.



Source: Ministry of Treasury and Finance

Figure 14. Distribution of gross written premium production



Source: Insurance Association of Turkey

Figure 15. Share of branches in non-life premium production (%)

The third non-life premium generating branch in 2018 is Fire and Natural Resources whose share is 14.6%. Fire insurance takes 66% share, mandatory earthquake insurance (DASK) takes 17% share and voluntary earthquake insurance takes 15% in this branch.

The forth non-life premium generating branch in 2018 is Sickness/Health whose share is 13.1%. In this branch, health insurance takes 96% share, travel health insurance takes 3% and sickness insurance takes 1% share.

The fifth branch in non-life premium production in 2018 is General Damages whose share is 11%. The share of Engineering insurances consisting of Machine Brokedown, Machine Montage, Electronic Equipment and Construction in General Loss branch is 42.1%, the share of Subsidized Agriculture Insurance (TARSİM) is 48.2%, the share of Theft is 5.8% and the rest is Plate Glass and Agriculture.

The rest of non-life premium production which is 8.6% comes from General Liability, Credit, Accident, Transportation, Legal Expenses Marine Vehicles, Railroad Vehicles, Air Vehicles, Marine Vehicles Liability, Air Vehicles Liability, Surety, Financial Loss and Support insurances.

Table 3. Distribution of life insurance gross written premium in 2018 (TL)

	Group	**%**	**Individual**	**%**	**Total**	**%**
1. Term Life Insurance (Yearly)	2,136,201	40.74	192,805	11.50	2,329,006	33.66
2. Term Life Ins. (Long Term)	3,098,673	59.09	603,521	36.01	3,702,194	53.50
3. Whole Life Insurance	7,114	0.14	318,131	18.98	325,245	4.70
4. Pure Endowment Life Ins.	121	0.00	152,020	9.07	152,141	2.20
5. Endowment Life Insurance	1,699	0.03	389,910	23.26	391,609	5.66
6. Annuity	0	0.00	19,802	1.18	19,802	0.29
7. Other	87	0.00	0	0.00	87	0.00
Total	5,243,896	100.00	1,676,189	100.00	6,920,084	100.00

Source: Created by the author based on Ministry of Treasury and Finance 2018 Report

When we look at the distribution of life insurance gross written premium in Table 3, we see that group insurance exceeds individual insurance. 92.4% of the premium was produced in the branches including no investment element which is contrary to developed insurance markets.

Top premium generating insurance company in 2018 is Allianz Sigorta A.Ş. with the share of 10.6%, the second is Anadolu Anonim Türk Sigorta with the share of 10.4% and the third is Aksigorta A.Ş. with the share of 6.3%. The share of top 10 insurance companies in gross written premium is 56.7%.

Table 4. Premium production of top ten insurance companies in 2018

Rank	Company	TL	%	Incremental %
1	Allianz Sigorta AŞ	5,809,795,566	10.6	10.63
2	Anadolu Anonim Türk Sigorta	5,701,355,415	10.4	21.06
3	Aksigorta AŞ	3,417,337,929	6.3	27.31
4	Axa Sigorta AŞ	3,374,669,830	6.2	33.49
5	Mapfre Sigorta AŞ	2,645,052,213	4.8	38.33
6	Sompo Japan Sigorta AŞ	2,508,209,693	4.6	42.92
7	Ziraat Sigorta AŞ	2,196,754,738	4.0	46.94
8	Güneş Sigorta AŞ	1,907,406,583	3.5	50.43
9	Halk Sigorta AŞ	1,756,187,308	3.2	53.64
10	Doga Sigorta AŞ	1,668,705,527	3.1	56.69

Source: Created by the author based on Insurance Association of Turkey

Table 5. Financial sector assets

Financial Institutions	Total Assets (Billion TL)	Share (%)
Banks	3257.84	89.06
Insurance, Reinsurance and Pension Companies	152.3	4.16
Pension Investment Funds	77.7	2.12
Securities Mutual Funds	54.21	1.48
Leasing Companies	58.12	1.59
Factoring Companies	43.71	1.20
Consumer Finance Companies	39.11	1.07
Securities Intermediary Institutions	23.06	0.63
Real Estate Investment Partnerships	26.92	0.74
Enterprise Capital Management Partnerships	2.59	0.07
Total	3657.9	100

Source: Ministry of Treasury and Finance 2017 Annual Report

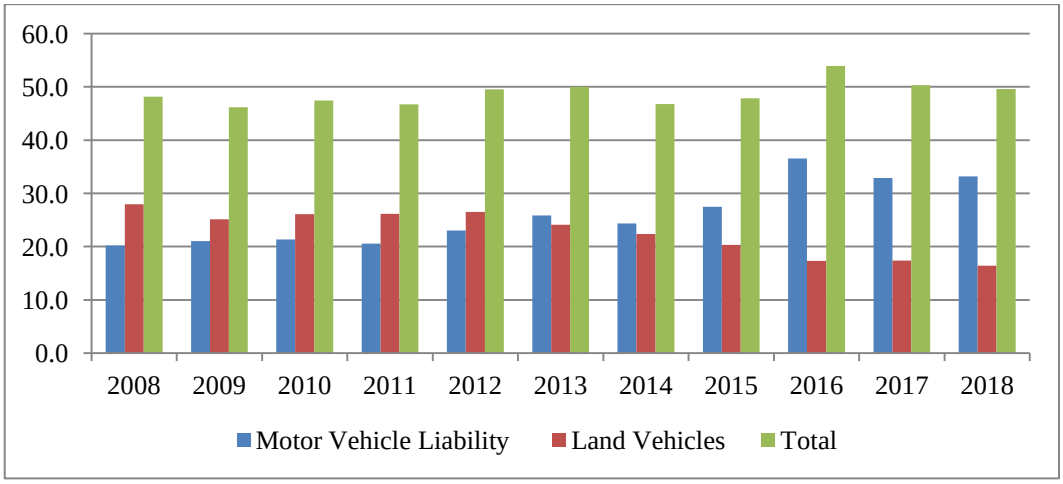
Assets of insurance, reinsurance and pension companies in 2017 are 152.3 billion TL. The share of insurance industry assets in total financial industry is 4.16% in the same year. Insurance industry assets are the second after banks' assets.

4.2. Mandatory Motor Vehicle Third Party Liability (Traffic) Insurance

Motor insurance, consisting of motor vehicle liability and land vehicles (Kasko), has an important place in Turkish insurance industry as it constituted 48.7% of the premium production in non-life business in 2018. Motor vehicle liability is the top premium

generating branch (33.1%) and Kasko is the second premium generating branch (16.4%). There are 3 types of insurance in motor vehicle liability branch. First of them is mandatory liability insurance (traffic insurance) representing 94% of the gross written premium generated in motor vehicle liability branch. Second of them is facultative liability insurance, paying claims above the limits of traffic insurance and moral indemnities which cannot be covered in traffic insurance, representing 3.5% of motor vehicle liability branch. The third is the Green Card, paying claims of drivers having accident in the countries included in Green Card scheme. Land vehicles branch, on the other hand, consists of only Kasko insurance.

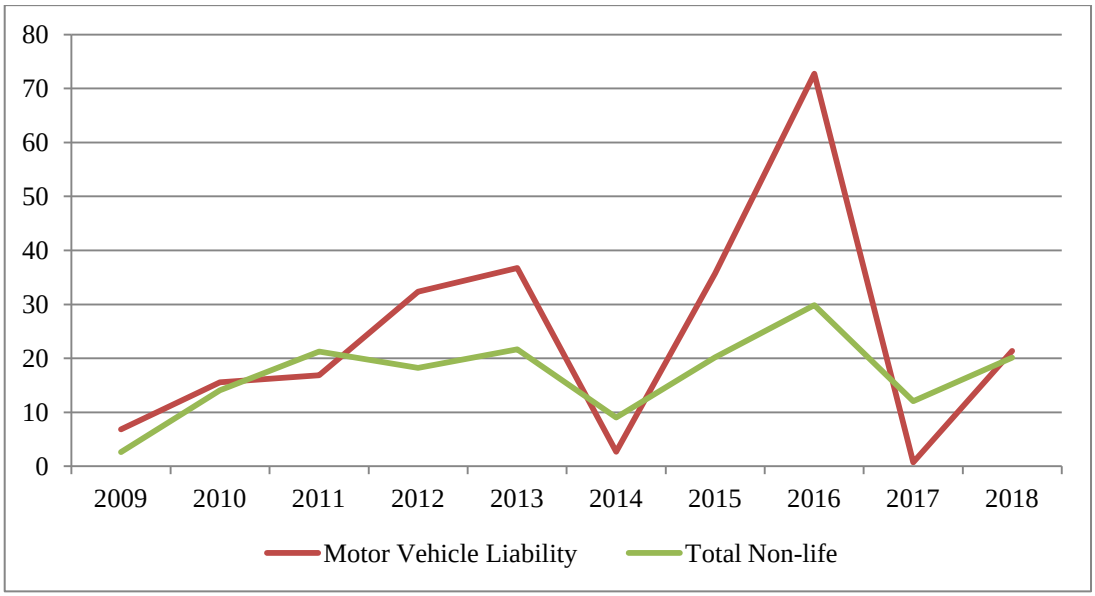
Portion of motor vehicle liability branch and Kasko insurance in total non-life premium has been proceeding in different ways for the last 10 years. While portion of motor vehicle liability branch has been increasing, Kasko has been decreasing. However, total premium production has been around 50%. Figure 16 shows the share of these two branches.



Source: Created by the author based on Ministry of Treasury and Finance and Insurance Association of Turkey

Figure 16. Share of motor insurance in total non-life premium (%)

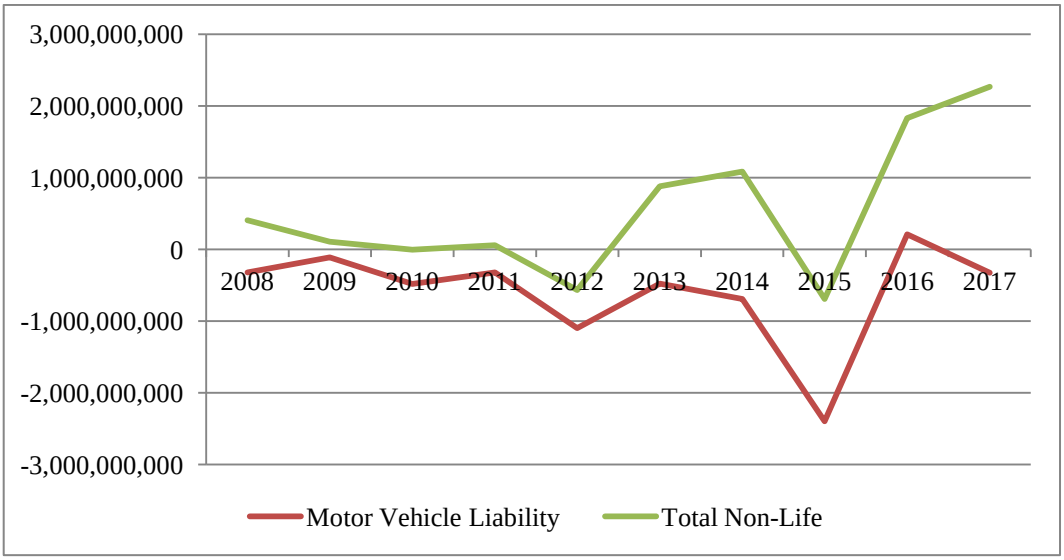
Figure 17 shows us the importance of motor vehicle liability branch in the sector. We can see the high correlation in premium production. When premiums increased in motor vehicle liability branch, total-non life premiums also increased between 2008 and 2017. For this reason, it is beneficial to understand the dynamics and developments in this branch which will be handled in the financial assessment section.



Source: Created by the author based on Ministry of Treasury and Finance and Insurance Association of Turkey

Figure 17. Premium growth rates of motor vehicle liability branch and total non-life (%)

Figure 18 shows us the fact that technical profits of motor vehicle liability branch and total-non life move together. We can also see from the figure that there is technical loss in 9 of last 10 years. This branch pulls overall technical profit of companies down. Despite this situation, 30 out of 38 non-life insurers have license at this branch as of 2018. Most of the companies operate at this branch to increase recognition and it is easy to produce premium as the competition is based on price.



Source: Ministry of Treasury and Finance

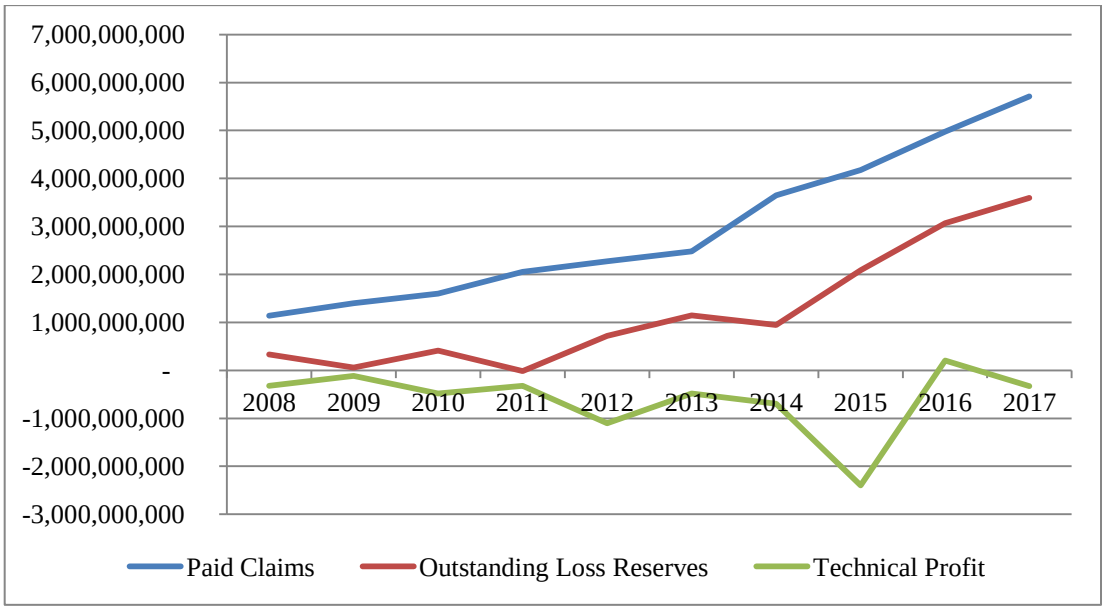
Figure 18. Technical profit data of motor vehicle liability branch and total non-life (TL)

When we look at the recent developments at the branch, due to increase in tariffs in 2016, written premium of traffic insurance rose 80% compared to the previous year. In 2017, as a result of traffic insurance pricing cap, nominal premium production declined 0.4% compared to the year of 2016. For this reason, technical loss occurred in traffic insurance by the end of 2017. With the effect of 6.5% increase in January and 1.5% regular increases in each other month in the pricing cap caused traffic insurance nominal premiums to increase 21% in 2018.

