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DETERMINANTS OF LIFE AND NON-LIFE INSURANCE DEMAND:  
EVIDENCE FROM OECD COUNTRIES

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DETERMINANTS OF LIFE AND NON-LIFE INSURANCE DEMAND:  
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HAYAT VE HAYAT DIŐI SİGORTASI TALEBİNİN BELİRLEYİCİLERİ:  
OECD ÜLKELERİ ÜZERİNE İNCELEME

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## CONTENTS

<b>LIST OF ABBREVIATIONS .....</b>	<b>v</b>
<b>LIST OF SYMBOLS .....</b>	<b>vi</b>
<b>LIST OF FIGURES .....</b>	<b>vii</b>
<b>LIST OF TABLES .....</b>	<b>viii</b>
<b>ABSTRACT .....</b>	<b>ix</b>
<b>ÖZET.....</b>	<b>x</b>
<b>INTRODUCTION.....</b>	<b>1</b>
<b>1. HISTORY OF INSURANCE .....</b>	<b>6</b>
<b>2. RISK CONCEPT IN INSURANCE .....</b>	<b>11</b>
<b>3. REINSURANCE TRANSACTIONS.....</b>	<b>16</b>
<b>4. TYPES OF INSURANCE .....</b>	<b>21</b>
<b>5. TYPES OF LIFE INSURANCE .....</b>	<b>25</b>
<b>6. PARTIES AND RELEVANT PERSONS IN LIFE INSURANCE .....</b>	<b>31</b>
<b>7. DIFFERENCES BETWEEN LIFE AND NON-LIFE INSURANCES.....</b>	<b>33</b>
<b>8. INSURANCE TRENDS.....</b>	<b>35</b>
<b>9. LITERATURE REVIEW.....</b>	<b>39</b>
<b>10. DATA AND METHODOLOGY.....</b>	<b>49</b>
<b>11. INSURANCE DETERMINANTS IN OECD COUNTIES .....</b>	<b>53</b>
<b>12. MODEL RESULTS AND DISCUSSION .....</b>	<b>64</b>
<b>CONCLUSIONS .....</b>	<b>70</b>
<b>REFERENCES.....</b>	<b>71</b>

## **LIST OF ABBREVIATIONS**

LIPEN: Life insurance penetration

LIDEN: Life insurance density

NLIPEN: Non-life insurance penetration

NLIDEN: Non-life insurance density

GDP: Gross domestic price per capita in current US\$

LEAB: life expectancy at birth in total years

FDI: Percentage of GDP for foreign direct investment net inflows

INF: Inflation for consumer prices in annual percentage

UR: Urban population in the percentage of the total population

DEPR: Age dependency ratio in the percentage of the working-age population

EFI: Overall score of economic freedom index

## LIST OF SYMBOLS

$i$ : Country

$t$ : Year

$\ln$ : Natural logarithm

$\beta$ : Slope coefficients

$\alpha$ : Constant term unit

$\varepsilon$ : Error landmark

## LIST OF FIGURES

<b>Figure 8.1 GDP of OECD Countries .....</b>	<b>36</b>
<b>Figure 8.2 Life Insurance Premium Volume .....</b>	<b>37</b>

## LIST OF TABLES

<b>Table 10.1 OECD Countries .....</b>	<b>49</b>
<b>Table 10.2 Data Definitions, Hypotheses, and Sources.....</b>	<b>52</b>
<b>Table 11.1 Descriptive Statistics .....</b>	<b>62</b>
<b>Table 11.2 Correlation Matrix .....</b>	<b>63</b>
<b>Table 12.1 Hausman Test .....</b>	<b>65</b>
<b>Table 12.2 Determinants of Life and Non-Life Insurance Consumption .....</b>	<b>66</b>

## **ABSTRACT**

Insurance supports the economy and contributes to investments as a precaution against risks. Therefore, developing countries should determine appropriate insurance policies in order to support their economic structures. As it is known that the insurance sector has positive contributions to the growth of countries, it has an important place in the economic development of countries. In this article, four models have created for the penetration and density of life and non-life insurances in The Organization for Economic Development and Cooperation (OECD) countries consisting of 36 countries, taking into account the annual data between 1996 and 2017, to measure the effects of economic variables on the insurance development of countries and tested with panel data analysis method. The research aims to investigate the determinants of the consumption of life and non-life insurances in OECD countries and to identify the economic impact of these determinants. Thus, the insurance sector and indirectly the economic development moves can be determined. The study results found that while the GDP per capita and economic freedom increased the penetration of life insurance, consumer price inflation decreased this rate. Foreign direct investment and age dependency ratio negatively affect non-life insurance penetration, while per capita GDP, urban population, and economic freedom have a positive effect. While foreign direct investment and economic freedom increase the density of life insurance, consumer price inflation and the urban population ratio cause a decrease. It has been observed that the dependency ratio does not carry a statistically significant burden on the life insurance side. For non-life insurance density, the age dependency ratio and the urban ratio has a negative effect whereas life expectancy, foreign direct investment, and economic freedom have a positive impact. Consumer price inflation does not seem to have a statistically significant effect on non-life insurance demand in OECD countries.

## ÖZET

Sigorta, risklere karşı önlem olması yönünden ekonomiye destek olmakta ve yatırımlara katkı sağlamaktadır. Bu yüzden gelişmekte olan ülkeler iktisadi yapılarını desteklemek adına uygun sigorta politikalarını belirlemelidir. Sigorta sektörünün ülkelerin büyümeleri üzerinde olumlu katkıları olduğu bilindiği için ülkelerin ekonomik gelişimlerinde önemli bir yere sahiptir. Bu makalede hayat ve hayatdışı sigortalarının 36 ülkeden oluşan Ekonomik Kalkınma ve İşbirliği Teşkilatı (OECD) ülkelerindeki penetrasyon ve yoğunlukları için 1996-2017 yılları arasında yıllık veriler dikkate alınarak ekonomik değişkenlerin ülkelerin sigorta gelişimine etkilerini ölçmek üzerine dört model oluşturulmuş ve panel veri analizi yöntemi ile test edilmiştir. Araştırma ile OECD ülkelerdeki hayat ve hayat dışı sigortaların tüketiminin belirleyicilerini ortaya koymak ve bu belirleyicilerin ekonomik etkisi tanımlanmak istenmektedir. Böylece sigorta sektörü ve dolaylı olarak ekonomik kalkınma hamleleri belirlenebilecektir. Çalışma sonuçları, kişi başına düşen GSYİH ve ekonomik özgürlüğün hayat sigortası penetrasyonunu artırırken, tüketici fiyat enflasyonunun bu oranı azalttığını ortaya koymuştur. Doğrudan yabancı yatırım ve yaş bağımlılık oranı, hayat dışı sigorta penetrasyonunu olumsuz etkilerken, kişi başına düşen GSYİH, kentsel nüfus ve ekonomik özgürlük olumlu bir etkiye sahiptir. Doğrudan yabancı yatırım ve ekonomik özgürlük hayat sigortasının yoğunluğunu artırırken, tüketici fiyat enflasyonunun ve kentsel nüfus oranının düşüşe neden olduğu gözlemlenmiştir. Bağımlılık oranının hayat sigortaları tarafında istatistiksel olarak önemli bir yük taşımadığı görülmüştür. Hayat dışı sigorta yoğunluğu için, yaş bağımlılık oranı ve kentsellik oranı olumsuz bir etkiye sahipken, yaşam beklentisi, doğrudan yabancı yatırım ve ekonomik özgürlük olumlu bir etkiye sahiptir. OECD ülkelerinde tüketici fiyat enflasyonunun hayat dışı sigorta talebi üzerinde istatistik olarak önemli bir etkisinin olmadığı görülmektedir.

## INTRODUCTION

Insurance is a generated contract between two parties known as insurer and insured. An insurer can be defined as the risk-taker, and an insured can be named the risk holder. Insured always prefers to avoid any financial risk (Kimball, 1961). The insurer determines the financial risk factors and creates warranties for these factors using a collected premium pool from insured parties. Risk factors have many varieties, such as robbery, natural disasters, acute diseases, accidents, and other similar dangers. An insurer is a person who follows and manages all insurance-related processes. It provides consultancy services to customers on all policy-related processes and manages all insurance transactions such as compensation and premium payments. Insurers can work under three structures. A person can be an insurer either in an insurance company or by opening an agency or branch. The insurer acts as a bridge between the insurance company and the insured and works customer-oriented.

Additionally, the insurer provides accurate information to customers about insurance services and product groups and tries to make insurance products attractive. The insurer should identify the customer's insurance-related needs, advertise the appropriate ones, create a file, follow up premium payments, and support customers by following their after-sales renewal periods. Moreover, it undertakes the duties of working in coordination with the insurer operation unit, ensuring that the customer gets compensation in case of possible damage, and informing the customers of possible policy changes (Kunreuther, Hogarth, & Meszaros, 1993). Insurance agents are real or legal persons who mediate insurance contracts on behalf and account of insurance companies within a specific region or acquire a profession to make them on behalf of insurance companies (Cummins, 1977). Insurance agents engage in activities such as negotiating on behalf of the insurance company, arranging policies within the framework of their powers, providing various consultancy services to the insured, and paying damages up to a certain extent when they are authorized. On the other hand, brokers work for the

policyholder, who is entirely independent in their relations with insurers, and help their customers choose the right product from the right company by offering various offers on insurers and insurance products.

The most crucial difference between insurance agents and insurance brokers; insurance agents provide consultancy services on behalf of insurance companies and insurance brokers on behalf of the insured (Eckardt, 2002). While insurance agents sell the existing products of the insurance company they are affiliated with, insurance brokers do not work with a specific insurance company and receive offers from insurance companies on behalf of their customers. Insurance agents can only work for the insurance companies they have contracted with, while insurance brokers can work with the insurance company they want. Insurance agents are limited to selling the products of the insurance companies they have contracted with, while insurance brokers can serve their customers with all insurance companies' products.

Insurances are contracts made with institutions dealing with insurance to compensate future damages on the life, health, and property of a person or something in return for premiums paid in advance. In the event of an accident resulting from the insurance contract, the policyholder will be entitled to receive compensation (Kimball, 1961). In return for the insurer's obligation to protect the insured, the insured should pay an amount called the premium determined by the contract. Insurance coverage guarantees the insured that the insurer gives that the damage will be compensated within the policy's terms due to the partial or complete damage of what is insured and insured at a particular premium. The addendum is an additional insurance contract that is considered an integral part of the policy, indicating the change in the policy's effectiveness. For example, changes such as vehicle changes, premium increase in life policies, adding children to family policies in health policies, correction of some deficiencies, and incorrect information at the insured's request are also transactions that require an addendum.

From the insured perspective, insurance policy purchasing decisions are evaluated formed by the combination of premium, policy limits, and deductible

factors. Insurance premiums include overheads, commissions, all costs, and operating profit that the insurer has to cover while ensuring, in addition to risk premiums, and is the essential part of the insurance contract (Gatzert, Hoermann, & Schmeiser, 2009). Even if all the conditions included in the insurance service a person purchased are applied, the insurance contract does not impact if a person does not pay the systematically determining premiums. Therefore, the person who buys the insurance cannot be covered by insurance protection against the risks s/he may encounter.

The first and most important variable that raises insurance premiums is the coverage covered by insurance. Additional guarantees included with the range coming with the change in the content of the services designed by insurance companies; causes an increase in premium payment (Landsman & Sherris, 2001). Policy limits are the guarantees that the insurer gives to the insured or the beneficiary of the insurance. The damage will be compensated within the policy's terms due to the beneficiary's partial or complete impairment and insured particular premium. Deductible, in insurance, the insured's undertaking plenty of risks. The deductible is written in mutual agreement with the insured and on the policy (Eeckhoudt, Gollier, & Schlesinger, 1991). It can be specified as an absolute value or proportional. The deductibles significantly limit the insurance company's risk. As a possibility, the frequency of minor damages is higher. Thanks to the deductibles, the effect of these damages on the insurance company are reduced. Also, since the risk is shared with the insured, the insured will better protect the insured property from dangers by acting more carefully. By the insured, the deductible provides a significant saving in the premium to be paid. An insurance policy is also known as a hedging instrument against financial risks. Insurance policy can protect personal health expenses or damage to assets. There are many different insurance policies in the insurance sector, but there are four common insurance types.

The first standard insurance policy is property insurance. In this type of insurance, property owners or renters aim to protect their facilities from damages

or robbery (Burnecki, Kukla, & Weron, 2000). Some property policies even include warranties for injuries within the boundaries of the land. Property insurance is a broad definition that represented different types of policies, for instance, homeowners or renter insurance and natural disasters insurance like earthquakes, floods, hurricanes. One of the property policies is House Policy. The House Policy is an essential type of insurance that protects and secures against various unexpected risks such as natural disasters, fire, and theft that may occur in homes. House insurance covers unwanted loss items that arise when such adverse events occur, in favor of the insured persons, and provides coverage. Housing insurances are taken out annually. It can be renewed on demand every year. The second common insurance type is health insurance. Health insurance is a type of insurance covering the treatment of health problems caused by illness or accident within the coverage and limits included in an individual's policy (Currie & C.Madrian, 1999). Health insurance premiums people have to pay are shaped by age, gender, health history, and the additional coverage they want to include in the policy. So, the premiums are calculated individually. The third well-known policy type is auto insurance. Auto insurance, which is also known as vehicle insurance, is a purchasing policy by vehicle owners to have coverage in any accident (O'Connell, 1973). Automobile insurance consists of many subtitles, but traffic and casco insurance is the most common use among automobile insurances. Traffic insurance and casco insurance are two different products that cover entirely different risks. While traffic insurance covers the other party's damage in the event of an accident, casco insurance covers a person's damage. In many countries, it is compulsory to take out traffic insurance, while casco insurance is optional (Ohlsson, 2010). The last one is life insurance, and in this type of insurance, companies collect some individual premium by evaluating the yearly life risk factors of the insurer. In the case of the insurer's death or at the end of a specific payment period, companies promise a defined amount of money (Lin & Grace, 2007). Life insurance is generally used to provide security for dependent family members or have a savings account. In other words, life insurance is a type of insurance in which the insurance company pays the insurance fee to the insured person in case of loss of life, critical

illness, unemployment, complete and permanent disability. Else the company pays the total insurance fee to the insured due to surviving more extended than the period specified in the contract, in return for an absolute premium.

Life insurance aims to prevent insured families or the people insurer specified while preparing the policy from experiencing financial difficulties while having a difficult period spiritually after the insurer dies. The education expenses of insurer children and essential expenses of households such as rent and food can be paid thanks to life insurance payments, or insurer can prevent his/her debts from being a burden on their family after they passed away. Life Insurance prices may differ depending on age, additional coverage, and many other variables. Likewise, it is worth noting that the validity period of life insurance and the age range that can benefit from insurance varies according to the products. For this reason, it will be healthier to calculate the number of insurance insurers has to pay after determining the life insurance product insurer want to benefit from and deciding on additional coverage. Anyone who wants to make savings or have coverage against various risks in life can benefit from life insurance. According to the type of coverage and the product consumers choose, some products may be required to be healthy or have an age limit.

In this article, four models have created for the penetration and density of life and non-life insurances in The Organization for Economic Development and Cooperation (OECD) countries consisting of 36 countries, taking into account the annual data between 1996 and 2017, to measure the effects of economic variables on the insurance development of countries and tested with panel data analysis method. The research aims to investigate the determinants of the consumption of life and non-life insurances in OECD countries and to identify the economic impact of these determinants. Thus, the insurance sector and indirectly the economic development moves can be determined. Moreover, this study is original in terms of hosting the index of economic freedom.

## 1. HISTORY OF INSURANCE

Insurance has been seen as a modern product; indeed, an early history of insurance was profound, and it was the first known practice commenced with the Code of Hammurabi (2250 B.C) (Trenerry, 1926). Between 3000 and 4000 B.C. Babylonians improved in the agricultural domain. Babylonians were producing more agricultural and animal goods than their consumptions. Therefore, Babylonian manufacturers were seeking an opportunity to convey exceed goods to foreign lands. Manufacturers started to hire slaves and relatives to send them to close markets as manufacturers' representatives. These trades provided a grown income source for the Babylonian manufacturers; however, this operation needed professional support to carry more goods and secure a more significant profit. For this purpose, manufacturers compromised to deal with the traders of the period (Trenerry, 1926). These traders could care more about products with the help of their caravans, and traders were asking a certain amount of commission on top of the value of their carried goods, yet traveling as a trader with valuable goods was not very safe in this period of robberies. An increasing number of traders on the road increased the number of robberies, and after these trading journeys, many traders became poor because robberies were seizing merchandise. This condition means no income from these travels for traders even though they had family expenses and living costs to survive.

Furthermore, when traders did not meet their capital borrowed and interest, they and their families became slaves of their employers or even killed due to their debts. From the perspective of social order, this commercial structure was not proper. For this reason, in the Code of Hammurabi (2250 B.C), the rights of traders and merchandisers were arranged (Manes, 1942). Regarding these rules, merchandisers and traders had limited partnerships to avoid any abuse. Protection responsibility for money and goods was on the trader side. Additionally, traders were not responsible for any debt that came from unpredictable harm such as

robbery. This situation was the first known guarantee arrangement for the risk factors in history.

In later years, other societies organized similar structures to avoid the danger of losing what they have owned. In Greece, owners of slaves paid a regular charge to ensure a refund for their slaves in slave escape (Manes, 1942). In the Roman empire, there was an association requiring admission fees and monthly payments from its members. This society had been ensuring proper funerals for its members in the event of death if any. Like modern insurance, these products were based upon risk-sharing between two parties; however, scientific knowledge did not support them.

In the middle ages (10<sup>th</sup>-11<sup>th</sup> century), a risk-sharing association was guilds, and these guilds were organized between craftspeople and traders (Manes, 1942). The guilds had a significant role in the development of insurance. These organizations compensated for losing their members under harmful conditions such as shipwreck, fire, flooding, and theft. Iceland had an extended version of a similar structure in society for the twelfth century. Being a part of these organizations, which regulate farmers' rights, was mandatory for social workers due to Icelandic legislation.

The development of modern insurance has been rooted in three historical stages. The first stage started from the middle of the fourteen century until the end of the seventeen century. The second stage began in the eighteenth century and continued until the middle of the nineteenth century. In this stage, society witnessed the existence of insurance companies. Lastly, the modern period of the insurance sector was covered after the middle of the nineteenth century. In the modern period, insurance companies transformed from local companies to great international insurance groups (Manes, 1942).

In the fourteenth century, sea trade evolved, and one of the earliest examples of marine insurance developed in Italy (Holdsworth, 1917). Marine insurance was the combination of different insurance products to take precautions

against the risks of sea trade owners. This independent contract included sea traders' rights in the sale, exchange, and maritime loan and provided a warranty for the carried merchandise. During the fourteenth century, Florentine and Genoese got used to using marine insurance, and they were calculating insurance costs inside their regular transportation cost. Also, Genoa had been a center for the insurance business. Insurance contracts had been preparing by notaries or sworn brokers with the method of related business. Hiring a sworn broker practice had been organizing around Genoa, Florence, and Pisa, so this practice led to the form of sixteen-century modern policy law. In the sixteen-century, insurance contracts had become an obligation for the sea traders by many governments. Thanks to growing foreign trade in this century legally, the first-time mentioned insurance policy in England.

Moreover, at the beginning of the sixteen-century, Germans had been operating property insurance, which had become a different type of insurance marketed. The primary purpose of this insurance was to protect houses against fires. Unlike other countries, the England legislation Council used two ways to hold control of the insurance business (Keller, 1961). Firstly, the Council created an office to register insurance transactions, and therefore insurance records became easily traceable for traders and voyagers. Secondly, the Council created a commission to handle insurance laws and trials, so it intended to speed up the execution of underwriting rules of insurance and regulate these rules if an unexpected event occurred. However, the seventeen-century commission structure, called The Office of insurance, collapsed because London management decided to rule the insurance business under the common law court. This action aimed to execute the insurance business's proper regulation and avoid any misuse of insurance underwriting rules.

In the first half of eighteen-century, an association of insurers was established in England. In the next years, insurance brokerage companies and agencies developed. After that, the reinsurance business, which was a critical factor in improving the insurance sector, appeared (Manes, 1942). Another significant development for nations was to achieve independence. Independent nations

provided a proper business environment for developing the insurance sector with economic prosperity around the 1850s. Crop insurance, one of the oldest forms of modern insurance, came up in the United States at the beginning of the nineteenth century. In 1845, the accident policy became common in Europe, but railroad accidents limited it. Companies began to introduce liability insurance in 1876, such as glass breakage, plumbing failure, and other side products.

One of the insurance sector's milestones was the banking sector's intensive growth in the last third of nineteenth centuries. Around the United States and Europe banking sector had been acting together with the insurance sector, and overseas foreign trade improved (Schweig, 1978). Therefore, the amount of insurance selling and capital assets grew. Further, the formation of insurance enlarged horizontally such as insurance and reinsurance combinations, insurance with banking and other sectors, shipbuilding in marine insurance, credit insurance for information services, burglary insurance in property protection, and life insurance coverage in health services improved in this century.