Risky Insureds Pool (Pool) was formed in April 2017 right after implementing pricing cap to distribute the technical loss generated in Traffic insurance among insurers. Highly risky policyholders and motor vehicle types are covered in the Pool. Insurer gets 5% of premium underwritten and transfers the rest to the pool. Insurer manages claims process itself resulting from its policies. Intermediaries get fixed 8% of total premium as commission. 50% of the premiums transferred to the Pool and the claims payments are distributed to the insurers equally. 50% is distributed according to the market share of insurers in the last 3 years. Management of the distribution is in the authority of Turkish Motor Insurance Bureau whose main responsibility is Green Card Scheme.

According to General Conditions, temporary disability claims and temporary caretaker expenses are not in responsibility of insurers. However, Supreme Court has decided that insurers are responsible for these expenses instead of Social Security Institution because of the contradiction between Road Traffic Law and General Conditions. This uncertainty increases lawsuits in bodily injuries and hence outstanding loss provisions.

Increase in paid claims and outstanding loss reserves in traffic insurance due to regulations, the verdicts of Supreme Court in 2011 and 2014 and minimum wage increase has been playing an important role in technical profit of traffic insurance and hence overall profit.



Source: Ministry of Treasury and Finance

Figure 19. Paid claims, outstanding loss reserves and technical profit of motor vehicle liability branch (TL)

4.3. World Insurance Markets

According to (Swiss Re, 2018b) global premium volume was $4.89 trillion in 2017 composed of $2.66 trillion in life (54.4%) and $2.23 (45.6%) in non-life. As opposed to Turkey, most of premium was generated in life insurance globally. Turkey's premium production in U.S. Dollar was 12 billion in 2017 and its share of World markets was 0.25%. When we look at the ratios used to compare countries ignoring population effect, the World's 2017 premium per capita (insurance density) was $650 in the world, $149 in Turkey. The rate of premium over the GDP (insurance penetration) was 1.42% in Turkey and 6.13% globally in 2017. These figures demonstrate that Turkey has a very long way to go in development of insurance markets.

Table 6. Some figures related to world insurance markets in 2017

	Turkey	**The 1st**	**The 2nd**	**The 3rd**
Name	Turkey	United States	China	Japan
Premium volume (in millions of USD)	**12,054**	**1,377,114**	**541,446**	**422,050**
Share (%)	0.25	28.15	11.07	8.63
Ranking	39	1	2	3
Name	Turkey	Cayman Islands	Hong Kong	Switzerland
Insurance density (in USD)	**149**	**12,122**	**8,313**	**6,811**
Ranking	63	1	2	3
Name	Turkey	Taiwan	Cayman Islands	Hong Kong
Insurance penetration (%)	**1.42**	**21.32**	**19.61**	**17.94**
Ranking	72	1	2	3

Source: Created by the author based on Swiss Re Sigma No 3/2018

4.4. Financial Assessment of Turkish Insurance Industry

Total assets of the companies operating in the industry in 2017 was 152.3 billion TL including pension companies. Assets of non-life companies was 50.5 billion TL, life companies was 1.16 billion TL, life & pension companies was 97.03 billion TL and reinsurance companies was 3.56 billion TL.

Table 7. Assets of companies in the industry in 2017

Assets (1000 TL)	**Insurance / Pension Companies**				**Reinsurance Companies**	**Grand Total**
	Non-Life	**Life**	**Life / Pension**	**Total**		
Current Assets	46,760,632	1,136,390	44,268,510	92,165,531	2,137,800	94,303,331
Long Term Assets	3,797,640	23,841	52,768,734	56,590,216	1,422,478	58,012,694
Total Assets	**50,558,272**	**1,160,231**	**97,037,245**	**148,755,747**	**3,560,278**	**152,316,025**

Source: Ministry of Treasury and Finance 2017 Annual Report

Table 8 shows the proportionate of each kind of assets in total assets. As it can be seen from the table, most of the assets of the industry are short-term assets. 92% of non-life insurance companies' assets are held in current assets and 8% are in long-term assets. Of

total assets non-life companies held 46.88% in cash and cash equivalents, 23.34% in financial assets and investments for the benefit of life insurance policyholders who bear the investment risk, 15.81% in receivables from technical operations and 6.46% in other current assets.

Table 8. Assets of companies in the industry in 2017

Assets (%)	Insurance / Pension Companies			
	Non-Life	Life	Life / Pension	Total
I- Current Assets	92.5	97.9	45.6	62.0
A- Cash and Cash Equivalents	46.88	34.40	8.85	21.97
B- Fin. Assets and Inv.for the Benefit of Life-Insurance Policyholders who Bear the Inv.Risk	23.34	41.80	6.22	12.31
C- Receivables from Technical Operations	15.81	15.75	29.96	25.04
D- Receivables from Related Parties	0.15	0.02	0.04	0.07
E- Other Receivables	0.24	0.06	0.03	0.10
F- Expense and Revenue for Future Months	5.71	5.11	0.51	2.31
G- Other Current Assets	0.35	0.81	0.03	0.14
II- Long Term Assets	7.5	2.1	54.4	38.0
A- Receivables from Technical Operations	0.07	0.00	52.95	34.57
B- Receivables from Related Parties	0.00	0.00	0.00	0.00
C- Other Receivables	0.01	0.00	0.00	0.01
D- Finansial Assets	3.73	0.09	0.07	1.31
E- Tangible Assets (Net)	2.15	0.51	0.36	0.97
F- Intangible Assets	0.70	0.67	0.85	0.80
G- Expense and Revenue for Future Years	0.07	0.01	0.04	0.05
H- Other Long Term Assets	0.79	0.78	0.11	0.34
Total Assets	**100**	**100**	**100**	**100**

Source: Ministry of Treasury and Finance 2017 Annual Report

Life insurance companies held 98% of their total assets in current assets and 2% in long-term assets. Of total assets, 34.4% was held in cash and cash equivalents, 41.8% was held in financial assets and investments for the benefit of life insurance policyholders who bear the investment risk, 15.75% was held in receivables from technical operations and 6% in other current assets. The short-term maturity of life insurance companies' assets are contrary to the general situation in developed markets. This is because of the fact that the share of life insurance products including investment element is too small which is 7.6%. It could also be resulted from uncertainty in Turkish economy. Normally, life insurance companies' assets are expected to be long term.

Life & pension companies have a longer term nature in their assets because of high portion of pension activities in their operations. These companies held 46% of their total assets in current assets and 54% in long-term assets. Of total assets, 8.85% was held in cash and cash equivalents, 6.22% was held in financial assets and investments for the benefit of life insurance policyholders who bear the investment risk, 29.96% was held in receivables from technical operations (29.25% in receivables from pension operations) and 0.6% in other current assets. Of total assets, 52.95% was in receivables from pension operations, 0.07% in financial assets, 0.36% in tangible assets and 0.85% in intangible assets.

In 2017, 68.4% of financial assets were held in Government Bonds/Treasury Bills, 2.7% in stocks, 20.6% in other financial assets and 8.3% in mutual funds (Ministry of Treasury and Finance, 2017)

Table 9 shows the passive side of the balance sheet of the companies operating in the industry in 2017. Total short term liabilities of insurance and pension companies are 71.80 billion TL, long-term liabilities are 57.54 billion TL and shareholder's equity are 19.4 billion TL.

73% of non-life insurance companies' passive total consists of short term liabilities, 3% long term liabilities and 24% shareholder's equity. 62% of passive total consists of technical provisions. These figures demonstrate that most of non-life insurance companies' liabilities are short term in accordance with their short term assets. Similar to non-life, life insurance companies also have most of their liabilities in short term (60%). However, their portion of technical provisions (43%) is less and shareholder's equity (%32) is more than non-life's. Contrary to non-life and life companies, life & pension companies have more of their liabilities in long term (58%) because of high level of pension activities. They have small part of passive total in technical provisions (9%) and equity (7%).

Technical provisions are very important for insurance industry especially for non-life insurers. Technical provisions are set aside for potential liabilities resulting from policies sold. There are 6 types of technical provisions that insurance companies operating in Turkey are obliged to set aside.

Table 9. Passive side of balance sheet of the companies in 2017

Liabilities and Shareholders' Equity	Insurance / Pension Companies			
	Non-Life	Life	Life / Pension	Total
Value (1000 TL)				
Short Term Liabilities	36,936,218	701,514	34,161,166	71,798,897
A-Short Term Technical Provisions	30,260,482	420,545	3,851,441	34,532,468
B-Other Liabilities	6,675,736	280,969	30,309,725	37,266,430
Long Term Liabilities	1,315,955	82,344	56,143,149	57,541,448
A-Long Term Technical Provisions	1,087,251	78,658	4,741,031	5,906,941
B-Other Liabilities	228,704	3,686	51,402,118	51,634,507
Shareholders' Equity	12,306,099	376,373	6,732,930	19,415,401
Total	50,558,272	1,160,231	97,037,245	148,755,747
Portion (%)				
Short Term Liabilities	0.73	0.60	0.35	0.48
A-Short Term Technical Provisions	0.60	0.36	0.04	0.23
B-Other Liabilities	0.13	0.24	0.31	0.25
Long Term Liabilities	0.03	0.07	0.58	0.39
A-Long Term Technical Provisions	0.02	0.07	0.05	0.04
B-Other Liabilities	0.01	0.00	0.53	0.35
Shareholders' Equity	0.24	0.32	0.07	0.13
Total	1	1	1	1

Source: Ministry of Treasury and Finance 2017 Annual Report

1) Unearned premiums provision: Unearned premiums provision is set aside for the part of premiums accrued in the next accounting period due to matching principle of accounting. Unearned premiums provision consists of 38% of total technical provisions in 2017 in Turkey.

2) Outstanding claims provision: Outstanding claims provision consists of 2 parts. First part is set aside for the claims reported but not paid yet. When a claims file is opened, insurer estimates an indemnity amount based on its experiences or a minimum amount set by the Regulation. The amount and time of this claim payment and whether it will be paid are not certain. Second part is set aside for the claims incurred but not reported yet (IBNR). IBNR is forecasted by using statistical methods. Outstanding claims provision consists of 45% of total technical provisions in 2017 in Turkey. 63% of outstanding claims provision is the provisions for reported claims and 37% is IBNR.

3) Profit loaded actuarial provision (mathematical provision): This provision is set aside for the longer-than-one-year life, health and personal injury insurance policies. It comprises 12% of total technical provisions in 2017 in Turkey.

4) Additional unexpired risk reserves: It is set aside if unearned premiums provision is not sufficient compared to the insurer's risk and expense level. It consists of less than 1% of total technical provisions in 2017 in Turkey.

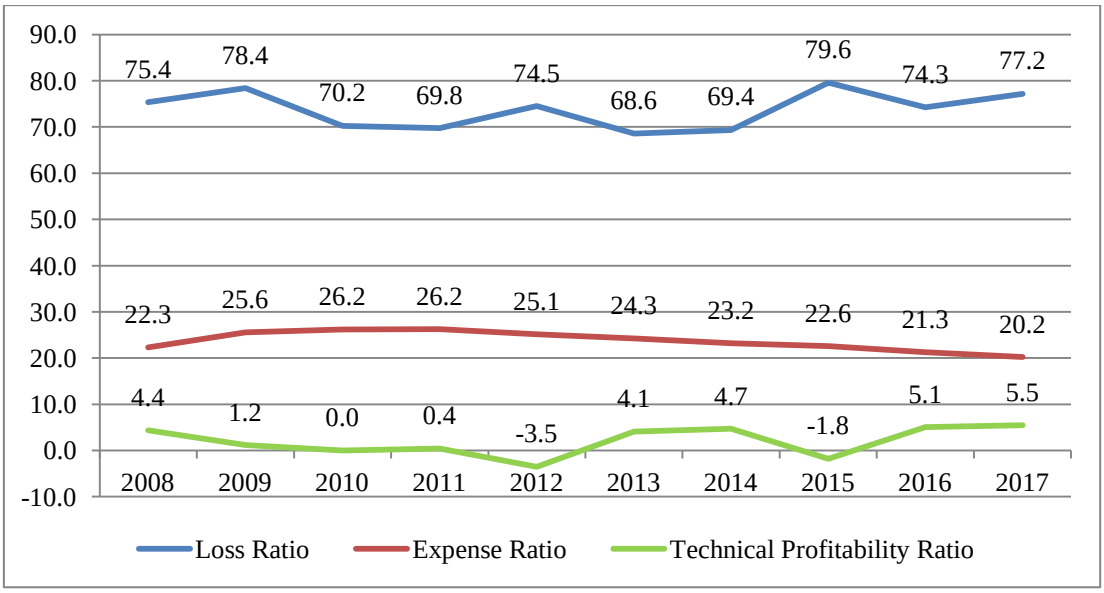
5) Catastrophe provision: It is set aside for the volatility in loss ratios in the future and special risks. It comprises 3.4% of total technical provisions in 2017 in Turkey.

6) Provisions for bonus and rebates: It is set aside if insurer implements bonus or rebates in policies. It comprises less than 1% of total technical provisions in 2017 in Turkey.

Average loss ratio of non-life companies has been volatile in the last 10 years but in rising trend in recent years while expense ratio has been decreasing on a regular basis. 2017 loss ratio was 77.2%, expense ratio was 20.24%. Technical profitability has also been volatile. 2012 and 2015 generated loss, 2016 and 2017 showed record high levels for the last 10 years and reached to 5.5%.

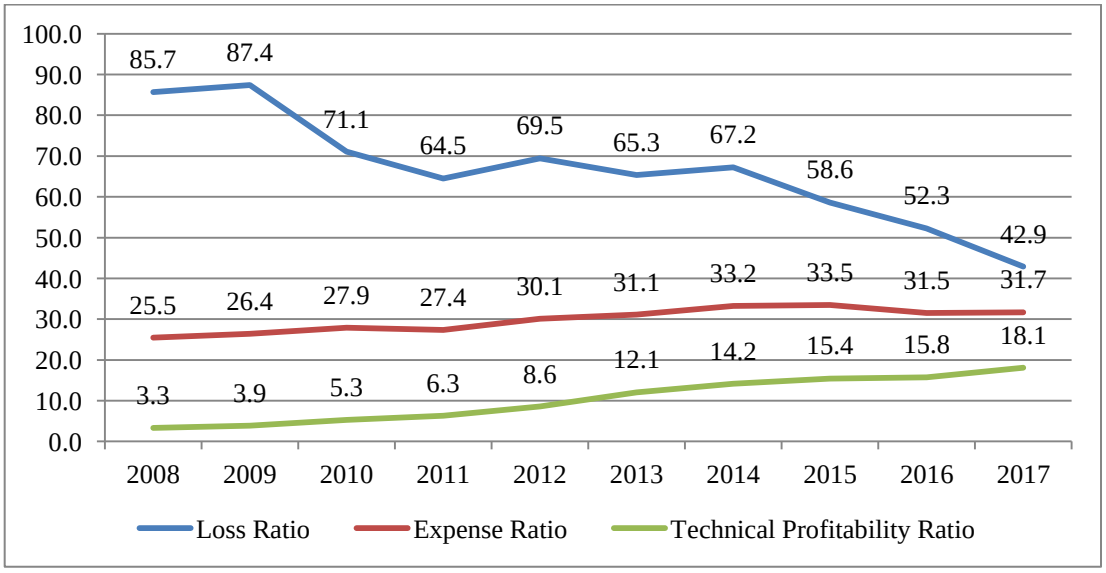
Average loss ratio of life and pension companies has been decreasing on a regular basis in the last 10 years while expense ratio increased from 25.5% to 33.5% and started fall. 2017 loss ratio was 42.9%, expense ratio was 31.7%. Technical profitability ratio has been increasing on a regular basis and reached to 18.1% record high level in 2017.

ROE of non-life insurance companies has been quite volatile in the last 10 years. It ranged between -10.4% and 21.2%. 2017 was the highest ROE of last 10 years. The global non-life insurance sector ROE of 6% for 2017 is much lower than that of Turkey because of higher loss raito and lower interest rates. ROA and technical profitability ratios have been quite same and moved together in that period because of the high share of investment returns in both profitability ratios. They were also volatile between -3.5% and 5.9%. 2017 ROA was 4.9% and technical profitability ratio was 5.5%.



Source: Ministry of Treasury and Finance 2017 Annual Report

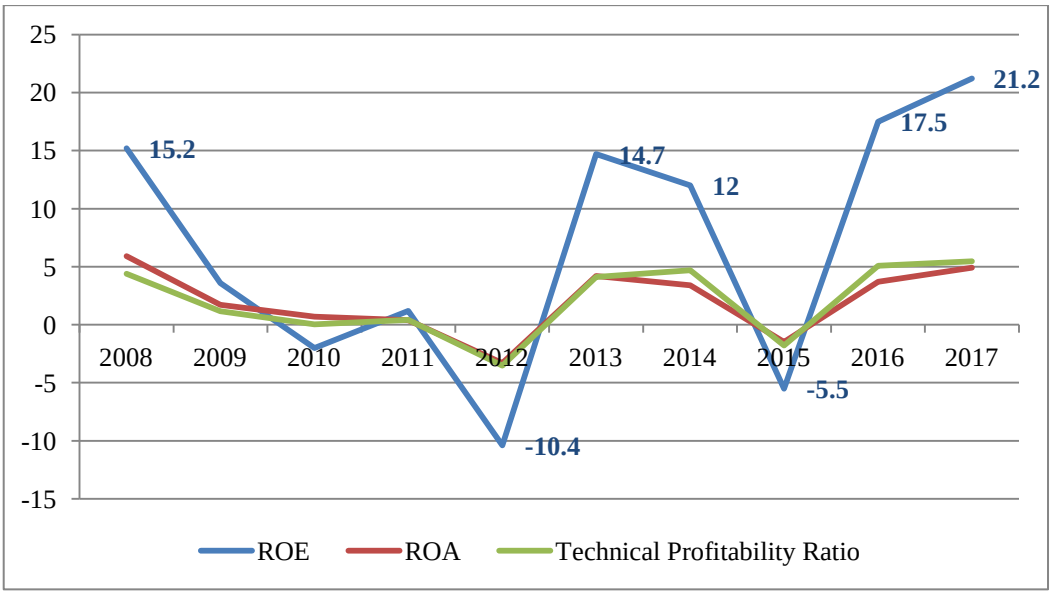
Figure 20. Loss, expense and technical profitability ratios of non-life companies (%)



Source: Ministry of Treasury and Finance 2017 Annual Report

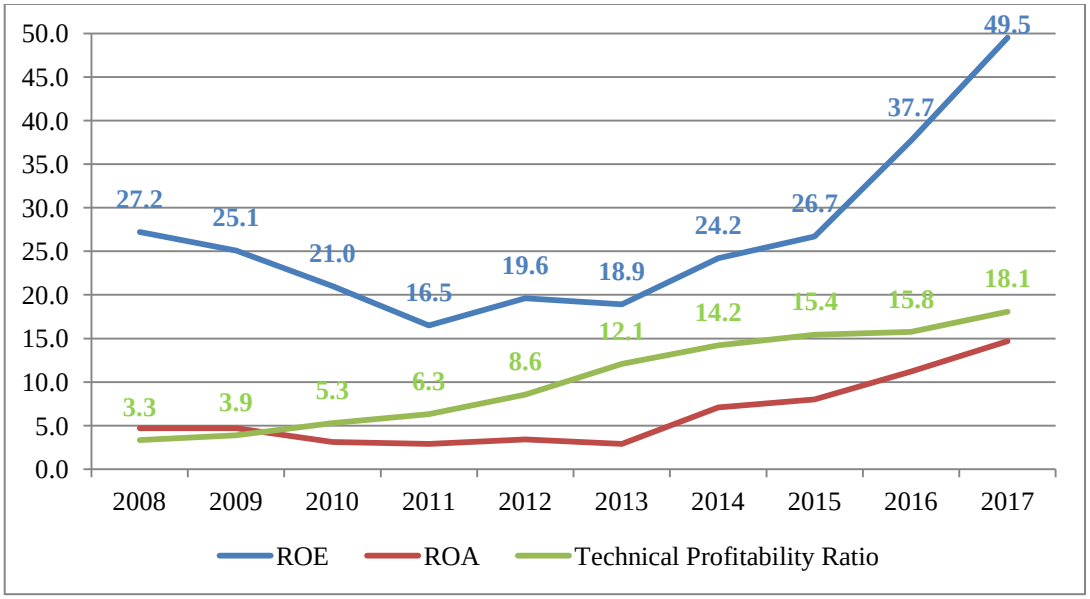
Figure 21. Loss, expense and technical profitability ratios of life&pension companies (%)

ROE of life and pension companies has hit record highs in recent years which was 49.5% in 2017 and it has never been below zero. ROA and technical profitability ratios have also been rising in recent years. 2017 ROA was 14.7% and technical profitability ratio was 18.1%.



Source: Ministry of Treasury and Finance 2017 Annual Report

Figure 22. ROE, ROA and technical profitability ratios of non-life companies (%)



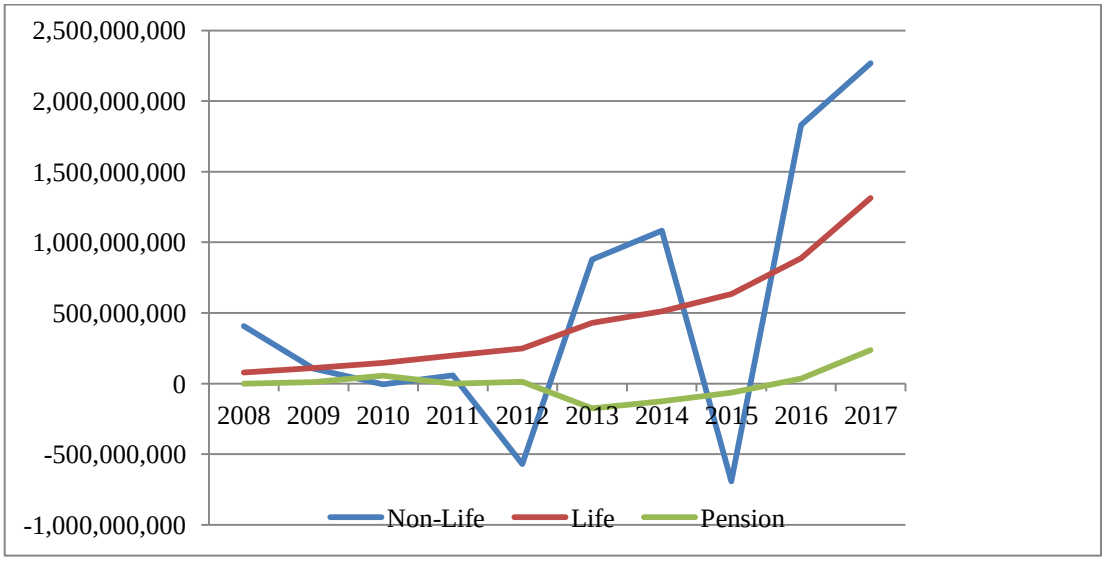
Source: Ministry of Treasury and Finance 2017 Annual Report

Figure 23. ROE, ROA and technical profitability ratios on life & pension companies (%)

When we look at technical profit numbers, we see that life technical profit increased regularly in the last 10 years and it reached to 1.3 billion TL in 2017. It seems that technical profit of pension companies had difficulty to stay above zero for 8 years and the last 2 years show their profits have been rising. Total net profit of life & pension companies was 2 billion TL in 2017.

Non-life technical profit has been volatile for the last 10 years. The main reason for this are the verdicts of Supreme Court (Yargıtay), Regulation amendments in technical provisions, 2008 global financial crisis and the premium volatilities because of high competition in motor vehicle liability branch which we will discuss in the next chapter. The sector saw technical losses in 2012 and 2015. In 2017 technical profit reached to 2.27 billion TL after adjustments in premiums. 2017 non-life net profit was 1.6 billion TL.

Finally, it is important to analyze the significance of insurance activities in the companies selling both life insurance and pension products (life/pension companies). Table 10 shows that 86% of technical profit of life/pension companies comes from insurance activities. It means that great amount of technical profits come from insurance technical profit and insurance activities play an important role in life/pension companies.



Source: Ministry of Treasury and Finance

Figure 24. Technical profits of the companies in the turkish insurance market (TL)

Table 10: Portion of insurance technical profit in life/pension companies

	TL	**Portion (%)**
Non-Life Technical Profit (Health/Sickness and Accident)	127,881,127	8
Life Technical Profit	1,310,773,388	78
Pension Technical Profit	236,910,276	14
Total Technical Profit	1,675,564,791	100

Source: Created by the author based on income statements in Ministry of Treasury and Finance 2017 Annual Report

4.5. Recent Developments Affecting Profitability of Insurance Companies

Turkish insurance market, having low penetration rates and high growth potential, attracted interest of foreign investors which led foreign capital share to increase up to 51.3% from 16.8% in 2005-2008 period. The capital injection to the market increased the financial strength of the insurance companies while instigating the competition. On the other hand, premium tariffs were set by Ministry of Treasury and Finance in traffic insurance in accordance with the risk levels of insureds before 2008. By the amendment in legislation, the tariffs in traffic insurance started to be set by the insurance companies as of 2008. Additionally, global financial crisis broke up in 2008 reducing demand for insurance all over the world. The fact that the tariffs were set by insurance companies freely in a setting there was hard competition and the global financial crisis caused traffic insurance premiums to increase slightly in real terms. The average real growth rate of non-life gross written premium, which was 15% in 2002-2007 period, fell to 1.72% in 2008-2011 period. With the change of estimation method of technical provisions for IBNR (Incurred But Not Reported) by an amendment in Regulation caused technical provisions to increase which is an expense source in income statement. After 2008 financial crisis factory fires also started to increase. These important changes in revenues and expenses caused overall profitability of non-life insurance companies to reduce. Hence, ROE of non-life insurance companies fell to -2% in 2010.

The verdict of Supreme Court (Yargıtay) in 2011 that the people getting support from the insured who died in a unilateral traffic accident even if he is %100 faulty are able to get support indemnity caused insurers' claims and technical provisions to increase highly and ROE to fall to -10.4% in 2012.

Again the amendment in Regulation related to technical provisions giving more freedom to insurers in estimation of technical provisions but more responsibility caused technical provisions to increase largely. Additionally, value losses of vehicles after accidents were started to be covered by traffic insurance after the new General Conditions published by Ministry of Treasury and Finance entered into force. Moreover, the increasing competition in the sector again reduced non-life insurance premium real growth rate to 2.5% in 2014. These factors led to ROE of insurers to fall to -5.5% in 2015.

After the withdrawal of licenses of the insurance company called Ege Insurance (Ege Sigorta A.Ş.) in 2015 which had 2.5% share in 2014 traffic insurance gross written premiums and conducted low price strategy, non-life insurance premiums started to increase in 2015 and 2016 with a real growth rate of 13.75% and 18%. The increasing reactions of insureds because of these huge sudden changes in insurance premiums caused the Ministry of Treasury and Finance to set ceiling in traffic insurance premiums in April 2017. The implementation of ceiling caused real growth rate of non-life gross written premiums to fall to -2.87% in 2017. But ROE of non-life insurers increased to 21.2% in 2017. The unwillingness of insurers to insure high risky drivers although insurers has an obligation to insure everybody who demand traffic insurance by Law caused the government to form Risky Insureds Pool (Pool) in July 2017 which was applied to the policies written after April 2017. All the insurers having license in motor vehicle liability branch are natural shareholders of the Pool. Insurer who arranges an insurance policy covered by the pool gets 5% of the premium and transfers 95% to the pool. 50% of premiums and claims are distributed equally among insurers, 50% are distributed in accordance with the latest 3-year market share of each insurer.