After the great earthquake in 1906, the insurance sector had proved its power by supporting the fast and splendid reconstruction of San Francisco (Manes, 1942). In this event, American and foreign fire and reinsurance companies paid millions of dollars without hesitation. Insurance companies had needed to complete their growing period to reach a position having the power to support society in a catastrophic or natural disaster. This progress had evolved in the last thirty-five years of the nineteenth century. In these years, with the help of globalization, international insurance companies were born and developed.

When insurance companies started to form in the modern sense, the 17<sup>th</sup>-19<sup>th</sup> is the period between centuries. After the great London fire in 1666, significant developments were made, especially in fire insurance (Evans, 1987). The industrial revolution, which accelerated in the 19<sup>th</sup> century, increased insurance demand in many areas. Today, it is possible to encounter insurance products in all areas of our lives. The insurance sector has an essential and increasing place in the national income of developed countries.

Life insurance assesses death probability within a specific period by calculating risk factors related to environmental parameters. This calculation ensures a certain amount of payment in case of death of the policyholder responsible for paying an absolute amount premium calculated with a degree of risk. The early sign of life insurance was seen in Italy in the middle ages and sixteen and seventeen centuries of England. In Italy of the middle ages, life insurance similar products had against a particular type of risks for a limited time, such as a death in pregnancy or plague (Holdsworth, 1917). However, these products had not developed like marine insurance because they were not in common usage in society, and they were very limited in these years.

The first life insurance company showed up in Central Europe in 1828. This company was obligated to open its four hundred shares on the international market. Once every seven years, the company needed to prove fifty percent participation of its customers in profits. Before the first World War, American life insurance companies had turned to international companies by investing in foreign countries (Manes, 1942). The darkest part of the insurance history had actualized in World War I. Even with many casualties in this period, life insurance companies had not delayed their payments, showing their power and importance to society. Until the middle of the 20<sup>th</sup> century, there was a different perspective on insurance. With the influence of religious and moral considerations, insurance was seen as a saving instrument. It was not taken into account that human life was an economic value and earning potential. Contemporary life insurance has gained a more functional structure only starting from the 1920s, aiming to transfer the person's earning potential and secure this against certain risks (Hu & Manning, 2010). Besides, keeping the statistical data more accurate and scientific and the mortality tables created based on probability with developing mathematical studies have an essential place in the historical development of life insurance and its current status.

## **2. RISK CONCEPT IN INSURANCE**

Daily life and the future are full of risks and uncertainties. When a person is concerned about these risks, they want to eliminate them. Among many definitions of the concept of risk, it can be defined as the variation of possible consequences of an event based on chance. The greater the variation or variation at an expected average loss, the greater the risk. Another definition is that risk is related to the uncertainty of a possible loss (Dorfman & Cather, 2012). The word risk is derived from the Italian word “risicare” and means “to dare.” In this respect, the risk is not a destiny but a choice. The actions we take with courage depend on how free we are in our choices. In this respect, risk perception is a social process. In the insurance literature, risk refers to the uncertain danger that threatens an individual’s measurable interest with money and has the possibility of realization. They are among the basic concepts of insurance law to determine the scope of the hazard and incident insurer’s action. According to the insurance law, an event must have occurred for the insurer to be liable to pay compensation. In insurance, a risky event is defined as a situation that occurs in the future, that causes a loss or other inappropriate situation and a need.

There is a strong link between the concepts of risk and insurance. The need to build trust against the risks that have a chain effect in the global economic structure where the borders are narrowing is increasing in the world day by day. Insurance is seen as a precautionary and precautionary package against risks that may arise, especially in developed countries. Since the concept of risk has many definitions and is interpreted differently from different perspectives, these differences should also be considered in risk management. Defining and analyzing the risks well forms the basis of risk management (Glenn, 2003). Risk management is a rational process used by businesses and individuals against the effects of the loss. It defines an ongoing process regarding possible risks and includes a pre-loss planning strategy for post-loss resources.

On the other hand, in the insurance technique, risk management is the exposure and interpretation of risks for the insured and/or policyholders. In this analysis, all threats that may pose a danger to the insured assets and affect these assets are revealed. Risk in terms of insurance; must be formed out of the related parties' will and must be following the law; otherwise, the insurer cannot make the necessary compensation payment (Houston, 1964). There should also be a possibility that the risk will occur in the future, but it should also be uncertain when it occurs. Insurance combines the risks of many individuals and distributes the impact of an uncertain event to many individuals. Insurance distributes not only risk but also loss. For this reason, the insurance's risk-dispersing functions play two roles: pre-loss (providing peace of mind) and post-risk (allocating cost among all policyholders).

### **2.1. Types of Risks in the Insurance Sector**

A structure has been prepared to classify risks in insurance companies by the International Association of Insurance Supervisors ("IAIS") (IAA Insurance Regulation Committee, 2002). According to this classification, the risks to be covered by insurance companies are divided into three main categories as "technical risks, investment risks, and non-technical risks". Technical risks, also named liability risks, are various risks that are directly or indirectly related to the technical or actuarial calculation of technical provisions and premiums in life and non-life insurances. These risks arise due to the continuation of the insurance business. Moreover, they arise from the structure of the insurance business. Technical risks are examined under two categories as current risks and special risks (Athearn, 1971).

Current risks may arise from errors in basic accounts. The quality of risk due to reasons such as insufficient tariff or miscalculation of the premium in a way that cannot cover the risk, deviation of the damage frequency, and/or the amount of

damage from the factors that will affect the risk premium, insufficient information in risk analysis and calculation. Besides, the valuation of technical provisions incorrectly, insufficient collateral, and operational risk occurs when operating expenses are realized above. The anticipated amount, bankruptcy risks, which are the causes of excessive growth risk that cause an excessive increase in damage and expenses, can be given as examples of current risks.

On the other hand, special risks refer to some risks that require both lack of application possibilities and intensive technical knowledge. For example, revocation of a multinational firm's export/import license, change of local laws, government breach of its commitments, interruption of raw material supply due to war or embargo. Cancellation of export credit support, bankruptcy or weakening of subcontractors or other venture partners, strike, lockout, deliberate damages, and especially design and workmanship errors that occur during the construction of untested technologies are included in the scope of special risks.

Investment risks (active risks) are various risks directly or indirectly related to insurance companies' asset management (Parker, 1997). Investment risks include the risk of depreciation in the value of investments due to various reasons. Such as liquidity risk, which is the risk of not having enough liquid assets to cover financial debts, the matching risk that occurs with the imbalance of future cash flow and responsibilities, and the decrease in investment instruments' prices (IAA Insurance Regulation Committee, 2002). Investment risks include interest risk that causes reinvestment costs, valuation risk, which refers to the valuation at high prices. Additionally, they include exposure due to the group's difficulty or its subsidiaries, i.e., participation risk and derivative transactions arising from the credit market and the liquidity risk of these products. These risks affect the insurance industry as a result of the local or global economic structure. Most insurance companies cannot control these risks because these risks are generally not predictable. Non-Technical Risks are various risks that cannot be classified as appropriate and are not classified as technical and investment risks. Business risks with a broad scope arising from

the management, the group to which they are affiliated, and legal reasons are handled in this group.

## **2.2. Risk in Life Insurance**

Life insurance is voluntary insurance that provides necessary assurance to individuals if certain events occur and personal income stops or disappears altogether. For this reason, it is known as insuring people against the risks of accident and death (Bikker & Leuvensteijn, 2008). While it is not clear whether the event will occur in non-life, i.e., loss insurances, the event will undoubtedly occur in most life insurances. For example, the risk of death will occur in life insurance due to death. Risk in life insurance is that the person whose life is insured. Suppose a risky person dies within the insurance period (death-related life insurance) or s/he is alive on a specific date (life-related life insurance) or if s/he dies until a specific date or is alive the latest in mixed insurances covering both possibilities (Fukuyama, 1997). Also, the risks of accidental injury, loss of work, and the need for maintenance can be provided by an additional contract or guarantees. The element of uncertainty in mixed insurances is not about whether the payment will be required but about when the insurer will have to pay. The risks leading to the insurer's obligation to pay compensation can be summarized in four items. First, the risk of death was identified and left this risk to medicine. The risk of death as a result of suicide or attempted suicide has been explicitly regulated. In line with the rule that the insurer cannot be held responsible in the deliberate realization of the risk valid in non-life insurances, in life insurances, the insurer's responsibility is removed if the person kills himself (Schuman, 1993).

In insurance against the possibility of death, the insured can kill the beneficiary to receive the insurance compensation, as the beneficiary will benefit from the insured's death. For this reason, it is stipulated that the person benefiting from the insurance will be deprived of insurance compensation if he/she killed the

insured or was complicit in killing him (Bikker & Leuvensteijn, 2008). However, this situation does not relieve the insurer from the debt of compensation payment, and the insurance compensation still has to be paid to the legal heirs. In insurance contracts that require the insurer to pay the insurance amount to stay on the pre-agreed date, the risk is realized by the phenomenon of survival. Other than these, systematic life risks, such as increased life expectancy, may threaten life insurance companies. Besides, the inherent risk of active and passive mismatch, which is one of the most significant risks of life insurance companies, can be ignored if well distributed (Dahl, 2004). Nevertheless, the significant risk will always be an investment risk. Investment risk should not be ignored in life insurance. Because when looking at life insurances, it is seen that the main feature of such policies is that they are long-term and often last for decades. Life insurance companies need large reserves for their liabilities. These reserves are financed by annual or simple insurance premiums and mostly capital market investments.

### 3. REINSURANCE TRANSACTIONS

With reinsurance, insurers can accept increasingly rising insurance costs and new risks that arise in parallel with technical developments without putting themselves at risk. In our legal system, reinsurance, which is defined as reinsurance, is a risk transfer method and insurance transaction that protects against risks that are too large for the insurer to keep. Reinsurance is a risk transfer method and insurance transaction that protects against risks that are too big for the insurer to handle. Reinsurance is a type of insurance transaction as it is defined as the insurance of the insurer's risk, in short, the insurer's insurance. As a result of the insurance company's reinsurance agreement, the insurance company transfers all or part of the reinsurer's loss if the risk incurred due to the contract between them and the policyholder is realized. Thus, they can claim all or part of the damage they have paid from the reinsurer. The reinsurer of transferring the business is retrospective. The liability taken over by reinsurance is wholly or partially transferred to another company by the reinsurer. In this way, it reduces the reinsurer risk and ensures a more balanced portfolio. The retrocession is also called "second-tier reinsurance" (Innes, 2007). Contracts between insurance companies and the reinsurer are called treaties. The principles of insurable benefit, maximum goodwill, close cause, and compensation, which are among the basic principles in insurance, are also applied to reinsurance transactions. With reinsurance transactions, insurance companies' work capacity increases, stability is achieved in profit/loss calculations, and companies' financial power increases. Besides, more manageable and less costly for companies to enter into a business type or region.