The large increases in minimum wage (Asgari ücret) set by the government (30% increase in 2016 and 26% increase in 2019) is another factor increasing expenses and claims of insurance companies as most of disability and support claims and labor costs in repairs of cars are calculated upon minimum wage. The large increase in exchange rate of U.S. Dollar in recent years also increased claims because the prices of imported car parts used in repairs increased.

5. LITERATURE REVIEW

Insurance is very important for society in order to be protected against negative effects of undesired events and continue living comfortably. In order that insurance exists, insurers have to survive. For this reason, financial performances of insurers have been measured by different stakeholders for years and factors affecting insurance company performance have been attracting attention of researchers in recent years. In this chapter, the studies conducted about profitability of insurers in the world and Turkey will be reviewed.

5.1. Studies Conducted About the Profitability of World Insurance Industry

(Chidambaran et al, 1997) analyzed the economic performance of U.S. property-liability insurance industry for the period 1984-1993. The results of the analysis suggest that the concentration ratio for the line and the share of direct writers in the line are both significant determinants of insurers' performance.

(Adams & Buckle, 2003) empirically examined the determinants of corporate financial performance among insurance/reinsurance companies operating in Bermuda by using panel data for the period 1993-1997. The independent variables used in this study are company size, underwriting risk, leverage, liquidity, type of company and scope of operations. According to the results, financial performance is positively and significantly influenced by the leverage, type of company and underwriting risk. In contrast, liquidity has a negative and significant impact on financial performance. Moreover, company size and scope of operations are not significantly correlated with financial performance.

(Shiu, 2004) analyzed the determinants of the general insurance companies' performance over the period 1986-1999 in the United Kingdom. In this study, performance has been measured by three different indicators: investment yield, percentage change in shareholders' funds, and return on shareholders' funds. By empirically testing economic and company-specific variables, the study suggests that liquidity, unexpected inflation, interest rate level and underwriting profits are statistically significant determinants of UK's general insurance companies' performance.

(Curak et al., 2011) investigated both the firm-specific and economic characteristics as determinants of the Croatian composite insurance companies' financial performance during the period from 2004 to 2009. Based on the results of panel data analysis, the study shows that size, underwriting risk, inflation, and equity returns have a significant influence on the insurance companies' ROA.

(Doumpos et al., 2012) have examined the firm-specific and country-specific characteristics that affect the financial performance of non-life insurance companies using the sample of 2176 property and casualty insurance companies operating in 91 countries between 2005 and 2009. The study reveals that higher GDP growth, lower inflation rate, lower income inequality and more developed stock markets increase the performance of property and casualty insurance companies.

(Pervan et al., 2012) have investigated the determinants of profitability in the Bosnia and Herzegovina insurance industry between the years of 2005-2010 by using a dynamic panel model. According to the study, age of company, market share and past performance are positively and significantly related with current profitability. Claims ratio has a negative and significant influence on profitability. It is also found that foreign-owned companies perform better than domestically owned companies. There is no significant relationship between diversification and profitability.

(Mehari & Aemiro, 2013) have analyzed the impact of firm-specific factors (size of the company, leverage, tangibility of assets, loss ratio, growth in written premium, liquidity and age of the company) on the ROA of nine Ethiopian insurance companies during the period from 2005 to 2010. According to the results, the financial performance of Ethiopian insurance companies is significantly and positively influenced by the size of the company, tangibility of assets and leverage while loss ratio has a negative and significant influence on financial performance. The results also show that the age of the company, growth in written premium and liquidity are not significantly related to financial performance.

(Burca & Batrinca, 2014) have investigated the factors that influence the financial performance of 21 insurance companies operating in the Romanian insurance market during the interval 2008-2012. The explanatory variables tested empirically are: financial leverage in insurance, company size, number of years of operations in the Romanian

market, growth of gross written premiums, equity, total market share, diversification, underwriting risk, investment ratio, reinsurance dependence, retained risk ratio, solvency margin, and growth of GDP/capita. ROA has been used as an indicator of the financial performance. By applying specific panel data techniques, the authors have shown that the determinants of the financial performance in the Romanian insurance market are financial leverage in insurance, company size, growth of gross written premiums, underwriting risk, risk retention ratio and solvency margin.

(Lee, 2014) primarily focused on the investigation of the firm-specific factors and macroeconomic factors that affect the profitability of Taiwanese property-liability insurance companies for the period 1999-2009. The study shows that operating ratio and ROA are affected significantly by the underwriting risk, reinsurance usage, input cost, return on investment and a member of a financial holdings group. Additionally, the economic growth rate has a statistically significant relationship with operating ratio. The results also show that the market share has a negative and significant effect on operating ratio while financial leverage is significantly and negatively related to ROA. Moreover, firm size, firm growth, diversification, and inflation rates are not significantly correlated with operating ratio and ROA.

(Dorofti & Jakubik, 2015) empirically investigated the link between the macroeconomic environment and life and non-life insurers' profitability using 30 European countries' aggregate data for the period 2005-2012 by using dynamic panel approach. Macroeconomic variables used as explanatory variables in the study are real gross domestic product, long term interest rates (Maastricht criterion), inflation, unemployment rates and stock market index. Profitability measures used in the study are ROA and ROE. The results for non-life insurers show that GDP, stock market index, interest rate have positive; inflation has negative impact on ROE as well as ROA. The results for life insurers show similar results for ROE but the results of the models for ROA are a bit mixed not allowing a conclusion.

(Jadi, 2015) analyzed the determinants of financial performance of insurance companies based on their financial strength rating performance for 57 insurers in the United Kingdom over the period 2006-2010. The analysis include 8 firm-specific variables, which are leverage, profitability, liquidity, size, reinsurance, growth, type of business and organizational form. Rating transition matrices and regression models are

employed in the study. The study establishes that profitability, liquidity, size and organizational form are statistically significant determinants of financial performance of insurance companies in the United Kingdom.

(Hailegebreal, 2016) has analyzed the effects of firm specific factors which are age of company, size of company, leverage ratio, liquidity ratio, premium growth, technical provision, underwriting risk, solvency, re-insurance dependency and tangibility of assets and macroeconomic factors which are GDP and inflation on profitability of Ethiopian insurance industry over the period 2004-2014. The study found that underwriting risk, technical provision, leverage and inflation have negative and significant effect whereas premium growth, age of the company, solvency ratio and GDP have statistically significant and positive relationship with the profitability of Ethiopian insurance industry.

(Berhe & Kaur, 2017) analyzed the effects of internal (size of insurance companies, market share, capital adequacy, leverage ratio, liquidity ratio and loss ratio) and external (GDP growth and inflation rate) on ROA for 17 Ethiopian insurance companies covering 10 years period from 2005-06 to 2014-15. Results of the regression analysis revealed that size of insurance, capital adequacy, liquidity and GDP growth were the major factors that significantly affect the profitability of insurance companies. On the other hand, leverage ratio, loss ratio, market share and inflation rate were found to have insignificant effect on insurance companies' profitability.

(Veleva, 2017) analyzed the relationship between ROA and firm-specific factors which are age of company, size of company, market share, volume of capital, leverage ratio and loss ratio for 23 non-life insurance companies in Bulgaria for the period 2006-2014 by using panel data. The study found that capital ratio, age and market share positively affects ROA while leverage ratio and loss ratio negatively affects ROA. Size of company seems to have no statistically significant effect on ROA.

(Pooser & Browne, 2018) analyzed the link between customer satisfaction and profitability of U.S. auto insurers for the period 2001-2015. The study found that greater customer satisfaction leads to reduced expenses and increased profitability.

(Ahmad & Prasetyo, 2018) analyzed the determinants of ROA for non-life insurance companies in Indonesia for the period 2011-2014. By using fixed effect model panel data approach, the study found that premium income, underwriting income and risk-based

capital have positive and significant impact on ROA. Meanwhile, liquidity and growth variables have positive but no significant effect on the ROA.

Table 11. Review of studies abroad

Author	Period	Dep. Var.	Independent Var.	Model	Results
Ahmad & Prasetyo, 2018	Indonesia 2011-2014	Non-life ROA	Premium income, underwriting profit and Solvency (risk-based capital), liquidity (current ratio) and premium growth	Fixed Eff.	Positive: premium income, underwriting profit and solvency Insignificant: liquidity and premium growth
Veleva, 2017	Bulgaria, 2006-2014	Non-life ROA	Size, leverage, loss, market share, age, capital ratio	Classic panel and random effects model	Positive: capital ratio Negative: Leverage and loss Insig: Age, size
Berhe & Kaur, 2017	Etiopia, 2006-2015	ROA	Size, leverage, solvency, liquidity, loss, market share, GDP, inflation	Fixed effects	Positive: size, solvency Negative: liquidity, GDP İnsign.: leverage ratio, loss ratio, market share, inflation
Reshid, 2015	Etiopia, 2004-2014	ROA	underwriting risk (loss ratio), retention, solvency ratio, technical provision risk, liquidity, size, premium growth, GDP, inflation	Fixed effects	Positive: premium growth, size, liquidity Negative: Loss, technical provisions ratio, solvency ratio, GDP, Insig: Retention, inflation
Burca & Batrinca, 2014	Romania, 2008-2012	ROA	leverage, size, age, premium growth, equity, market share, diversification, underwriting risk,	Fixed effects	Positive: size, retention, solvency Negative: leverage,

			investment ratio, retention, retained risk ratio, solvency margin, GDP		premium, loss İnsign: age, equity, market share, diversification, underwriting risk, investment ratio, retained risk ratio, GDP
Hailegebreal, 2016	Etiopia, 2004-2014	ROA	age of company, size of company, leverage ratio, liquidity ratio, premium growth, technical provision, underwriting risk, solvency, re-insurance dependency and tangibility of assets	OLS	Positive: premium growth, age, solvency ratio, GDP Negative: underwriting risk, technical provision, leverage, inflation Insign: Size, liquidity, retention, tangibility of assets
Dorofti & Jakubik, 2015	25 E.U. Countries, 2005-2012	Non-life ROA, ROE Life ROA, ROE	Real GDP,interest rate, inflation and stock market index	GMM	NON-LIFE: Positive: GDP, stock market index, interest rate Negative:inflation
Kramaric et al., 2017	Croatia, Slovenia, Hungary and Poland, 2010-2014	ROA, ROE	Size, retention, combined ratio, company type, ownership, age, organizational form, real GDP	Random effects	Positive: age in both ROE, ROA. Real GDP only in ROE.
Pervan et al., 2012	Bosnia, 2005-2010	ROE	age, market share, past performance, foreign ownership,	GMM	Positive: age, market share, past performance,

			Claims ratio, Diversification		foreign ownership Negative: Claims ratio Insign.: Diversification
Lee, 2014	Taiwan, 1999-2009	Non-life ROA and Operating Margin	ROI, input cost, Leverage, underwriting risk, Retention, size, growth, diversification, inflation	Random effects	Positive: ROI, input cost, Negative: Leverage, underwriting risk, Retention Insign: size, premium growth, diversification, and inflation
Shiu, 2004	U.K. 1986-99	Non-life investment yield, percentage change in shareholders' funds, and return on shareholders' funds	unexpected inflation, interest rate, equity returns, liquidity, underwriting profits, solvency, size, retention, leverage, affiliated investments, type	Panel data	Positive: liquidity, interest rate, underwriting profits, solvency Negative: unexpected inflation, retention
Pooser & Browne, 2018	U.S. 2001-2015	Non-life Combined Ratio, Expense Ratio, Loss Ratio,	Customer satisfaction, Size, age, organizational form, premium growth, retention, leverage, current ratio, motor, solvency	Logistic Reg.	Combined ratio: Positive: Retention Negative: *customer satisfaction*,size, age, motor, solvency, leverage Insignif.: organizational form, premium growth, current ratio
Jadi, 2015	U.K. 2006-	financial strength rating	leverage, profitability, liquidity, size,	Ordered probit	Positive: profitability,

	2010		retention, growth, type of business and organisational form	regression models	liquidity, size Negative: organisational form Insign:leverage, retention, growth, type of business
Chidambaran et al, 1997	U.S. 1984-1993	non-life economic loss ratio	Concentration ratio, Direct/agency ratio, investment ratio, standart deviation, regulation dummy	Two-step GLS	Positive: the share of direct writers in the line Negative: Concentration ratio Insign.: investment ratio, standart deviation, regulation dummy

Source: Prepared by the author

5.2. Studies Conducted About the Profitability of Turkish Insurance Industry

(Doğan, 2013) examined the influence of firm-specific factors (loss ratio, leverage ratio, liquidity, size of the company and age of the company) on the profitability of insurance companies listed on the Istanbul Stock Exchange for the period 2005-2011. According to the results of multiple regression and correlation methods used in the study, there is a positive and significant relationship between the size and profitability of insurance companies. However, profitability is influenced significantly and negatively by loss ratio, leverage ratio, current ratio and age of the company.

(Öner Kaya, 2015) investigated the firm-specific factors affecting the profitability of 24 non-life insurance companies operating in Turkey for the period 2006-2013 by using panel data. In the study, profitability is measured by two different variables: technical profitability ratio and sales profitability ratio. Firm-specific factors used in the study are size of the company, age of the company, loss ratio, current ratio, insurance leverage ratio, share of motor insurance in the company's portfolio, premium growth rate and premium

retention ratio. According to the study, the firm-specific factors affecting the profitability of Turkish non-life insurance companies are size of the company, age of the company, loss ratio, current ratio and premium growth rate.

(Öner Kaya & Kaya, 2015) investigated the firm-specific factors affecting the profitability of 17 life insurance companies operating in Turkey for the period 2008-2013 by using panel data. Profitability measure used in the study is ROA and firm-specific factors are size of the company, age of the company, loss ratio, current ratio, insurance leverage ratio, gross written premium and solvency ratio. According to study, it has been identified that age of company and gross written premiums have a significant and positive effect on ROA. However, size of company, current ratio and insurance leverage ratio have significant and negative impact on ROA.

Table 12. Review of studies on Turkey

Author	**Period**	**Dep. Var.**	**Indep. Var.**	**Model**	**Results**
Doğan, 2013	2005-2011 insurance companies in BIST (Ak Sigorta, Güneş Sigorta, Anadolu Sigorta, Anadolu Hayat, Aviva Hayat)	ROA	Size, loss ratio, leverage, current ratio, age	Multiple regression analysis and correlation methods	Positive: Size Negative: Loss ratio, leverage, current ratio, age
Öner Kaya, 2015	2006-2013	Non-life Technical prof. ratio, Sales Prof. Ratio	Size, age, loss,leverage ratio, current ratio, premium growth, motor, retention	Fixed effects	Positive: size, premium growth Negative: age, loss ratio, current ratio Insign: Leverage, motor, retention
Öner Kaya&Kaya, 2015	2008-2013	Life ROA	Size, age, loss,leverage ratio, current ratio,	Fixed effects	Positive: Age, premium Negative: size,

			premium growth, solvency		current, leverage Insign: loss, solvency

Source: Prepared by the author

6. EMPIRICAL ANALYSIS

In this part of the thesis, empirical analysis will be made for both life and non-life insurers and results will be interpreted.

6.1. Econometric Background

6.1.1. Panel Data

"Panel data refers to pooling of observations on cross-section of households, countries, firms, etc. over several time periods" (Baltagi, 2005, p. 1). Panel data consists of values of N number of units for different time periods. In other words, it combines cross section and time series data. The number of units is expressed as "N" and the number of periods is expressed as "T".

Balanced panel refers to the case that each unit contains data for all specified time periods. Unbalanced data refers to the case that some of the data for some periods are lost. Unbalanced data applies mostly while working with firms. In the case of unbalanced data, some restrictions apply.

Advantages of panel data are as follows;

- Increasing efficiency,
- Controlling for individual heterogeneity,
- Giving more informative data,
- Decreasing multicollinearity problem,
- Establishing more comprehensive models.

Limitations of panel data are as follows;

- Short time series problem,
- Collecting data problem,
- Cross-sectional dependence.

Panel data contains data of units and each unit has individual-specific features. The variables reflecting features of units are called individual-specific effect. Individual-specific effect is a variable that change over units but is fixed over time. Skills for persons

or manager skills for firms are examples of individual-specific effect. Every time period may also have specific features. The variable reflecting features of time is called time effects such as financial crises, earthquakes. “Time effect is a variable that is fixed over units but change over time” (Yerdelen Tatoğlu, 2018a, p. 5).

While working with panel data, detection of individual-specific effects and time effects and whether these effects are one way or two way determine the type of panel data model.

Panel data regression is different form cross-section or time-series regression because double subscript is used on panel data variables.

$$Y_{it} = \alpha + \beta_{1it} X_{1it} + \beta_{2it} X_{2it} + \ldots + \beta_{kit} X_{kit} + u_{it} \quad i=1,\ldots..,N \; ; \; t=1,\ldots..,T$$

where i denotes units such as individuals, firms, households, countries (cross-section dimension) and t denotes time (time series dimension). α is constant term, β_{kit} is Kx1 and X_{it} is the *it*th observation on K explanatory variables. u_{it} is error term which is assumed that it is identically and independently distributed with zero average and constant variance for all time periods and units.

$$u_{it} = \mu_i + \lambda_t + \upsilon_{it}$$

where μ_i denotes the unobservable individual-specific effect that is time invariant and not included in the regression, λ_t denotes unobservable time effects which is individual invariant and not included in the regression and υ_{it} denotes the remainder stochastic disturbance term. Most of the panel data models contain individual-specific effects but not time effects and therefore most of the panel data models are one way error component model. For this reason, the remaining of this study will continue according to one-way error component model.

6.1.2. Fixed Effects Panel Data Model

In fixed effects panel data model, the individual-specific effects are assumed to be fixed parameters to be estimated. Independent variables are assumed to be uncorrelated with error term (υ_{it}) but can be correlated with individual-specific effects (μ_i). In fixed effects model, the differences among units are stated as differences in α.

$Y_{it} = \alpha + \beta x_{it} + \mu_i + \upsilon_{it}$

In fixed effects model, by transforming variables μ_i is eliminated from the model. Transformation is done by averaging variables over time and subtracting average values from the initial values.

Assumptions of fixed effects model are;

- Independent variables and individual effects are uncorrelated with error term meaning strict exogeneity. But it is allowed that independent variables can be correlated with individual effects.
- There is no multicollinearity.
- There is no heteroscedasticity which means conditional variances are constant.
- There is no autocorrelation which means conditional variances are zero.

6.1.3. Random Effects Model

In random effects panel data model, the individual-specific effects are assumed to be random parameters to be estimated. Independent variables are assumed to be uncorrelated with error term (υ_{it}) and individual-specific effects (μ_i). Contrary to fixed effects model which inserts individual-specific effects into constant term, random effects model inserts individual-specific effects into error term (u_{it}).

$Y_{it} = \alpha + \beta x_{it} + u_{it}$

$u_{it} = \mu_i + \upsilon_{it}$

Assumptions of random effects model;

- Independent variables and individual effects are uncorrelated with error term meaning strict exogeneity. Independent variables and individual effects are also not allowed to be correlated with each other.
- There is no multicollinearity.

- There is no heteroscedasticity which means conditional variances are constant.

- There is no autocorrelation which means conditional variances are zero.

6.1.4. The Choice of Fixed and Random Effects Regression

- If T, number of times series data, is large and N, number of units, is small it is not important to make choice between two models as they will generate almost same results. Fixed effects can be chosen as it is easier to calculate.

- If N is large and T is small, then the model will generate different results. In this case, if the sample, N, is chosen from a large population then random effects model will be suitable. If N consists of specific countries, firms or cities then fixed effects model will be suitable.

- If there is correlation between individual specific effects and independent variables then fixed effects model should be used. If there is no correlation, random effects model should be used as it is more efficient. Hausman test is used to make choice between two models. The test detects if there is correlation between individual specific effects and independent variables.

6.1.5. System Generalized Method of Moments (System GMM)

Using random effects estimators in dynamic panel data models is not appropriate because random effects estimator does not consider endogeneity. Fixed effects estimators and first-difference estimators, on the other hand, allow individual-specific effects to be correlated with independent variables. However, when T is small fixed effects estimator is biased and inconsistent as using dummy variables reduces number of observations. In this case, robust least squares dummy variable estimator can be used to correct dynamic panel (Nickell) bias.

First-difference estimators eliminate individual effect by first-difference transformation but error term and lagged dependent variable are correlated. For this reason, results of first-difference estimators are biased. Anderson Hsiao (1981) proposes twice lagged level of dependent variable as an instrument as it is not correlated with the lagged

error term. However, Anderson Hsiao (1981) estimator is consistent but not efficient as it does not exploit all the available moment conditions and it ignores the structure of the error component in the transformed model.

Generalized Method of Moments (GMM) proposed by Arellano and Bond (1991) estimator transforms first-difference estimator by using instrument matrix and estimates the transformed model by generalized least squares estimator to eliminate autocorrelation.

System Generalized Method of Moments (System GMM) estimator by Arellano-Bover/Blundell- Bond (1998) allows usage of more than one instrument and increases efficiency. "In this method, lagged variable is not subtracted from current variable, instead mean of all possible future values of variable is subtracted" (Yerdelen Tatoğlu, 2018b, p. 136). System GMM is more efficient when T is small and unbalanced data is used.

6.2. Empirical Analysis for Life Insurance Companies

In this section of the study, steps and results of the models for life insurance companies showing relationship between independent variables and ROA/ROE will be discussed.

6.2.1. Data and Descriptive Statistics

The empirical analysis for life insurance companies in Turkey covers a period of 12 years between 2006 and 2017. Depending on the existence of data, 16 out of 22 life insurance companies operating in Turkey as of 2017 have been selected for this study. 3 of those companies are life insurance companies and 13 of them are life&pension companies. These companies represent 71.4% of the Turkish life insurance industry in terms of premium size in 2017. To obtain balanced data, companies having data for all years were included in the study. Stata 13 has been used to obtain results.

ROA and ROE are among the most used profitability measures in literature. They are used because their calculation and accessibility are easy. Hence, ROA and ROE data are more reachable for the companies in this thesis' analysis than other measures such as economic value growth. ROA (Return on Assets) and ROE (Return on Equity) are used in this study as the profitability measure for life insurance companies.

Annual data of life insurance companies were used in the study. The data was obtained from Ministry of Treasury and Finance, Turkish Statistical Institute and Central Bank of Turkey. The data of 16 life insurance companies operating in Turkey in 2006-2017 period were brought together to obtain 192 observed panel data sets. The descriptive statistics related to each dependent and independent variables calculated on the basis of this panel data set are presented in Table 13.

Table 13 shows that the mean of ROA for life insurance companies, contrary to non-life, is positive and not as volatile as non-life because of low business volume and less developments affecting profitability. Premium growth rate is volatile ranging between -92% and 600% with a mean value of 24.3% annually. High volatility in current ratio also attracts attention. Lastly, the mean value of current ratio which is 4.165 demonstrates that the market is very liquid and investments are on short term.

Table 13. Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
ROA	192	0.011	0.064	-0.417	0.240
ROE	192	0.067	0.349	-1.298	2.074
SIZE	192	0.264	0.325	-0.367	3.026
PREMIUM	192	0.243	0.715	-0.916	6.123
LOSS	192	0.783	0.940	-0.994	10.035
EXPENSE	192	0.389	0.235	0.084	1.890
LIQUIDITY	192	4.165	3.649	0.495	24.479
LEVERAGE	192	0.829	0.130	0.361	1.201
AGE	192	25.125	22.855	5.000	101.000
GDP	192	0.052	0.039	-0.047	0.111
INTEREST	192	0.122	0.034	0.081	0.179

ROA: Return on Assets; ROE: Return on Equity; SIZE: Asset Growth Rate of the Company; PREMIUM: Premium Growth Rate; LOSS: Loss Ratio; EXPENSE: Expense Ratio; LIQUIDITY: Current Ratio; LEVERAGE: Leverage Ratio; AGE: Age of the Company; GDP: Real GDP Growth; INTEREST: 1-Year Interest Rate. Source: Results obtained using Stata 13.

Before defining the variables, whether the series is stationary was tested. The panel unit root test by Levin, Lin and Chu (LLC) was used to test if the series are stationary. The null hypothesis in LLC test is that panels contain unit roots. Alternative hypothesis, on the

other hand, is that panels do not contain unit roots. Acceptance of the null hypothesis indicates that there is common unit root meaning that the series are nonstationary.

Based on the results of LLC test, because the probability values calculated are lower than the significance level of 5%, the null hypothesis was rejected for all variables. Table 14 shows the results of unit root tests.

Table 14. Unit root test results

Variable	***t*-statistic**	**p-value**
ROA	-3.66	0.0001
ROE	-7.09	0.0000
SIZE	-7.96	0.0000
PREMIUM	-25.07	0.0000
LOSS	-19.41	0.0000
EXPENSE	-4.45	0.0000
LIQUIDITY	-3.24	0.0006
LEVERAGE	-5.53	0.0000
AGE	-	-
GDP	-7.68	0.0000
INTEREST	-8.4	0.0000

Source: Results obtained using Stata 13.

Table 15. Correlation matrix

	SIZE	PRE	LOSS	EXP	LIQ	LEV	AGE	GDP	INT	PEN
SIZE	1.00									
PRE	0.36	1.00								
LOSS	-0.32	-0.17	1.00							
EXP	-0.06	0.10	0.08	1.00						
LIQ	-0.06	-0.01	0.08	0.09	1.00					
LEV	-0.09	-0.07	0.01	0.00	-0.08	1.00				
AGE	-0.14	-0.13	0.15	0.09	0.39	0.16	1.00			
GDP	-0.03	0.02	-0.17	-0.01	0.00	-0.03	0.03	1.00		
INT	0.16	0.03	-0.09	-0.22	0.01	0.06	-0.10	-0.48	1.00	
PEN	0.27	0.07	-0.19	0.17	0.17	0.38	0.17	0.00	0.00	1.00

SIZE: Asset Growth Rate of the Company; PRE: Premium Growth Rate; LOSS: Loss Ratio; EXP: Expense Ratio; LIQ: Current Ratio; LEV: Leverage Ratio; AGE: Age of the Company; GDP: Real GDP Growth Rate; INT= 1 Year Interest Rate; PEN: Pension Source: Results obtained using Stata13.

Table 15 shows the correlation coefficients between the independent variables. That correlation coefficient is more than 0.8 indicates severe multicollinearity (Kennedy, 2008; Gujarati 2009). According to the table, as there is no correlation equal to or above 0.8, we can say there is no multicollinearity. As a result, we can keep all the independent variables in our regression model.

6.2.2. Specification of The Model

We employed System GMM in our analysis for life insurance companies as lagged values of dependent variables cause endogeneity in static panel data models. System GMM is also proper for the dataset with many units but small periods. The models used to measure the impact of both firm-specific factors and macroeconomic factors on the profitability of life insurance companies in Turkey are as follows:

Model 1:

$$ROA_{it} = \alpha + \beta_1 ROA_{it-1} + \beta_2 SIZE_{it} + \beta_3 PREMIUM_{it} + \beta_4 LOSS_{it} + \beta_5 EXPENSE_{it} + \beta_6 LIQUIDITY_{it} + \beta_7 LEVERAGE_{it} + \beta_8 AGE_{it} + \beta_9 GDP_{it} + \beta_{10} INTEREST_{it} + \beta_{11} PENSION_{it} + u_{it}$$

Model 2:

$$ROE_{it} = \alpha + \beta_1 ROE_{it-1} + \beta_2 SIZE_{it} + \beta_3 PREMIUM_{it} + \beta_4 LOSS_{it} + \beta_5 EXPENSE_{it} + \beta_6 LIQUIDITY_{it} + \beta_7 LEVERAGE_{it} + \beta_8 AGE_{it} + \beta_9 GDP_{it} + \beta_{10} INTEREST_{it} + \beta_{11} PENSION_{it} + u_{it}$$

6.2.3. Panel GMM Estimation Results

One-Step System GMM (Robust) using orthogonal deviations was applied to find out if our models are dynamic models meaning lagged value of dependent variable is among independent variables.

Autocorrelation is tested by using Arellano-Bond Test for AR(1) and AR(2) in first differences. The null hypothesis in this test is that there is no autocorrelation. As the test for AR(2) detects autocorrelation in terms of levels, we are more interested in the test for AR(2). The rejection of null hypothesis in test for AR(1) does not mean the model is misspecified (Dorofti & Jakubik, 2015). While p-value of the test for AR(1) is 0.008

meaning that the null hypothesis is rejected, p-value of test for AR(2) is 0.091 meaning that we cannot reject the null hypothesis at 5% significance level. As a result, there is no autocorrelation problem in our model.