Reinsurance methods are divided into voluntary (optional, facultative) reinsurance agreements and compulsory (treaty, automatic) reinsurance agreements (Briys, Kahane, & Kroll, 1988). In the voluntary reinsurance method, the ceding company cannot transfer the risk, and the reinsurer accepts the transferred business. The reinsurer examines the discretionary reinsurance offer regarding the risk that the transferring company is obliged to provide all kinds of information in the

framework of maximum goodwill and accepts it if deemed appropriate. The voluntary reinsurance method is the oldest, and although automatic reinsurance methods are preferred in practice today, they can benefit insurance companies in some cases due to their flexible nature. Whenever the insurance company needs reinsurance, it enters the reinsurance market and makes discretionary agreements by negotiating the protection it will receive and the premium it will pay. Optional reinsurance agreements are divided into two parts as proportional and non-proportional.

In proportional (proportional) facultative reinsurance agreements, the ceding company transfers the parts of the risks it has taken over the retention share to the reinsurer at the rates determined on the document called reinsurer slip or bulletin (Schmidli, 2010). In this case, premiums and damages are also divided between the insurer and the reinsurer according to the bulletin rates with the retention share (retention) of the insurance company's total insurance amount and the reinsurer's participation share. When the risk occurs, the ceding company participates in the damages at the retention rate, while the reinsurer pays compensation by participating in the liability compensation inherited. Voluntary reinsurance is valid only for the period in which it is accepted. In principle, it must be offered to the reinsurer again. The changes must be notified, if any, to be renewed when the period is over. Proportional facultative reinsurance companies need to provide additional coverage to these companies to ensure large risks beyond their limits. The company has a balanced portfolio by paying considerable compensations to the reinsurer to disrupt the balance. Insurance companies enter new business areas and geographies, technical and experience from the reinsurer. They need to receive assistance and be prepared for future risks.

In non-proportional (disproportionate) facultative reinsurance agreements, they are free to grant ceding jobs, just as in proportional reinsurance contracts, and accept or reject the work assigned reinsurers to them. In this reinsurance method, liability, premiums, and damages are not shared within a predetermined rate. It covers all the damages itself, provided that it is limited to the lower limit of the

excess of loss agreement, keeping more premiums than the ceding risk, and can increase its capacity in large risks in reinsurance. In this method, premiums and claims are shared over the “damage amount” (Innes, 2007). Since no party has the right to choose and the given guarantee is processed automatically, the parties’ freedom in treaty reinsurance agreements, also known as automatic reinsurance agreements, has been replaced by a mandatory agreement in treaties. Providing work to the ceding reinsurer, within the agreement’s scope; the reinsurer must also accept the transferred risk. The division of premium, damage, and liability is made according to the parties’ rates. Treaty agreements, like discretionary agreements, are divided into two parts as proportional and non-proportional.

Proportional Compulsory Reinsurance Agreements are automatic guarantees given by the reinsurer with cessation (Samson & Thomas, 1983). It is obliged to transfer the amount of work called cession to the ceding reinsurer within the different treaties’ framework than the discretionary reinsurance. The reinsurer is obliged to take over this transferred business. In these treaties, the liability is shared over the insurance amount. The ceding and the reinsurer divide the premium and damage proportion to their shares on the insurance subject. Proportional treaty agreements are divided into quota share, surplus, and quota share/surplus combination.

The most distinctive feature of the quota share treaty reinsurance method, which is called “certain share” in the literature, is the obligation of ceding to transfer a specific rate of all premiums written in an insurance branch in a certain period to the reinsurer (Fang & Qu, 2014). The reinsurer to accept this transferred rate. Here, the liability, premium, and damage are shared between the parties within the treaty’s rates. If the damage exceeds the maximum treaty limit, the amount exceeding the maximum treaty limit can also be protected by applying the optional reinsurance. Quota-share agreements are the most appropriate method for the insurance company to enter a new market, and damage insurances varying over the years. Besides, the execution and settlement of the agreement are simple and inexpensive. In surplus treaty reinsurance, which is widely used in practice, the

ceding company determines the custody share according to the weight of the risks it has taken based on its financial strength and technical experience. Transfers the part exceeding the retention share of all the works within the agreement's scope to the reinsurer.

The feature of quota-share / surplus agreements, which is not used much in today's reinsurance practices, is optional for ceding but compulsory for the reinsurer. Insurance companies use it to keep a low retention share due to its small volume and therefore apply for quota-share but want to take responsibility for significant risks for developing their portfolio (Liang & Guo, 2011). The quota-share treaty limit is accepted as a gross slice, and several times more excess treatment is arranged. When insurance companies transfer to the quota-share agreement, they determine the retention share, and this share determines the amount of the transfer to be made to the surplus agreement. As a result, separate retention is not calculated for each reinsurance agreement. The most crucial difference separating non-proportional compulsory (automatic) reinsurance agreements from proportional compulsory agreements is that the reinsurer steps when the risks subject to reinsurance are realized, and damage occurs. Liability, premium, and damage in these agreements; calculated over the damage cost. Mandatory to share treats; The excess of loss agreements are divided into four parts: total excess of loss agreements, additional excess of loss agreements, and voluntary excess of loss agreements.

In excess of loss reinsurance agreements, the reinsurer's involvement with the damage starts if it exceeds the custody margin in the ceding damage and becomes responsible for the damages between the lower and upper limit specified in the treaty (Kaluszka, 2004). Damages exceeding the upper limit are covered by the ceding, but the ceding can protect itself from this situation by making second and third excess damage agreements. In these agreements, unlike the others, responsibilities, premiums, and damages are not shared by the parties at specific rates determined in advance. The liability of the reinsurer begins when it comes to compensation. Despite the damage of a single and generally low-frequency risk,

there are agreements of the excess of loss per risk (employee) and catastrophic excess of damage agreements that protect the ceding against high amounts of damage resulting from catastrophic risks earthquakes, hurricanes, and tsunamis. In total excess of loss agreements, if the rate of losses incurred in a certain period (generally one year) exceeds a rate determined in the treaty, that is, the limit, the exceeding portion is covered by the reinsurer up to an individual rate. The total excess of loss agreements from the excess of loss agreements is that they cover the damages realized within a certain period and use a certain percentage instead of a specified limit.

Some agreements have the characteristics of voluntary and compulsory reinsurance agreements, and they are rarely implemented today. While the transfer to such a treaty is optional for the cedant in such reinsurance agreements, the reinsurer must accept the transfers made to this treaty. It is used for risks with high damage rates, and the cedant covers the damages at the lower limit of the agreements itself. The treaties that ceding does not keep a retention share are loaded on the treaty, and the treaties where the maximum limit is specified in terms of the amount of money are called open cover treaties (Fang & Qu, 2014). Apart from proportional and non-proportional reinsurance methods, reciprocity results from the reinsurer taking business with the same volume and quality to balance its portfolio against the work transferred by the insurance company reinsurance. The system formed by reinsurance companies in areas such as a particular region and insurance branch for catastrophic risks with a high loss frequency is known as pooling. Financial reinsurance methods provide financial stability to ceding companies by spreading the losses over time, based on the return on investment that a certain amount will provide after being invested and operated in time.

#### **4. TYPES OF INSURANCE**

In insurance law, insurance activities appear in two forms: social (compulsory) and private insurance. While the futures of individuals are secured with social insurance organizations within the scope of social security; Private insurance organizations are also helping to ensure social security (Ronen, 2012). Therefore, private insurance is not only a discipline of private law but also an instrument of the welfare state. Social insurances have emerged as a requirement of the social state understanding and are governed by the constitution. Social insurance expresses an obligation and finds an application area with legal regulations by binding the parties within this scope. Social insurance programs have five essential elements. These are the elements of contribution, balance element, self-help element, insurance element, and must element.

While social insurance is made with the institution (s) established by law, this is not the case for private insurance. While there is a compulsory principle in social insurances, private insurances are optional; they are optional. Social insurances arise from the law, private insurance from the contract. To benefit from social insurance, the insured must have an individual status, but anyone can take insurance in private insurances. In social insurances, the insured or the employer should pay the premium. The benefits of the Social Security Institution to the insured are not regulated according to each insured's unusual situation. Although social insurances are exceptions, they are not shaped according to their particular conditions and wills. In other words, there is no premium adjustment according to risk in social insurance (Feldstein, 2005). On the other hand, the premium amount paid in private insurance, and the assurance to be provided are entirely left to the individual's will. Risks subject to social insurance are old age, invalidity, death, occupational accidents, occupational diseases, sickness, maternity, unemployment, and family benefits. It is not easy to find the probability of these happening by actuarial calculations. On the other hand, private insurance risks are related to the

individual's property and his life. The probability of such risks can be calculated more quickly.

Private insurance is based on the idea of 'self-help' in principle. Furthermore, private insurances are contractual and open to everyone without discrimination (Jost, 2001). Different rules than social insurances manage private insurances. Private insurance has different types of risks. The benefits of being insured in the private insurance are arranged according to each insured's unusual situation. Private insurances are mainly divided into three classes, property, life, and liability insurances. Property insurance is a type of insurance that covers the damages and losses of the goods under insurance protection, and in case of damage, profit and business loss may be covered accordingly. The scope of property insurances includes fire, additional insurances provided by fire insurances, transportation, auto insurance, theft, glass breakage, machinery and assembly, construction, electronic equipment, agriculture and aircraft, boat insurances (earthquake, flood, storm, strike, etc.). In financial liability and liability insurances, the insurance includes the risks arising from the insured's liabilities against third parties. The scope of this type of insurance is compulsory auto financial liability (traffic), voluntary auto financial liability, international auto financial liability, financial liability against third parties, employer financial liability, elevator financial liability, professional liability, and hazardous substances and bottled gas liability insurance.

Life insurances are insurances that protect against unplanned health expenses and loss of income. These insurances cover the risks related to people's death and generate a collective or monthly income at the end of a certain period with accumulated life insurances. Personal health insurance, group health insurance, individual / group, cumulative life insurances, and personal accident insurances under the scope of life insurances. Non-life insurances cover the losses resulting from various risks in the insured's assets (property), excluding the life branch. In this way, risks that threaten businesses' tangible assets and individuals measured with money are under insurance coverage. Although non-life insurances

are optional due to their characteristics, some insurances have been obligatory by laws due to the public interest. For instance, some optional insurances are fire, accident, transportation, machinery-assembly (engineering), agriculture, and liability insurances within this scope. Compulsory insurances are those that are required by law (Dragos, 2014). Its scopes include compulsory financial liability (traffic), green card, bus compulsory personal accident, hazardous materials, bottled gas liability, and compulsory earthquake insurance. The Council of Minister's decisions determines the application principles regarding compulsory insurance.