Table 16. Definition of variables

Dependent Variable	**Formulas/Explanations**	
ROA	net income/total assets	
ROE	net income/Equity	
Independent Variables	**Formulas/Explanations**	**Expected Signs**
Asset Growth Rate (SIZE)	(current year assets-last year assets)/last year assets	+
Premium Growth Rate (PREMIUM)	(current year GWP-last year GWP)/last year GWP	?
Loss Ratio (LOSS)	incurred claims/net premiums earned	-
Expense Ratio (EXPENSE)	underwriting expenses/net premiums earned	-
Current Ratio (LIQUIDITY)	current assets/current liabilities	?
Leverage Ratio (LEVERAGE)	total liabilities/total assets	?
Age of the Company (AGE)	the number of years during which the non-life insurance companies have been operating in the Turkish insurance industry	+
Real GDP Growth (GDP)	(current year real gdp-last year real gdp)/last year real gdp	+
Interest Rate (INTEREST)	1 year deposit rate	?
Pension Dummy Variable (PENSION)	1 if the company is engaged in life&pension business; 0 if the the company is engaged only in life insurance	?

Source: Prepared by the author.

Difference in Hansen test is employed in our model to test the exogeneity of instrument subsets as this test is consistent in System GMM even if there is heteroscedasticity. The null hypothesis in this test is that instrument subsets are exogenous. As the p-value is greater than 0.05, the null hypothesis cannot be rejected meaning that instrument subsets are exogenous.

The results of the models are expressed in Table 17. According to the results presented in Table 17, the lagged value of ROA is statistically significant at 5% level and the lagged value of ROE is statistically significant at 5% level. For this reason, our model

is dynamic and the results of System GMM regression models will be interpreted as the following.

Table 17. Panel GMM estimation results

Variable	ROA		ROE	
	Coefficient	**z value**	**Coefficient**	**z value**
1-YEAR LAGGED VALUE	0.3926	2.16**	0.3848	2.17**
SIZE	0.0100	0.76	0.0055	0.10
PREMIUM	0.0099	2.69***	0.0787	2.82***
LOSS	0.0018	0.74	0.0002	0.01
EXPENSE	-0.0594	5.34***	-0.2380	3.49***
LIQUIDITY	-0.0014	1.37	-0.0229	2.98***
LEVERAGE	-0.0459	1.80*	-0.0901	1.19
AGE	0.0003	1.93**	0.0035	2.69***
GDP	0.2189	2.40***	0.4703	1.62*
INTEREST	0.3365	2.54***	0.4597	1.11
PENSION	0.0110	0.91	0.1337	2.18**
Arellano-Bond Test AR(2)	z	-1.620	z	0.770
	p-value	0.104	p-value	0.442
Difference in Hansen Test	Chi2	-0.310	chi2	0.290
	p-value	1.000	p-value	0.588

Note: 1) *, **, *** indicate significance at 10%, 5% and 1% respectively.

Premium growth rate is positively related to both ROA and ROE and statistically significant at 1% level. This result is in line with the findings of (Öner Kaya&Kaya, 2015), (Reshid, 2015) and contrary to the findings of (Burca & Batrinca, 2014), (Lee, 2014). The positive relationship shows that life insurers in Turkey underwrite profitable premium and the underwriting risk is low.

Expense ratio is negatively related to both ROA and ROE as expected and statistically significant at 1% level. This result shows that expenses take an important place in life insurer's cash outflows. It is thought that the main reason for this is the high intermediary commissions, around 26% of gross written premium, in life insurance products. And also operating expenses play an important role in pension companies.

Age is positively related to ROA at 5% significance level and ROE at 1% significance level as expected. This result supports the idea that increasing experience and reputation raises the company's profitability. This finding is in line with the results of

(Öner Kaya&Kaya, 2015), (Kramaric et al., 2017) and (Pervan et al., 2012). However, it is incompatible with the findings of (Doğan, 2013), (Burca & Batrinca, 2014) and (Öner Kaya, 2015). It is concluded from our finding that shareholders should be patient in getting return from their investments in insurance business. The finding also emphasizes the importance of experienced managers and workers. Regulator, on the other hand, should pay more attention to younger life insurers.

Real GDP is positively related to ROA and ROE as expected and statistically significant at 1% and 10% level, respectively. A statistically significant relationship between real GDP and life insurer ROA-ROE was also found by (Dorofti & Jakubik, 2015). The findings suggest that life insurance industry is affected by overall macroeconomic development.

While liquidity (current ratio) is negatively related to ROE at 1% statistically significance level, its negative relationship with ROA is not statistically significant. Life insurers in Turkey have always been profitable for the study period and the profitability has been increasing in recent years. Bankruptcy probability has been low. Additionally, the nature of life insurers' assets in general is long-term but the situation in Turkey is opposite. Our finding is in line with those of (Öner Kaya&Kaya, 2015), (Doğan, 2013), (Berhe&Kaur, 2017) but contrary to (Reshid, 2015).

While there is negative relationship between leverage ratio and ROA at 10% statistically significance level, a statistically significant relationship between leverage ratio and ROE could not be determined. This is in line with (Berhe & Kaur, 2017) and it is not supported by (Doğan, 2013), (Öner Kaya&Kaya, 2015) and (Burca & Batrinca, 2014). Our finding implies that using leverage in capital financing affects profitability of life insurers negatively.

While there is positive relationship between interest rate and ROA at 1% statistically significance level, a statistically significant relationship between interest rate and ROE could not be determined. On the contrary, (Dorofti & Jakubik, 2015) found statistically significant relationship with interest rate and ROE but not for ROA. These findings emphasize the fact that life insurers are sensitive to interest rates.

While positive relationship between engaging in pension business and ROE is determined at 5% statistically significance level, there is no statistically significant relationship with ROA. It is implied that life&pension companies are more profitable than life insurance companies in terms of ROE. It could be because of the benefits of diversification.

There is no statistically significant relationship between size and both profitability measures. This is in line with the finding of (Pavic Kramaric et al., 2017). On the other hand, (Doğan, 2013), (Berhe & Kaur, 2017), (Burca & Batrinca, 2014), (Reshid, 2015) found statistically significant positive relationship while (Öner Kaya & Kaya, 2015) found statistically significant negative relationship between these two variables.

There is no statistically significant relationship between loss ratio and both profitability measures. This finding is in line with those of (Öner Kaya & Kaya, 2015), (Berhe & Kaur, 2017). However, this finding is not supported by (Doğan, 2013), (Reshid, 2015), (Burca & Batrinca, 2014). This result shows that underwriting risk of life insurers is quite low.

When we look at the coefficients of the statistically significant independent variables in Table 18; lagged value has the top influence degree, interest rate has the second and GDP growth rate has the third for ROA model. GDP growth rate has the top influence degree, lagged value has the second and expense has the third for ROE model. This figure shows the importance of past performance and GDP in life insurance profitability.

Table 18. Ranking of regression coefficients

	ROA		**ROE**	
Rank	**Variable**	**Coefficient**	**Variable**	**Coefficient**
1	1-YEAR LAGGED VALUE	0.3926	GDP	0.4703
2	INTEREST	0.3365	1-YEAR LAGGED VALUE	0.3848
3	GDP	0.2189	EXPENSE	-0.2380
4	EXPENSE	-0.0594	PENSION	0.1337
5	LEVERAGE	-0.0459	PREMIUM	0.0787
6	PREMIUM	0.0099	LIQUIDITY	0.0229
7	AGE	0.0003	AGE	0.0035

Source: Results obtained using Stata 13.

We can see from the regression results that while past performance, interest rate, Real GDP growth rate, premium growth rate and age are positively related to ROA; expense ratio and leverage ratio are negatively related. On the other hand, while Real GDP growth rate, past performance, engaging in pension activity, premium growth rate, liquidity and age are positively related to ROE; expense ratio is negatively related.

Table 19 shows Variance Inflation Factor (VIF) values of independent variables which is another measure of multicollinearity. "Marquardt (1970) uses a VIF greater than 10 as a guideline for serious multi-collinearity. Mason et al. (1989) cite a VIF of greater than 10 as reason for concern" (O' Brien, 2007, p. 16). As all VIF values are under 10, we can say there is no multicollinearity among our independent variables.

Table 19. VIF values

Variable	VIF	1/VIF
PENSION	1.56	0.6430
INTEREST	1.52	0.6577
SIZE	1.46	0.6831
GDP	1.43	0.6974
LEVERAGE	1.36	0.7374
AGE	1.31	0.7629
LIQUIDITY	1.30	0.7687
LOSS	1.25	0.7980
PREMIUM	1.20	0.8336
EXPENSE	1.16	0.8618
Mean VIF	1.36	

Source: Results obtained using Stata 13.

6.3. Empirical Analysis for Non-Life Insurance Companies

In this section of the study, steps and results of the model for non-life insurance companies showing relationship between independent variables and ROA will be discussed.

6.3.1. Data and Descriptive Statistics

The scope of the empirical analysis for Turkish non-life insurers is a period of 12 years between 2006 and 2017. Depending on the existence of data, 21 out of 38 non-life insurance companies active in Turkey as of 2017 was selected for the study. These

companies represent 82% of the Turkish non-life insurance industry in terms of premium size in 2017. To obtain balanced data, companies having data for all years were included in the study. Stata 13 has been used to obtain results.

ROA is used in this study as the profitability measure for non-life insurance companies. ROE is not used because it fluctuates extremely for the determined period causing regression to generate inaccurate results.

Annual data of non-life insurance companies were used in the study. The data was obtained from Ministry of Treasury and Finance, Turkish Statistical Institute and Central Bank of Turkey. The data of 21 non-life insurance companies operating in Turkey in 2006-2017 period were brought together to obtain 252 observed panel data sets. The descriptive statistics related to each dependent and independent variables calculated on the basis of this panel data set are presented in Table 20.

Table 20. Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
ROA	252	-0.01	0.11	-1.17	0.13
SIZE	252	0.21	0.27	-0.68	2.72
PREMIUM	252	0.25	1.05	-0.93	14.72
LOSS	252	0.74	0.17	0.26	1.56
LIQUIDITY	252	1.42	0.59	0.62	7.20
LEVERAGE	252	0.71	0.15	0.13	1.54
INVEST	252	0.07	0.04	-0.24	0.20
SOLVENCY	252	1.40	0.93	-1.50	8.68
AGE	252	44.73	26.32	5.00	101.00
GDP	252	0.05	0.04	-0.04	0.11
INTEREST	252	0.12	0.03	0.08	0.18

ROA: Return on Assets; SIZE: Asset Growth Rate of the Company; PREMIUM: Premium Growth Rate; LOSS: Loss Ratio; LIQUIDITY: Current Ratio; LEVERAGE: Leverage Ratio; INVEST: Investment Yield; SOLVENCY: Solvency Ratio; AGE: Age of the Company; GDP: Real GDP Growth Rate; INTEREST: 1-Year Interest Rate; Source: Results obtained using Stata13.

Table 20 shows that the mean of ROA is negative and highly volatile because of strict competition in the market and the developments stated in chapter 5 which are global financial crisis, amendments in regulations related to technical provisions, the verdict of

Supreme Court, high increase in minimum wage, putting cap on traffic insurance premiums, factory fires etc. The mean of traffic insurance is 24% showing its importance. Premium growth rate is also highly volatile ranging between -92% and 1400%. High volatility in loss ratio, expense ratio, current ratio, leverage ratio and solvency also reflects the condition of the market for 2006-2017 period. Lastly, the mean value of current ratio which is 1.42 demonstrates that the market is liquid and investments are on short term.

Before defining the variables, whether the series are stationary was tested. The panel unit root test by Levin, Lin and Chu (LLC) was used in this study to test if the series are stationary. The null hypothesis in LLC test is that panels contain unit roots. Alternative hypothesis, on the other hand, is that panels do not contain unit roots. Acceptance of the null hypothesis indicates that there is common unit root meaning that the series are nonstationary.

Based on the results of LLC test, because the probability values calculated are lower than the significance level of 5%, the null hypothesis was rejected for all variables. Table 21 shows the results of unit root tests.

Table 21. Unit root test results

Variable	***t*-statistic**	**p-value**
ROA	-5.09	0.0000
SIZE	-7.59	0.0000
PREMIUM	-6.51	0.0000
LOSS	-3.18	0.0007
LIQUIDITY	-12.13	0.0000
LEVERAGE	-5.04	0.0000
INVEST	-6.27	0.0000
SOLVENCY	-10.52	0.0000
AGE	-	-
GDP	-8.8	0.0000
INTEREST	-9.63	0.0000

Source: Results obtained using Stata 13.

Table 22 shows the correlation coefficients between the independent variables. According to the table, as there is no correlation equal to or above 0,8, we can say there is no multicollinearity. As a result, we can keep all the independent variables in our regression model.

Table 22. Correlation matrix

	SIZ	PRE	LOSS	LIQ	LEV	SOL	INV	AGE	GDP	INT
SIZE	1.00									
PREM	0.51	1.00								
LOSS	-0.07	-0.06	1.00							
LIQ	0.21	0.17	0.08	1.00						
LEV	-0.11	-0.13	0.19	0.61	1.00					
SOLV	-0.02	0.00	-0.18	0.45	-0.73	1.00				
INV	0.05	0.00	0.11	0.11	-0.21	0.15	1.00			
AGE	-0.13	-0.09	0.18	-0.09	-0.05	0.00	0.12	1.00		
GDP	-0.07	-0.03	0.01	-0.11	0.18	-0.12	-0.24	0.02	1.00	
INT	0.22	0.13	0.04	0.19	-0.22	0.14	0.27	-0.08	-0.48	1.00

SIZE: Asset Growth Rate of the Company; PRE: Premium Growth Rate; LOSS: Loss Ratio; EXP: Expense Ratio; LIQ: Current Ratio; LEV: Leverage Ratio; SOL: Solvency Ratio; INV: Investment Yield; AGE: Age of the Company; GDP: Real GDP Growth; INT: 1 Year Interest Rate; Source: Results obtained using Stata13.

6.3.2. Specification of The Model

The model used to measure the impact of both firm-specific factors and macroeconomic factors on the profitability of non-life insurers in Turkey is as follows:

$$ROA_{it} = \alpha + \beta_1 SIZE_{it} + \beta_2 PREMIUM_{it} + \beta_3 LOSS_{it} + \beta_4 LIQUIDITY_{it} + \beta_5 LEVERAGE_{it} + \beta_6 SOLVENCY_{it} + \beta_7 INVEST_{it} + \beta_8 AGE_{it} + \beta_9 GDP_{it} + \beta_{10} INTEREST_{it} + u_{it}$$

To choose the correct model, firstly, if there is individual-specific effect was examined. F test and Score test were conducted for this reason. H_0 hypothesis, all individual effects equal zero, is tested in F test. The test result demonstrates that H_0 is rejected meaning there is individual-specific effect. H_0 hypothesis, standard deviation of individual-specific effect equals zero, is tested in Score test. The test result demonstrates that H_0 is rejected meaning there is individual-specific effect.

After detecting there is individual-specific effect, Hausman test was conducted to choose between fixed effects model and random effects model. H_0 hypothesis, there is no correlation between independent variables and individual-specific effect, is tested in Hausman test. According to Hausman test result, as H_0 is rejected fixed effects model is appropriate. The results of these three tests are stated in Table 24.

Table 23. Definition of variables

	Dependent Variable	**Formulas/Explanations**	
	ROA	net income/total assets	
	Independent Variables	**Formulas/Explanations**	**Expected Signs**
1	Asset Growth Rate (SIZE)	(current year assets-last year assets)/last year assets	+
2	Premium Growth Rate (PREMIUM)	(current year GWP-last year GWP)/last year GWP	?
3	Loss Ratio (LOSS)	incurred claims/net premiums earned	-
4	Current Ratio (LIQUIDITY)	current assets/current liabilities	?
5	Leverage Ratio (LEVERAGE)	total liabilities/total assets	?
6	Solvency (SOLVENCY)	solvency ratio calculated in accordance with formula in the regulation	?
7	Investment Yield (INVEST)	total investment return/total invested capital	+
8	Age of the Company (AGE)	the number of years during which the non-life insurance companies have been operating in the Turkish insurance industry	+
9	Real GDP Growth (GDP)	(current year real gdp-last year real gdp)/last year real gdp	+
10	Interest Rate (INTEREST)	1 year deposit rate	?

Source: Results obtained using Stata 13.

Table 24. F test, Score test and Hausman test results

	F/Chi-Square Statistic	**Probability**
F test	4.72	0.0000
Score	175.88	0.0000
Hausman test	63.63	0.0000

Source: Results obtained using Stata 13.

Table 25. Regression results for the dependant variable ROA

Variable	Coefficient	t value
SIZE	0.0320	2.04**
PREMIUM	-0.0100	2.22**
LOSS	-0.5215	7.27***
LIQUIDITY	0.0194	2.21**
LEVERAGE	-0.3059	2.27**
SOLVENCY	-0.0186	1.83*
INVEST	0.4950	2.25**
AGE	0.0099	3.38***
GDP	0.1849	2.95***
INTEREST	0.7885	3.42***
Constant	-0.0016	0.03
Observations	252	
R-squared	0.7493	

Notes: 1) *, **, *** indicate significance at 10%, 5% and 1% respectively. 2) Autocorrelation problem in the model is thought to be serious as the result of Durbin-Watson (DW) test by Bhargava, Franzini and Narendranathan is 1.70 and the Locally Best Invariant (LBI) test by Baltagi and Wu is 1.93 which are below two (Yerdelen Tatoğlu, 2018a, p. 226). 3) According to the results of Pesaran's test, Friedman's test and Free's test, as the null hypothesis is not rejected at 1% statistically significance level, there is no cross-sectional dependence in the model. 4) As p-value of Modified Wald test is 0.0000, there is heteroscedasticity in the model. 5) The estimator suggested by Arellano (1987), Froot (1989) and Rogers (1993) generating robust standard errors in existence of heteroscedasticity and autocorrelation by clustered standard errors was applied. Source: Results obtained using Stata 13.

6.3.3. Regression Results

According to the results presented in Table 25, negative relationship between loss ratio and ROA is determined at 1% statistically significance level, as expected. This result is in line with the findings of (Öner Kaya, 2015), (Doğan, 2013), (Veleva, 2017), (Reshid, 2015), (Burca & Batrinca, 2014) and (Pervan et al., 2012). However, (Adams & Buckle, 2003) found that financial performance of insurance companies in Bermuda was positively related to underwriting risk. Our finding about loss ratio shows that losses are very important determinant of profitability. The losses comprise a significant part of insurer cash outflows and it reflects underwriting risk. The losses consist of paid claims and outstanding loss provisions. Both components have been increasing in Turkey in recent years. Non-life insurer actuaries have to set prices in accordance with risk levels to reduce loss ratio. Insurers should also increase efficiency in claims management process to reduce loss ratio.

Negative relationship between premium growth rate and ROA is determined at 5% statistically significance level. This should be because of the high risks undertaken. This result is supported by (Burca & Batrinca, 2014) for Romania. However, this finding conflicts with the findings of (Öner Kaya, 2015) and (Doğan, 2013). It is thought that the confliction stems from the specific features of the empirical periods. There have been significant developments causing volatility in ROA of insurers in 2006-2017 period such as amendment in Regulation related to technical provisions and the publication of Traffic Insurance General Conditions. In this period, competition among insurers drove down premium per policy causing mistakenly pricing of risks. Implementation of price cap on traffic insurance policies also drove down average premiums. Our findings and the developments emphasize the importance of pricing and aggressive risk taking.

The negative relationship between leverage ratio and ROA is determined at statistical significance of 5%. This is because increasing technical provisions cause reduction in profitability because it is reflected in income statement as cash outflow reducing net profit of insurer. On the other hand, technical provisions have an advantage of tax shield. Our finding is supported by (Doğan, 2013), (Veleva, 2017), (Reshid, 2015), (Lee, 2014) and (Burca & Batrinca, 2014). However, it was not supported by (Berhe & Kaur, 2017) and (Jadi, 2015). Leverage ratio is an indicator of capital structure and financial strength. The notion that is low leverage ratio means higher financial soundness is supported by our finding. Also the notion that is increased debt usage as capital decreases profitability because of financial distress costs is supported. Leverage ratio is very important for our country as technical provisions have been playing significant role in Turkey causing volatility in profitability in recent years. Ministry of Treasury and Finance gives freedom to insurance companies in estimation of technical provisions such as selection of estimation method. They should be calculated by actuaries of insurance companies properly in order to avoid decline in profitability and hence need for additional equity capital. However, the fact that compensation period of bodily losses is long (average 1213 days for 2017 in traffic insurance) and high portion of claims going to court (72% for death, 64% for injury in 2017 for traffic insurance) cause inflation of outstanding loss provisions and increase in uncertainty and hence deviations in estimations. Regulators, on the other hand, should avoid frequent amendments in regulation related to outstanding loss provisions and supervise level of outstanding loss provisions in order to prevent exploitation of tax shield effect.

The positive relationship between age of insurer and ROA is determined at 1% significance level supporting the idea that increasing experience and reputation raises the company's profitability. This finding is in line with the results of (Pavic Kramaric et al., 2017) and (Pervan et al., 2012). However, it is contrary to the findings of (Doğan, 2013), (Öner Kaya, 2015). It is concluded from our finding that shareholders should be patient in getting return from their investments in insurance business. The finding also emphasizes the importance of experienced managers and workers. Regulator, on the other hand, should pay more attention to younger firms.

The positive relationship between interest rate and ROA is found at 1% significance level. It is concluded that Turkish insurers are exposed to interest rate risk. This is because insurance companies in Turkey invest most of their funds in interest income generating financial instruments. This finding is in line with findings of (Dorofti & Jakubik, 2015) and (Shiu, 2004). Positive relationship between interest rates and ROA is good for insurers when interest rates are high and bad when interest rates start to fall. Diversification of their investment portfolio will help reduce the risk. Regulator should pay more attention in insurer financial performance in low-interest rate periods.

The positive relationship between investment yield and ROA is found at 5% significance level as expected. As investment yield is a source of income, it causes increase in net income and hence profitability. Insurers should direct premiums collected to profitable investments as our finding states that investment yield is important for insurers.

The positive relationship between real GDP growth and ROA is observed, and it is statistically significant at 1% level. This finding is in accordance with the findings of (Dorofti & Jakubik, 2015) and (Pavic Kramaric et al., 2017). It is not supported by (Berhe & Kaur, 2017), (Reshid, 2015), (Burca & Batrinca, 2014). Our finding suggests that non-life insurance industry is susceptible to macroeconomic environment.

A positive relationship between size of company and ROA is found at 5% significance level. This finding is in line with the those of (Doğan, 2013), (Öner Kaya, 2015), (Berhe & Kaur, 2017), (Burca & Batrinca, 2014; Reshid, 2015). However, it is not supported by (Veleva, 2017) and (Lee, 2014). Our finding supports the suggestion that bigger companies make use of economies of scale or scope. Insurers should evaluate

merger and acquisition opportunities to get bigger. Our finding also suggests that regulators should pay more attention to smaller companies.

The positive relationship between liquidity (current ratio) and ROA is determined, and it is statistically significant at 5% level. This means that liquidity increases profitability as it reduces default risk of insurers. The finding is supported by (Reshid, 2015), (Shiu, 2004) and (Jadi, 2015). The finding conflicts with the findings of (Doğan, 2013), (Öner Kaya, 2015), (Ahmad & Prasetyo, 2018), (Berhe & Kaur, 2017). Liquid assets are converted into cash quickly and without losing its value. Volatility in Turkish economy makes long term investments disadvantageous. Insurers should stay liquid based on our finding. Regulators should pay more attention to illiquid companies. Regulators could also limit share of illiquid assets in insurer's investment portfolio.

A negative relationship between solvency ratio and ROA is determined at 10% significance level. This result supports the suggestion that holding sources in reserve funds could prevent productive use of sources.

When we look at the coefficients of the independent variables for the model in table 26; interest rate has the top influence degree, loss ratio has the second and investment yield has the third.

Table 26. Ranking of regression coefficients

Variable	Coefficient
INTEREST	0.7885
LOSS	-0.5215
INVEST	0.4950
LEVERAGE	-0.3059
GDP	0.1849
SIZE	0.0320
LIQUIDITY	0.0194
SOLVENCY	-0.0186
PREMIUM	-0.0100
AGE	0.0099

Source: Results obtained using Stata 13.

While interest rate, investment yield, Real GDP growth rate, size, liquidity and age are positively related to non-life profitability; loss ratio, leverage ratio, solvency and premium growth rate are negatively related.

Table 27 shows variance inflation factor (VIF) values of independent variables which is another measure of multicollinearity. "Marquardt (1970) uses a VIF greater than 10 as a guideline for serious multi-collinearity. Mason et al. (1989) cite a VIF of greater than 10 as reason for concern" (O' Brien, 2007, p. 16). As all VIF values are under 10, we can say there is no multicollinearity among our independent variables.

Table 27. VIF values

Variable	VIF	1/VIF
LEVERAGE	3.21	0.31
SOLVENCY	2.27	0.43
LIQUIDITY	1.89	0.53
SIZE	1.48	0.67
INTEREST	1.47	0.68
PREMIUM	1.39	0.72
GDP	1.35	0.74
LOSS	1.25	0.80
INVEST	1.17	0.85
AGE	1.14	0.88
Mean VIF	2.20	

Source: Results obtained using Stata 13.

7. CONCLUSION

Insurance has been an efficient way of protection from risks for years. Besides protecting individuals from damages of unwanted events, it helps entities to continue their economic activities and develops financial markets. The insurance industry has reached an enormous size in the world with the premium production of 5 trillion U.S. dollars in 2018 due to its benefits and importance (Swiss Re, 2019).

Insurance companies differ from other firms in different industries as they sell promise in exchange for premiums. They collect premiums forehand and direct them into investment. In order to ensure that they will be able to keep their promises, they are tightly regulated and supervised. Regulators, investors, policyholders need to be convinced that insurers make use of these premiums healthily and create buffers for unpredictable events.

Insurance companies have to ensure certain level of profitability in order to stay financially strong and keep their promises. Regulators, policyholders, investors, managers are interested in profitability of insurance companies. Insurers who are not able to make profit become insolvent and need additional capital. It is hard to find additional capital for insolvent companies as their cost of capital increases. For this reason, profitability is very important for insurance companies and the factors affecting profitability attract attention of researchers in recent years.

The Turkish insurance industry has a long way to go in terms of premium production. Premium production in the industry is rather low compared to most developed markets. The fact that legal system in Turkey does not function well, income level of people, financial literacy level and trust to insurance companies are rather low, people are not informed well about insurance contracts by intermediaries, amendments are performed too often by the Regulator and Islamic belief are the top factors hindering Turkish insurance industry to develop.

Despite those obstacles, Turkish insurance industry has a great growth potential. The industry can healthily grow with reasonable profitability levels. Despite its importance, the number of studies about profitability of insurance companies in Turkey is not high. This study contributes to understanding the determinants of profitability in the industry, helps

managers to sustain profitability and gives an insight to regulators, investors, managements and policyholders.

The analysis of Turkish insurance industry in chapter 4 showed that profitability level of life insurers is very high. Their average ROA (14.7% in 2017) and ROE (49.5% in 2017) have been increasing steadily. Their loss ratios have been quite low. Credit-life insurance comprises most of the premiums written. For this reason, the insurers having agreement with the biggest banks are the most profitable ones. Their solvency ratios are very high reaching to %336 in 2018, which is an indicator of financial strength.

Unlike life insurers, profitability of non-life insurers has been volatile due to the variations in loss ratios. The amendments in Regulation related to technical provisions and traffic insurance and verdicts of Supreme Court about coverage of traffic insurance caused increases in outstanding loss provisions and loss ratios and hence decrease in profitability. Additionally, increasing competition with the injection of foreign capital and amendment in Regulation letting insurers to set traffic premium tariffs freely drove down average premiums causing mispricing and decreasing profitability. Moreover, the implementation of cap on traffic insurance premiums and Risky Insureds Pool opened a new period in the industry.

The empirical analysis in this study is divided into two parts. In the first part, empirical analysis is done for life insurance companies in Turkey. The study covers the period between 2006 and 2017 for 16 life insurance companies. The dependent variables are ROA and ROE and the independent variables are Size, Premium Growth Rate, Loss Ratio, Expense Ratio, Liquidity (current ratio), Leverage Ratio, Age, Real GDP growth rate, Interest Rate and Pension Dummy variable.