Life Insurance is a contract in which the insurance company agrees to pay a certain amount to him or his legal heirs in case of death by paying a predetermined premium amount to the insurance company in return for the risks that may occur in his life as an insured. Life insurance has been introduced to prevent the loss of economic power due to the temporary or permanent loss of working power by providing the livelihood of the dependents in case of death, sickness, or injury as the social life develops and has the risk of death from birth. Life insurance provides the insured person opportunity to live a life without falling into trouble in old ages. It gives the same opportunity to the family members who are cared for in case of death (Bekovitch & Venezia, 1992). As a complement to the public social security system, the Private Pension is established based on voluntary participation. It determined contribution basis to increase the welfare level by providing an additional income during the retirement period by directing individuals' savings for retirement to investment, increasing employment by creating long-term resources for the economy, and contributing to economic development. It is the regulation and supervision of the private pension system.

The main benefits of the private pension system are the increase in the welfare of individuals in retirement, the creation of new jobs and employment opportunities by the system by creating resources for infrastructure investments and long-term investments, increasing the scope of social security, and reducing the burden of the public arising from social security. It also provides indirect benefits such as increasing long-term funds in the financial sector, ensuring better financial

sector functioning. Intercalarly it contributes positively to the fight against inflation and stable growth, reduces fluctuations and speculations in the markets with corporate investment strategies, and allows the deepening of the capital market (Oldfield, 1977). Apart from life, non-life insurance, and individual retirement, another system that is not yet implemented system is called the Individual Retirement Account (IRA). In the personal retirement account, the person's age, savings goals, and income level during retirement are determinants (Gravelle, 1991). In the USA, private insurance coverage is provided for the personal retirement account. When the person working with this coverage is temporarily ill or dismissed, the insurance is activated and pays the person's premiums. Some developed countries have brought various tax advantages to this system for incentives. With this system, which is managed by the private sector and called a retirement savings account, retirement pensions are no longer a state issue, and thus they are no longer a prisoner of politics. Besides, it is possible to transform personal preferences into individual decisions with this system and achieve the desired results. The employee can determine the retirement salary and retirement age as they wish. The retirement savings account is tied to the employee, not the employer, and thus mobile, which helps create flexibility in the labor market both within and outside the country, without restricting mobility. The productivity of the country's capital and thus, the economic growth rate increases.

## 5. TYPES OF LIFE INSURANCE

In today's world, there are many kinds of life insurance; however, they all can be clustered under two main categories as the term and whole life insurance. Term life insurance provides coverage for a short period. At the end of every period, the insured need to renew his/her policy. Getting closer to the end of the policy opens the possibility of a repurchase policy for the next limited period. In the insurance sector, this is also known as the renewal period. In the term life policy, the policy's premium can vary due to the insured's condition in the renewal period (Shaw, 1985). Suppose the insured has to change life conditions, including life-treading risks like health problems, risky occupations, and low-quality living conditions. In that case, the insurance premium can increase at a significant level for the next renewal period. When a potential insured has an acute disease like cancer, the insured can overcome his/her disease; however, when this condition is compared to the insured's previous health condition, the insured life is at higher risk due to new health problems.

Furthermore, when potential insured employed by a chemical production factory that produces toxic chemicals increases the potential of having related sickness, even this can cause death at a young age. Occupational risks can affect the premium of the potential insured. Another issue if a potential insured lost his/her job insurer can evaluate that as a possibility of having trouble taking care of personal health. Therefore, an insurer can raise the premium of the term life policy to cover death risk at a younger age insured. Although life insurance types are classified as death-related and life-related life insurance according to the type of risk, this distinction is not considered sufficient (Gabel & Scott, 2009). Different life insurance types have been created according to the day's needs in both the doctrine and the real insurance sector. When life insurance products are examined in general, life insurance types can be divided into two main groups according to application types and risk classifications.

## **5.1. Life Insurance by Types of Execution**

According to the execution methods, life insurances are divided into individual life insurances and group life insurances, distinguishing between an individual or global transaction. Individual life insurances are designed for individual customers and are insurances that cover individuals whose target audience is individuals. If a person insures his/her spouse and child, one by one, it is included in the individual insurance group. Group life insurances are formed by insuring a particular group as a group in order to assure the risks faced by especially those working in a specific profession (Norberg, 1989). In this type of insurance, it is a particular person or organization that ensures. In group life insurances, individual insured individuals, who are an unspecified group and consist of more than one person, are covered by a single insurance policy. (Dorfman & Cather, 2012) As a result of this, leaving the group can cause them to lose their title of insured, while those who are new to the group gain self-insured title provided that they have the same conditions. This type of insurance is supportive of social insurance, and the employer can make premium payments on behalf of those benefiting from the insurance. Group life insurances, which are short-term and are generally renewed annually, are insurances designed according to corporate customers. Group insurances are low-cost in terms of premiums, expenses, and agency commissions. This group insurances attributes bring cheap premiums for employers and provide trust to their workers. Besides, it provides benefits for the insurer due to its low cost. In the group insurance made by the loan creditors, the borrowers who are included in the group have the assurance of being insured, and the lender secures himself because he has the opportunity to obtain the loan from this insurance receivable in the event of death or inability to work.

## **5.2. Life Insurances According to Their Risks**

The most crucial difference that separates life insurance from other insurance types is protecting and saving functions. In life insurances, the central guarantees that lead to the insurer's obligation to pay are death and survival (Yaari, 1965). Also, additional coverage is provided for incapacitation, disability, need for care, and dangerous diseases. According to the risks they bear, life insurances are divided into three groups: demise-related life insurances, life-related life insurances, and endowment life insurances. The state of death due to death or, in other words, death is the state of death in life insurances. In other words, in the event of the insured's death, the insurer is under the obligation to pay the insurance cost. Life insurances based on death, which are also referred to as risky life insurances in practice, are divided into life insurances based on term life insurance and lifetime (indefinite) life insurances (Gabel & Scott, 2009).

In life insurance subject to term life insurance, the insurer's indemnity liability is formed when the insured dies within a certain period. This period refers to a specific period agreed in the contract and shown in the policy. In the event of the insured's death during this period, the insurer should pay the amount shown in the policy to the beneficiary or the insured's heirs. If the risk, i.e., death, does not occur, the insurer is freed from liability, and the premium payments remain with the insurer (Bekovitch & Venezia, 1992). This type of insurance is carried out to provide economic assurance to those who will be entitled to retirement after a specific date against the risk of death that may occur until that date. For example, in the cumulative life policies that include annual death cover, the insured pays the savings premium according to the periods specified in the contract and secures himself against the risk of death by making an additional death guarantee and paying a small premium. Life insurances subject to term can be renewed at the end of the specified period by adding renewable or changeable records to the contract. It is possible to change it into another life insurance at the end of the term. This ability to change is called convertibility in insurance. With this feature, life

insurances based on permanent death are suitable for people who typically need permanent protection but cannot obtain life insurance valid for a lifetime at that moment.

In life insurances that are valid for a lifetime, based on permanent death, the beneficiary or the insured's heirs are assured of payment whenever the insured's death occurs. The policy ends when the insurer pays the damage. In lifetime life insurance, indeed, the damage (death) will eventually occur, so the insurer must collect enough premiums to pay it. Therefore, the premium amount of lifetime life insurances is initially higher than annual or limited-term life insurances (Braun, Schmeiser, & Schreiber, 2016). The insurer is obliged to pay the insurance amount specified in the contract on what date the insured dies. In addition to the term life insurances and lifetime life insurance, there are also life insurances in death cases, which are rarely seen in practice, provided that the beneficiary is alive in the death of the insured. While the risk in death-related life insurance is the state of death, the risk in life-related life insurance is the condition of the insured's thickened survival in the insurance policy, that is, the continuation of the state of life. In practice, it is a type of insurance known as cumulative life insurance and intended to cover. It is divided into two categories as life insurance for income and capital payment purposes.

If life status capital payment purpose insurance holder lives on a predetermined date, the insurer must pay an amount determined in the contract to the insured. If the insured dies within the specified period, the insurer is relieved of the liability. The risk is not realized. Life status income payment purpose insurance is in practice only defined as income insurance. In this type of insurance, the insurer provides an absolute income assurance to the insured until they die by placing income to be paid to the insured at specific intervals. This type of insurance is carried out for two different purposes: immediately paid income insurance and postpaid income insurance. In immediate payment income insurance for income payment, the insurer pays the premium to be paid collectively to the insurer. The insurer starts to pay income to the insured immediately and at regular intervals in

return. This type of insurance is preferred as an investment tool by people who have much money but do not have the opportunity to operate. Immediate income insurance is in practice; it is a type of insurance in which the insurer pays the premium in advance (Anderson & Nevin, 1975). The insurer also pays income by operating, depending on the amount of the premium deposited (capital) and the insured's age. This type of insurance is divided into two as lifetime income insurance, where no payment is made to the heirs in the event of the insured's death. The second one is capital-refunded income insurance, in which the establishment and operation are the same as lifetime income insurance. However, the remaining balance (principal) is paid to the heirs by deducting the income payments in that year from the technical provision when the insured dies. After a later or a specific future date, the policyholder pays the insurance premium to the insurer at regular intervals in the paid income insurance. The insurer pays the income not immediately but at regular intervals starting from a predetermined future date.

Mixed life insurances, also known as an endowment in practice and covering risk and insurance and savings features, create two rights. The first is the indemnity payment in the insurance amount previously determined in the contract to the beneficiary or the insured's heirs if the insured dies within a certain period. The second is the payment of the amount to the insured in case of survival. Endowment life insurances are the most preferred type of life insurance today because the realization of the risk is absolute for the insurer and has a risk uncertainty regarding time and saving (Sain & Selimovic, 2013). This insurance is mostly preferred by those who want to assure their relatives, who need enough funds to continue their lives comfortably, or to continue their business if they live. Considering the legal nature of endowment insurance, which is also referred to as complicated insurance in the literature, it is seen that there are some controversial issues. There are three different opinions about the merits of endowment insurance.