The results of System GMM panel data models for ROA and ROE suggest that; premium growth rate is positively related to both ROA and ROE. The positive relationship shows that life insurers in Turkey underwrite profitable premium and the underwriting risk is very low.

Expense ratio is negatively related to both profitability measures as expected. This result shows that expenses take an important place in life insurer’s cash outflows. It is thought that the main reason for this is the high intermediary commissions, around 26% of

gross written premium, in life insurance products. And also operating expenses play an important role in pension companies.

Age is positively related to both profitability measures. This result supports the idea that increasing experience and reputation raises the company's profitability. It is concluded from our finding that shareholders should be patient in getting return from their investments in insurance business. The finding also emphasizes the importance of experienced managers and workers. Regulator, on the other hand, should pay more attention to younger life insurers.

The real GDP is positively related to both profitability measures as expected. The findings suggest that life insurance industry is affected by overall macroeconomic development. When GDP growth slows down, precautions such as reducing prices to hinder demand reduction should be taken by life insurers.

There is positive relationship between size and both profitability measures but it is not statistically significant. It implies that economies of scale is not valid for life insurers. There is no statistically significant relationship between loss ratio and both profitability measures.

There is negative relationship between liquidity and ROE. However, the negative relationship between liquidity and ROA is not statistically significant. Life insurers in Turkey have always been profitable for the study period and the profitability has been increasing in recent years. Solvency ratios have been quite high meaning that bankruptcy probability has been quite low. Additionally, the nature of life insurers' assets in general is long-term but the situation in Turkey is opposite. For these reasons, life insurers should decrease liquidity in order to increase profitability.

There is a negative relationship between leverage ratio and ROA. However, the negative relationship between leverage ratio and ROE is not statistically significant. Our finding implies that increase of debt (technical provisions) in capital structure affects profitability negatively. Unearned premiums provisions and mathematical provisions comprise most of the technical provisions of life insurers. These provisions increase with growth in premium production.

While there is positive relationship between interest rate and ROA, a statistically significant relationship between interest rate and ROE could not be determined. The finding for ROA emphasizes the fact that life insurers are sensitive to interest rates. Decline in interest rates will cause reduction in profitability which is the case in Europe nowadays. However, increase in credit-life insurance premium production with higher credits issued by banks could offset the decline. While the positive relationship between engaging in pension business and ROE is determined, there is no statistically significant relationship with ROA. It is implied that life&pension companies are more profitable than life insurance companies in terms of ROE. It could be due to the benefits of diversification.

To put them together, we see that life insurers increase their profitability as long as they raise premium as their loss ratio is low. Expenses are very important for life insurers as intermediary comissions are very high in life insurance. The positive affect of age and the high share of credit life insurance (83% in 2018), which requires bank connection emphasize that younger firms need more attention by supervisors. The relationship with GDP and interest rate shows that life insurers should be paid more attention by supervisors in the periods when macroeconomic variables are volatile.

In the second part, the empirical analysis is performed for non-life insurance companies in Turkey. The study covers the period between 2006 and 2017 for 21 non-life insurance companies. The dependent variable is ROA and the independent variables are the firm-specific factors which are Size, Premium Growth Rate, Loss Ratio, Liquidity, Leverage Ratio, Investment Yield, Solvency, Age and the macroeconomic factors which are Real GDP Growth and Interest Rate.

The results of the fixed effects panel data model demonstrate that negative relationship between loss ratio and ROA is determined. Our finding about loss ratio shows that losses are very important determinant of profitability. Losses comprise a significant part of insurer cash outflows and they reflect underwriting risk. Losses consist of paid claims and outstanding loss provisions. Both components have been increasing in Turkey in recent years. Non-life insurer actuaries have to set prices in accordance with risk levels undertaken to reduce loss ratio.

A negative relationship between premium growth rate and ROA is found. This could be because of the high risks undertaken and the high cash outflows related to the growth of

business volume. Our finding emphasizes the importance of pricing and aggressive risk taking.

The results show that there is a negative relationship between leverage ratio and ROA. This is because increasing technical provisions cause reduction in profitability. It is reflected in income statement as expense reducing net profit of insurer. On the other hand, technical provisions have an advantage of tax shield. The leverage ratio is an indicator of capital structure and financial strength. The leverage ratio is very important for our country as technical provisions have been playing significant role in Turkey causing volatility in profitability in recent years. The Ministry of Treasury and Finance gives freedom to insurance companies in estimation of technical provisions such as selection of estimation method. They should be calculated by actuaries of insurance companies properly in order to avoid decline in profitability and hence need for additional equity capital. The regulators, on the other hand, should avoid frequent amendments in regulation related to outstanding loss provisions and supervise level of outstanding loss provisions in order to prevent exploitation of tax shield effect.

The positive relationship between age of insurer and ROA is confirmed supporting the idea that increasing experience and reputation raises the company's profitability. It is concluded from our finding that shareholders should be patient in getting return from their investments in insurance business. The finding also emphasizes the importance of experienced managers and workers. The regulator, on the other hand, should pay more attention to younger firms.

The positive relationship between interest rate and ROA shows that Turkish insurers are exposed to interest rate risk. This is because insurance companies in Turkey invest most of their funds in interest income generating financial instruments. The positive relationship between interest rates and ROA is good for insurers when interest rates are high and bad when interest rates start to fall. Diversification of their investment portfolio will help reduce the risk. Regulator should pay more attention in insurer financial performance in low-interest rate periods. The positive relationship between liquidity and ROA means that liquidity increases profitability as it reduces default risk of insurers. Liquid assets are converted into cash quickly and without losing its value. Volatility in Turkish economy makes long term investments disadvantageous. Insurers should stay

liquid based on our finding. Regulators should pay more attention to illiquid companies. Regulators could also limit share of illiquid assets in insurer's investment portfolio.

The positive relationship between investment yield and ROA is observed as expected. As investment yield is a source of income, it causes an increase in net income and hence profitability. Insurers should direct premiums collected to profitable investments as our finding states that investment yield is important for insurers. The positive relationship between real GDP growth and ROA leads us to suggest that non-life insurance industry is susceptible to macroeconomic environment.

The positive relationship between the size of company and ROA supports the idea that bigger companies can make use of economies of scale. Our finding also suggests that regulators should pay more attention to smaller companies. Having a negative relationship between solvency ratio and ROA supports the suggestion that holding sources in reserve funds could prevent productive use of sources.

If we interpret the findings for non-life insurers together, regulators should supervise young and small firms strictly as they are more inclined to higher premium growth. Especially, the ones using traffic insurance as means to grow and to increase recognition pose a threat to the industry. Traffic insurance share should be limited for these insurers. Increasing trend of outstanding loss provisions in traffic insurance due to the amendments in regulations and Supreme Court verdicts together with implementation of cap on traffic insurance premiums pose another threat to the industry. The regulator should remove the cap on traffic insurance premiums as it causes mispricing and technical loss in traffic insurance branch. The regulator should also determine the scope of treatment expenses more precisely in General Conditions in order to reduce court, expert and lawyer expenses of insurers. In addition, government should employ strategies increasing growth rate of real GDP to improve the industry. These variables can also be used by the regulator or researchers to create early warning system. The non-life insurers should focus on reducing loss ratio in specializing risk estimation, claims management and fraud detection. They should improve their cross selling activities to increase diversification. They should also utilize mergers and acquisitions because of the positive effect of size in profitability.

Finally, our analysis considering the differences between non-life and life insurance industries provides useful implications for the stakeholders in the industry including

regulators, investors, managers and clients. To be able use both ROA and ROE as dependent variable in life insurance analysis enhances the robustness. However, our analysis does not cover newly established firms after 2006 and the ones leaving the industry. It was not possible to make analysis using ROE for non-life industry because of extreme variations. Using additional profitability measures such as profit margin and technical profitability ratio will be useful in comparison. Covering wider time range and examining effects of other factors such as human capital, customer satisfaction, share of foreign capital in total capital and diversification of product portfolio on profitability will enhance the literature.

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9. APPENDIX

Table 28. ROA model results for life insurance companies

Dynamic panel-data estimation, one-step system GMM

Group variable: unit				Number of obs	=	176
Time variable : year				Number of groups	=	16
Number of instruments = 21				Obs per group: min	=	11
Wald chi2(11) =	219.52			avg	=	11.00
Prob > chi2 =	0.000			max	=	11

ROA	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ROA						
L1.	.3926067	.1814615	2.16	0.030	.0369487	.7482646
SIZE	.0105646	.0138991	0.76	0.447	-.0166772	.0378064
PREMIUM	.0099108	.0036801	2.69	0.007	.002698	.0171237
LOSS	.001811	.0024426	0.74	0.458	-.0029764	.0065985
EXPENSE	-.059467	.0111317	-5.34	0.000	-.0812847	-.0376494
CURRENT	-.0014982	.0010904	-1.37	0.169	-.0036354	.000639
LEVERAGE	-.0459051	.0255351	-1.80	0.072	-.095953	.0041428
AGE	.0003653	.0001893	1.93	0.054	-5.63e-06	.0007363
GDP	.2189763	.0911589	2.40	0.016	.0403082	.3976445
INTEREST	.3365594	.1326978	2.54	0.011	.0764765	.5966423
PENSION	.0110877	.0121533	0.91	0.362	-.0127323	.0349078

Arellano-Bond test for AR(1) in first differences: z = -2.69 Pr > z = 0.007
Arellano-Bond test for AR(2) in first differences: z = -1.62 Pr > z = 0.104

Sargan test of overid. restrictions: chi2(10) = 26.83 Prob > chi2 = 0.003
(Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(10) = 2.57 Prob > chi2 = 0.990
(Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
GMM instruments for levels
Hansen test excluding group: chi2(9) = 2.88 Prob > chi2 = 0.969
Difference (null H = exogenous): chi2(1) = -0.31 Prob > chi2 = 1.000
iv(SIZE PREMIUM LOSS EXPENSE CURRENT LEVERAGE AGE GDP INTEREST PENSION)
Hansen test excluding group: chi2(0) = 0.00 Prob > chi2 = .
Difference (null H = exogenous): chi2(10) = 2.57 Prob > chi2 = 0.990

Source: Results obtained using Stata 13.

Table 29. ROE model results for life ınsurance companies

Dynamic panel-data estimation, one-step system GMM

Group variable: unit			Number of obs	= 176
Time variable : year			Number of groups	= 16
Number of instruments = 21			Obs per group: min	= 11
Wald chi2(11) = 365.73			avg	= 11.00
Prob > chi2 = 0.000			max	= 11

ROE	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ROE						
L1.	.3848311	.1774128	2.17	0.030	.0371084	.7325538
SIZE	.0055723	.0576205	0.10	0.923	-.1073618	.1185064
PREMIUM	.0787407	.0278912	2.82	0.005	.0240749	.1334065
LOSS	.0002431	.0168216	0.01	0.988	-.0327266	.0332127
EXPENSE	-.2380759	.0682046	-3.49	0.000	-.3717545	-.1043972
CURRENT	-.0229609	.0077169	-2.98	0.003	-.0380857	-.007836
LEVERAGE	-.0901954	.076007	-1.19	0.235	-.2391665	.0587757
AGE	.0035743	.0013271	2.69	0.007	.0009733	.0061753
GDP	.4703787	.2907598	1.62	0.106	-.0995	1.040257
INTEREST	.4597638	.4137314	1.11	0.266	-.3511347	1.270662
PENSION	.1337076	.0614332	2.18	0.030	.0133008	.2541144

Arellano-Bond test for AR(1) in first differences: z = -1.15 Pr > z = 0.251
Arellano-Bond test for AR(2) in first differences: z = 0.77 Pr > z = 0.442

Sargan test of overid. restrictions: chi2(10) = 12.16 Prob > chi2 = 0.275
(Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(10) = 4.05 Prob > chi2 = 0.945
(Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
GMM instruments for levels
Hansen test excluding group: chi2(9) = 3.75 Prob > chi2 = 0.927
Difference (null H = exogenous): chi2(1) = 0.29 Prob > chi2 = 0.588
iv(SIZE PREMIUM LOSS EXPENSE CURRENT LEVERAGE AGE GDP INTEREST PENSION)
Hansen test excluding group: chi2(0) = 0.00 Prob > chi2 = .
Difference (null H = exogenous): chi2(10) = 4.05 Prob > chi2 = 0.945

Source: Results obtained using Stata 13.

Table 30. Regression results for non-life insurance companies

Fixed-effects (within) regression — Number of obs = 252
Group variable: unit — Number of groups = 21

R-sq: within = 0.7493 — Obs per group: min = 12
between = 0.1001 — avg = 12.0
overall = 0.1471 — max = 12

F(10,20) = 97.96
corr(u_i, Xb) = -0.9283 — Prob > F = 0.0000

(Std. Err. adjusted for 21 clusters in unit)

ROA	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
SIZE	.0320111	.0131815	2.43	0.025	.004515	.0595072
PREMIUM	-.0100016	.0045026	-2.22	0.038	-.0193938	-.0006094
LOSS	-.5215089	.0717492	-7.27	0.000	-.6711751	-.3718426
CURRENT	.0194324	.0087917	2.21	0.039	.0010934	.0377715
LEVERAGE	-.3059799	.134506	-2.27	0.034	-.5865545	-.0254053
INVEST	.4950728	.220247	2.25	0.036	.0356456	.9545001
SOLVENCY	-.0186994	.0102021	-1.83	0.082	-.0399805	.0025818
AGE	.009983	.0029522	3.38	0.003	.0038248	.0161412
GDP	.1849958	.062676	2.95	0.008	.054256	.3157356
INTEREST	.7885639	.2304173	3.42	0.003	.3079219	1.269206
_cons	-.0016894	.0561568	-0.03	0.976	-.1188304	.1154516
sigma_u	.25181587					
sigma_e	.0533145					
rho	.95709768	(fraction of variance due to u_i)				

Source: Results obtained using Stata 13.

Table 31: Test results for non-life insurance companies

Modified Wald test	Chi-Square Statistic	5130.00
	Probability	0.0000
Modified Bhargava et al. Durbin-Watson statistic	1.70	
Baltagi-Wu LBI	1.93	
Pesaran's test	0.021	
Friedman's test	0.36	
Free's test	0.429	

Source: Results obtained using Stata 13.

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