According to the first view, endowment insurance is not insurance; it is claimed that it is a savings operation because the insurer has to pay the insurance amount; furthermore, there is no risk element. Indeed, the insurer will pay the

amount. However, since it is uncertain when the payment will be made, and there are risk factors and probabilities accounts in mixed insurance, this view is not popular (Fukuyama, 1997). In this case, the risk is when the payment will be made. On the second view, endowment insurance is a mixture of insurance against the possibility of living with insurance against death for a certain period. However, in endowment insurance, there are not two separate contracts, but one contract. The insurant has one obligation (such as paying insurance premiums), and the insurer has one obligation (such as paying the insurance amount). Also, if this opinion is adopted, it is impossible to explain the concept of participation, which is in question, especially for endowment insurances and technical provision prepayment. According to the last view, endowment insurance is a mixture of savings process and insurance; therefore, this definition of endowment insurance is more appropriate. Because it is not clear how long the person who deposits money in the bank every month to save will live. If he dies early, he will not save this money and will not leave a certain amount of money to his relatives. The risk of an insurance transaction here is the person's premature death and failure to achieve savings. On the other hand, the same person wants to secure himself for the days he cannot work. Therefore, if he is alive, he ensures that the insurance amount is given to him. This process is saving. Endowment insurance is a mixture of these two transactions. According to life insurance's characteristics and primary purposes, it is classified as endowment life insurance, a mixture of death and life-related insurances described above. However, in practice, apart from this fundamental distinction, there is also various differentiation according to the duration of life insurance, premium payment methods, and purposes.

## **6. PARTIES AND RELEVANT PERSONS IN LIFE INSURANCE**

In life insurance businesses, three related persons are mentioned: the insurer, the insured, and the beneficiary. Providing coverage to those who want to take out insurance to cover possible risks and laws determine the establishment method. Companies operating following the laws, regulations, and other sanctions published by the Undersecretaries of Treasury in the countries are defined as insurers. In most countries, an insurer authorized to make life insurance contracts must first have a license to work in the life branch. The insurer may have a domestic partnership or a foreign partnership.

The insurer is the person who concludes the insurance contract with the insured. The insurer insures for the interests of the insured with an individual premium. The insurer can be a real person or a legal person. Whether a person is eligible for an insurance contract is determined by the Code of Obligations' relevant rules. In the insurance contracts made by determining the beneficiary person, the condition that the policyholder has a material or moral interest in continuing this person's life is sought. In the event of a business partnership and creditor-debtor relationship, the existence of material interest is accepted, and the existence of moral interest between spouses and siblings. Liabilities for the insurer can be listed as follows; the obligation to issue and deliver the policy, the liability to pay the insurance amount, and the obligation to keep secrets. The obligations in terms of the policyholder are premium payment debt, pre-contract notification duty, the duty not to aggravate the risk, the duty to report that the risk has occurred (Mayers & Smith, 1981).

The insurer secures the insured by making an insurance contract on the possible risks. The beneficiary can be insured or a third party. Insured has an insurance contract signed in favor. Insured has the right to demand compensation from the insurer to rule if the risk is defined as the beneficiary. In life-related insurances, the insured and the beneficiary can be the same person. The beneficiary is not a party to the insurance contract but is concerned and can be a real or legal

person. More than one beneficiary appointment is possible. The insurer may appoint a beneficiary during or after the insurance contract is established and has the right to change the pre-appointed beneficiary (Vance, 1922). Risk selection becomes important in policy issuance. Since insurance is a risky undertaking business, the definition and determination of risks subject to insurance constitute an essential point of the insurance contract. The insurer may accept or refuse to issue the policy according to the risk ratios specified in the policies upon application. The insurer may also demand a premium according to the risk level involved. A report and other necessary information showing age, gender, occupation, marriage, and most importantly, health status are required for life insurance claims. Then it is essential to consider whether the risk will be accepted.

## **7. DIFFERENCES BETWEEN LIFE AND NON-LIFE INSURANCES**

Considering the voluntary automobile insurance, the owner ensures his vehicle against all possible dangers without much hesitation while not only postponing this issue but generally avoiding talking about it when his life is the subject. Life is so precious that even its possible loss is scary; talking about it is terrible, and talking about the plight of those left behind is not welcomed. Life insurance deals with the dangers associated with life, while non-life insurance addresses the dangers to property (Vencappa, Fenn, & Diacon, 2013). One of the most important differences between life insurance and non-life insurance (loss insurance) manifests itself in the insurance cost. In non-life insurances, when a benefit that can be valued with money is insured, and the risk occurs, the insurer is obliged to cover its actual loss. As a rule, it is not required to precisely pay the insurance amount, as shown in the insurance policy. In other words, non-life insurances have the principle of prohibition of enrichment, that is, compensation for real damages. Since the amount principle prevails in life insurances, if the risk occurs, the insurer is obliged, as a rule, to pay the entire insurance amount shown in the insurance policy to the insured or his legal heirs. Because in this type of insurance, a benefit that can be valued with money is not insured.

Since the mortality tables used in life insurances are made based on the Law of Large Numbers, the figures to be paid by insurance companies, i.e., the probability of occurrence of the risk, are more apparent than non-life insurances (Campbell J. A., 1940). Since the risk is distributed over many policies, the risk's realization will not hurt its financial structure. There are no significant fluctuations in compensation payments over the years. On the other hand, in non-life branches, the compensation amounts paid against the risk can reach very high amounts. For example, a major natural disaster may cause significant deviations in the loss ratios for that year. Companies have less need for reinsurance since the risk can be determined in life insurances and the guarantees are not very high. Since most of the premiums in life insurance are for saving, retention rates are relatively high

compared to other insurance branches. Therefore, most of the premiums from the life insurance branch remain domestically. Thus, the funds accumulated in life insurance contribute to the economy. Except for annual group insurances, maturity structures are generally long-term in life insurances. For this reason, insurance companies direct their premiums to longer-term investments. This situation generates an anti-inflationary effect on the country's economy. Directing premiums to longer-term investments can cause the industrialization of long-term funds. There are also various tax advantages to life insurance. For example, life insurance premiums are deducted at individual rates from the income tax base. Besides, life insurance is exempt from banking and insurance transactions tax as in other branches. Mathematical provisions and related returns of the life branch can be exempted from the corporate tax of companies.

## **8. INSURANCE TRENDS**

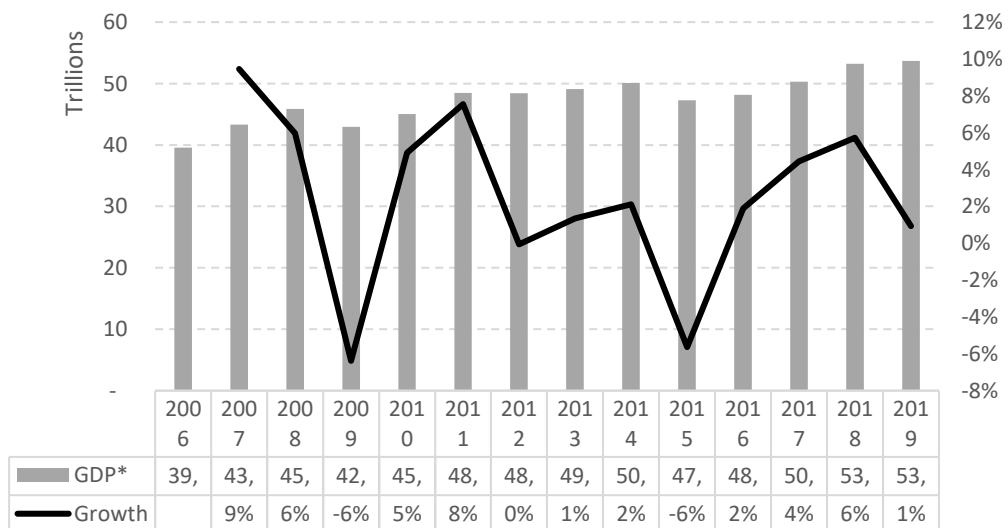
### **8.1. Global Insurance Market**

The period when insurance companies started to form in the modern sense, between the 17<sup>th</sup>-19<sup>th</sup> centuries. The industrial revolution, which gained speed in the 19<sup>th</sup> century, increased the demand for insurance in many areas. The importance of the service sector in the world economy has increased very rapidly after World War II. The insurance industry around the world has grown by around 10% annually since the 1950s. In the mid-1980s, a growth of around 25% was observed in the international life insurance sector (Browne & Kim, 1993). According to the 2013 World Insurance report published by Swiss Re, one of the largest reinsurance companies in the world, world premium production increased by 1.4% in real terms in 2013 compared to the previous year. When the insurance activities around the world are examined, it has been observed that the premiums paid in different parts of the world differ, and they show differences year by year. Today, it is possible to encounter insurance products in all areas, and the insurance sector has a very important and increasing place in the national income, especially in developed countries. Insurance is an important indicator in determining the development level of countries. The insurance industry contributes greatly to the national economy. It ensures the revival of the economy and increases the level of social welfare. For this reason, insurance awareness in people should be increased.

## 8.2. Insurance Market in OECD Countries

In order to better understand the general situation of the OECD countries, the below graph of the total gross national product of these countries in current US\$ from the World Bank database displayed and the change over the years is included. The below bar chart shows year by year the total gross domestic product of OECD countries from 2006 to 2019 in Trillions. At the same time, the line shows annual growth for the gross product. In the below chart, there are two different crises period. Other than these two periods total GDP for OECD countries raised and it was stable in 2012. The effect of the Great Recession with a sharp decline was observed in 2009. Another economic recession was witnessed by the Russian financial crisis in 2015. For the next periods, the COVID-19 outbreak is predicted to cause the most critical recession since the beginning of the 20<sup>th</sup> century, as well as shrink global gross domestic product by almost 4% for 2020. It is anticipated that the insurance industry will overcome this situation with a short-term recession and that premium growth will accelerate as the economy improves in the longer term (Staib, Cabral, Kubli, & Dornigg, 2020).

**Figure 8.1 GDP of OECD Countries**

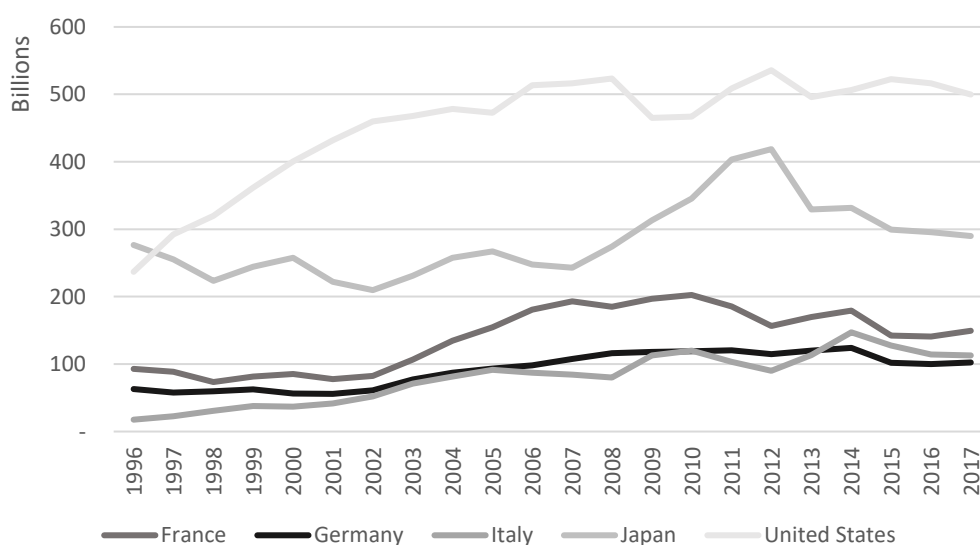


Source: World Bank

Information in 34 countries was compared, and real premiums increased in all insurance types, regardless of whether 28 countries have life or non-life insurances. The real gross premium of the 6 countries decreased in both segments. The fastest increase in life insurance real gross premium payments in 2015 took place in Uruguay with 19.3%. Chile(18.2%) and Argentina(14%) took their places second and third, respectively (OECD, 2017). The expansion of the life insurance product and its development in certain countries may also depend on the relative attractiveness of alternative savings products in these countries. The inflation situation which directly affects the insurance profession may be decisive for the OECD countries, affecting life and non-life insurances.

In the OECD countries compared in average non-life insurance premium volume between 1996 and 2017 in current US\$, over the past 20 years, the United States has played a leading role. In the below chart, the top 5 OECD countries displayed in average life insurance premium volume between 1996 and 2017 in current US\$. Over the past 20 years, the United States has also played a leading role in life insurances, but unlike non-life insurances, Japan plays a competitive role in life insurance.

**Figure 8.2 Life Insurance Premium Volume**



Source: World Bank

Interest has an essential place in the financial system. Because interest is the price of capital, it is an essential determinant of liquidity preference in savings and investments. It is also a cost element for the investor or the borrower. It varies according to many factors such as interest rate, inflation, non-repayment risk, maturity. Thus, interest rates can be considered an indicator of the countries' financial risks. Looking at OECD countries, it is observed that the long-term interest rates (ten-year bond interest rates) are low in countries with a high financial development index. (OECD, 2021) The countries' low interest rates may also cause those who want to take insurance to avoid high coverage insurances. As a result, life insurance premiums may decrease. However, interest rates are increasing in countries with high public and private sector debt. It is thought that this situation of countries entering into high debt high-interest spiral harms their financial development and liquidity. Also, the high interest rates of these countries may cause consumers to want to avoid debt. It can indirectly act as a driving factor for insurance accumulation.

## 9. LITERATURE REVIEW

In this section of the study, determinants of life and non-life insurance demand are investigated. Different perspectives from different studies were introduced to expose crucial independent and dependent values. At this stage, a summary of the period starting from the pioneers of the literature to current examples was given.

Explaining life insurance demand was a very complex issue. Umpteen number of independent and dependent variables influenced over demand. With a theoretical layout, Yaari (1965) was the pioneer to present life insurance demand. The author examined the rational behavior of humankind under the uncertain lifetime by maximizing the efficiency of lifetime consumption. Yaari (1965) was associated life insurance demand with the economic condition of individuals. In his article, he explained that people with rational behavior tended to evaluate the estimated lifetime earnings, the interest rate of a corresponding period, a premium of life insurance policy, and personal discount rates of lifetime consumptions to decide to purchase life insurance (Yaari, 1965). Hakansson (1969) was similar to Yaari in respect to defining insurance consumption under an uncertain lifetime. In his paper, Hakansson (1969) approached individual life as a random variable with a probability distribution, and he mentioned the utility function to understand the reason for bequest's motivation (Hakansson, 1969). By adjusting these inputs, Hakansson (1969) analyzed the insurance purchasing decision of the individual.

Another article that supported the related study of Yaari (1965) and Hakansson (1969) was written by Campbell (1980). As a phenomenon of life insurance consumption, Campbell (1980) tried to define households' evaluation for their uncertain lifetime income, which was critical to transforming uncertain lifetime income into a tradeable security. From the household's perspective, if a household's livelihood depended on labor income, then the death of labor income owners before starting pension funds may cause the rest of the household to have more spending to survive than their decreased earnings. According to Campbell

(1980), for most households, the main income stream was not capital income, and it was labor income. Therefore, most of the household was the potential buyer of life insurance. Capital income owners were not the target group of life insurance because their income stream was not dependent on their vitality (Campbell R. A., 1980). In the pre-retirement death of capital income owners, capital income sources can be manageable by other households. In light of these arguments, Campbell (1980) investigated the risk perception of households under uncertainty. For this purpose, he used the Taylor Series and tried to maximize household estimated utility to determine micro and macro demand factors for life insurance.

Burnett and Palmer (1984) examined the issue from a psychological point of view. Unlike the article written on life insurance demand, this article demonstrated that people did not behave rationally when making purchase decisions. Consumers should be evaluated under the environment's effects, which shaped their psychology and triggered their decisions. Burnett and Palmer (1984) did not only investigate the effect of psychology on the life insurance purchasing decision but also collaborated individual psychological structure with financial factors to define a complete profile of consumers for life insurance. With the help of multiple classification analyses, this study found out that psychological determinants like work ethic, fatalism, socialization, and assertiveness have a crucial role in the life insurance purchasing decision (Burnett & Palmer, 1984). Moreover, the writer showed that people tended to change their decision based on their demographic conditions such as education level, having children, and income level.

The economic conditions of individuals were inevitably effective for the life insurance demand because they shape the cost of life insurance, which directly reflects the premium. Babbel and Staking (1983) created a study evaluating the consumption performance of societies based on financial conditions with a cost index. The study revealed that high tax status decreases the expected cost of life insurance and interest rate volatility however it increases the cost of whole life insurance and slightly the cost of term insurance (Babbel & Staking, 1983). This

research denoted that the policy term, which provided by companies, was assumed to improve with society's developing economic condition because companies can give better options over time under the effect of *ceteris paribus*. In contrast, in reality, all conditions tend to reshape with time. Babbel and Staking (1983) emphasized that the rising interest rate balanced the improving policy terms. In this case, the authors showed that the policy conditions did not have a positive effect in the long run. On the other side of the coin, their analysis proved that increasing survival rate slightly raised the cost of whole life insurance and it considerably drove up the cost of term life insurance. Additionally, the article displayed that if whole life insurance owners exercise the loan option, this condition will lead to higher policy costs.

The price and demand relationship in the economic theory defines by the law of demand, and the quantity of purchase behaves inversely with the price of products. In other words, when the life insurance price high, the demand for life insurance will be lower. In contrast to this theory, Babbel (1985) tested the rejection of the hypothesis that whole life insurance customers are responsive to purchasing in case of price change. The writer generated a generalized least square technique with a second-order moving average process. In this regression, the writer evaluated the whole life insurance participants and non-participants with a three-year income variable for a ten-year expected holding period (Babbel, 1985). Consequently, the author indicated that insurance demand and price are within a converse relation.

Until the article by Lewis (1989), scholars mostly have argued about the standpoint of labor income owner or company's profitability perspective. Nonetheless, Lewis (1989) exhibited that one of the leading life insurance parties was the income-supported household members of life insurance owners. In this research, Lewis (1989) addressed the life cycle model under the uncertain life framework of Yaari (1965). Yaari's (1965) approach was that by purchasing a life insurance policy, the breadwinner can reasonably increase the expected utilities. By examining this study, Lewis (1989) produced a model to maximize income supported by household members' expected utilities. As Lewis (1989) mentioned

in his article, the primary motivation to buy life insurance was to protect income dependents in the premature death of income owners. Therefore, he described two demand factors: expected utility and risk aversion standards of income-dependent house households for breadwinner's life insurance demand (Lewis, 1989).

In life insurance demand, one of the influential studies belonged to Truett and Truett (1990). This study dissected market needs with the cross-sectional country analysis between Mexico and the United States. To compare these two countries, Truett and Truett (1990) followed a diachronic order. The authors exercised regression analysis in their method, and they revealed that education, income level, and age were influential in specifying the ingratiate of life insurance demand (Truett & Truett, 1990).

Bernheim (1991) portrayed life insurance's motivation as a saving opportunity for people to satisfy the need for leaving an inheritance. The author ascertained a positive relation between the holding of insurance and social security (Bernheim, 1991). By employing the Tobit model, the author verified that social security utility boosted the holding period of life insurance among the elderly.

In the 80s, the worldwide insurance sector was rapidly growing. To interpret this insurance sector accretion, Kim and Brown (1993) produced an empirical model using 45 counties. This model assessed the log-linear equation, which contained national income, dependency ratio, government social security investment, inflation, education, insurance premium, and life expectancy (Browne & Kim, 1993). Moreover, they contained Islamic and non-Islamic parameters in this equation to illuminate life insurance demand discrepancies. Kim and Brown (1993) applied the ordinary least square method to test their hypotheses. From this analysis, Islam was statistically significant and negatively correlated with life insurance consumption. Another finding was that life insurance demand was positively related to national income and the government's social security investment but it was negatively related to inflation. These results demonstrated that the economic strength of counties was one of the main drivers for insurance consumption.

By following Kim and Brown's (1993) footprints, Outreville (1996) established cross-sectional data analysis with 45 developing countries. Developing countries were known as small economies with a limited number of companies. With the help of this low competition around, Outreville (1996) planned to discover the importance of competition in the insurance sector to define life insurance's leading drivers. Outreville (1996) reached similar results with Kim and Brown (1993) and concluded the disposable income of countries' individual and financial development as driving factors for life insurance demand. Besides, in this study Outreville (1996) verified that monopolistic economics tended to create underdeveloped sectors. In the article, the author showed the importance of a competitive environment for life insurance otherwise monopolistic environment was harming the demand for life insurance. Therefore, privatization was significant to motivate a competitive environment and to increase life insurance demand (Outreville, 1996).

Outreville's (1996) competitive sector theory is needed to produce a fair market environment. Skipper and Klein (2000) claimed that regulators cooperate with corporations to create a fair and competitive market to boost life insurance demand. In other words, when regulators were removing the business barriers, they should carefully protect the interest of consumers to avoid potential fraud possibilities. Further, Skipper and Klein (2000) targeted the fair, competitive sector notion to lead more institutions to surpass entry barriers for the insurance sector; therefore, institutions would compete and improve insurance market products for the insured's benefit. These regulations got supported with four elements, which were adequacy, impartiality, minimal intrusiveness, and transparency (Skipper & Klein, 2000). In their study, Skipper and Klein (2000) observed that the government's social security expenditure decreased the number of dependences in society and encouraged insurance consumption.

Cross-sectional country analyses had proved a macro outlook for life insurance, yet understanding life insurance demand micro approximation was precious. According to Chen, Wong, and Lee (2001), to have micro and detail

information about life insurance, their study focused on the United States. Several articles intended to explain demographic, social, and economic factors around life insurance demand, and these factors are generally approached separately from their time frames. Still, the conditions of periods had been shaping the demand factors for life insurance. Chen, Wong, and Lee (2001) examined age and generations inside their respective time frames. The authors engaged cohort analysis and age standardization in the relevant period from 1940 until 1996 in the United States (Chen, Wong, & Lee, 2001). This examination presented that aging was a significant factor in developing life insurance demand for the United States within this period. The study pointed out that for life insurance the willingness to purchase of baby boomer generation was low.

As Outreville (1996) proved, the competitive and fair market was essential in improving the insurance sector and life insurance demand. A competitive and fair market structure did not expect under unstable politics and unprotected personal rights. Ward and Zurbrueg (2002) employed 37 countries' annual life insurance premiums to execute the General Method of Moment (GMM) dynamic system estimator. In this study, this method was generated to predict the specific moment in a serial distribution of independent variables. From 1987 to 1998, Asia was one of the fastest grown markets in life insurance; therefore, Ward and Zurbrueg (2002) estimated the leading factors for life insurance by comparing Asian counties with OECD countries. The writers explored that there was proof for the S curve in income level elasticity for life insurance demand. Further, the writers improved the idea of that political stability and improving civil rights were going to enhance life insurance demand (Ward & Zurbruegg, 2002).

Beck and Webb (2003) submitted a particular approach to assess life insurance determinants and correlated life insurance demand with other sectors. The authors clustered 68 counties' data to describe the correlation between supply and demand for life insurance, at various intervals between 1961 and 2000 (Beck & Webb, 2003). The article specified two models to measure their hypotheses. These were fixed and random effects moreover these methods were evaluated with the

Hausman test. For the null hypothesis, both models were viable. The fixed-effects model was consistent; therefore, Beck and Webb (2003) employed a fixed-effects model by rejecting the null hypothesis for the 10% level and failing in the random-effects model. The model inferred from a higher level of income, lower inflation level, and uplifted banking sector that related counties could grow in life insurance consumption.

In the OECD countries, specific Li et al. (2007) observed cross-section data of 30 countries between 1993 and 2000. This study included two estimation methods. The generalized method of moment (GMM) was exercised to forecast regressors' cross-correlation and residuals' heteroscedasticity. Ordinary least squares (OLS) were hired to display unlike perspective (Li, Moshirian, Nguyen, & Wee, 2007). Accordingly, Li et al. (2007) contrasted two model results. This study found out that income was one of the significant factors in life insurance consumption, similar to previous research. Long life expectancy and social security expenditure negatively impacted life insurance demand, dependency ratio, and education level positively impacted. Consistent with Outreville (1996), Li et al. (2007) proposed that financial development and competition had been improving life insurance consumption and besides inflation had been diminishing the level of life insurance consumption. In a nutshell, this article clarified that socioeconomic variables and product market provide a better understanding of the puzzler equation of life insurance consumption.

One of the most comprehensive written reports to determine insurance sector trends had published by the World Bank. Feyen et al. (2011) inquired driving parameters for life insurance and non-life insurance in this paper. This paper's primary motivation was the insurance sector's special status to direct economic and financial evaluation of counties. In line with former research, Feyen et al. (2011) confirmed income as a critical determinant of life insurance. Distinctively from previous studies, this paper emphasized that two of the vital life insurance regression elements were population and population density because a larger number of clients had been spreading the risk, and the scale of the economy enabled

companies to decrease the costs. Inconsistently with past articles, Feyen et al. (2011) certified that inflation and life expectancy were damaging life insurance consumption parameters. Also, age dependency was another crucial element for life insurance demand against the premature death of breadwinners. In the article, for life insurance regression, schooling was an insignificant element, and conservative social structure had an unfavorable influence on life insurance development (Feyen, Lester, & Rocha, 2011). The developed social security system decreased the need for life insurance. Correlatively, the author showed that private ownership contributed to request for life insurance by constituting a concentrated marketplace to assist quicker development for the life insurance sector.

Kjosevski (2012) operated the life insurance density and life insurance penetration model to clarify motivative variables of life insurance for Central and South-Eastern Europe (CSEE) between 1998 and 2010 by hiring 14 relevant countries' cross-sectional data. The method of the author was the fixed effect in panel data. This research paper identified that incremental per-capita income assisted incremental life insurance density and penetration. While life insurance penetration showed a positive relationship with the real interest rate within chosen countries, real interest rate did not positively affect life insurance density (Kjosevski, 2012). According to the writer, this result is assumed to link with the mindfulness of potential buyers. Another finding was that economic stability prevented high inflation and derived an affirmative position to develop life insurance demand.

Life insurance has unusual demand parameters in different parts of the world. Regional variables should be analyzed to have a better perspective on life insurance determinants. Alhassan and Biekqe (2015) noticed that life insurance penetration was insufficient between African countries. For this purpose, the authors struggled to evince determinants of life insurance in African countries and examined 31 African countries. The authors studied data of African countries between 1996 to 2010. Alhassan and Biekqe (2015) worked with two methodologies. The first one was the panel corrected ordinary least square (OLS-

PCSE) method, and with this method, they estimated a static model, and they elaborated error conditions. The second model was the generalized method of moment (GMM), and GMM was hired to generate estimations by eliminating biases generated by dependent variables. Additionally, D-GMM was utilized to handle country-specific factors. With this study's help, Alhassan and Biekqe (2015) discovered that demographic and financial determinants were critical for life insurance consumption and significantly rising income level, higher inflation, increasing life expectancy, and over-dependency ratio restrained parameters in the development of life insurance consumption. On the other hand, improving institutional quality, countries' financial development, and augmenting health costs promoted life insurance consumption; by using these findings, writers aimed to generate policy implication methods to help develop life insurance in Africa.

Another regional study was written by Zerriaa and Noubbigh (2016). This paper researched 17 countries located in the Middle East and North Africa (MENA) during 2000-2012. Similarly, previous studies used life insurance density and life insurance penetration as dependent variables. The writers simulated this study by comparing four regression techniques: ordinary least square (OLS), fixed effects, random effects, and the feasible general least square (FGLS). As a result of these methods, the article implied that life expectancy at birth, financial depth, interest rate, inflation, and income were uplifting determinants for the life insurance consumption equation (Zerriaa & Noubbigh, 2016). Besides, dependency and religion had significant adverse effects on life insurance demand. In the article, social security was a non-significant independent variable for life insurance density, while it is a significant negative parameter for life insurance penetration. Lastly, the methods of the article presented that neither life insurance density nor life insurance penetration had a significant relation with urbanization.

Zerriaa et al. (2017) conducted a Tunisia region study from 1990 to 2014. The contributors of the study hired multiple regression log-linear models to analyze some demographic and financial criteria. In the article, Zerriaa et al. (2017) intended to specify Tunisia's life insurance determinant using life insurance density

and life insurance penetration as dependent variables. This empirical study found out that in contrast with quondam researches, inflation and interest were not essential parameters to define life insurance's determinant in Tunisia (Zerriaa, Amiri, Noubbigh, & Naoui, 2017). On the other hand, income and financial development stimulated life insurance demand in Tunisia. Zerriaa et al. (2017) noted that increasing education level hindered the development of life insurance consumptions while urbanization, dependency ratio, and life expectancy at birth assisted the growth of life insurance demand in Tunisia. A critical finding from this article was that pension expenditures were a damaging parameter over life insurance demand because pension expenditures partially fulfilled similar needs with life insurance from the perspective of potential life insurance buyers.

There are very few studies to identify non-life insurance determinants compared to life insurance. One of these few studies is Nakata and Sawada (2007). This study aims to reveal the reality of the argument that non-life insurance is a luxury necessity. A cross-country analysis study has been conducted on insurance data and national wealth. As a result of the study, Nakata and Sawada (2007) found that the income elasticity of insurance demand is greater than the unity for upper-middle and high-wealth countries. In other words, it has been determined that non-life insurances are luxury products in terms of income elasticity in upper-middle and high-wealth countries. Another finding revealed in the study is that in upper-middle and high-wealth countries the wealth elasticity of insurance demand is smaller than the unity (Nakata & Sawada, 2007). For these countries, in terms of wealth elasticity, non-life insurances are not included in the luxury consumer goods class. In consequently from the literature, income, life expectancy, education, social security factors, foreign investment, inflation, interest rate, distribution of population, and institutional development were essential factors in the life insurance demand. In the different time periods, the researchers operated the combination of these factors with ordinary least square, fixed effect, random effect, and generalized method of the moment in order to form an equation for life insurance consumption.

## 10. DATA AND METHODOLOGY

Panel data, defined as time series of sections or section data of time series, can also be interpreted as expressing cross-sectional observations made up of units such as firms, countries, and households in terms of time. Among the panel regression models using data sets containing cross-section and time-series combinations, there are many methods such as one-way and two-way fixed effects, random-effects model, and dynamic panel analysis. In this study, one-way fixed effects and random effects models among the mentioned models are used (Bell & Jones, 2015). For the penetration and density of life and non-life insurances in The Organization for Economic Development and Cooperation (OECD) countries consisting of 36 countries, taking into account the annual data between 1996 and 2017, to measure the effects of economic variables on the insurance development of countries and tested with panel data analysis method. Below is a list of countries used in the study.

**Table 10.1 OECD Countries**

Australia	Denmark	Hungary	Korea, Rep.	New Zealand	Spain
Austria	Estonia	Iceland	Latvia	Norway	Sweden
Belgium	Finland	Ireland	Lithuania	Poland	Switzerland
Canada	France	Israel	Luxembourg	Portugal	Turkey
Chile	Germany	Italy	Mexico	Slovak Republic	United Kingdom
Czech Republic	Greece	Japan	Netherlands	Slovenia	United States

In the panel data model, variables are represented with two subscripts expressing both time and cross-section, unlike time series and cross-section data. The fixed-effect model below shows the sub-indices ‘i’ symbolized sections and time symbolized with ‘t’. Moreover, X is the vector of explanatory variables, Y is the dependent variable,  $\beta$  is the slope coefficients,  $\varepsilon$  denotes the error term, and the constant term unit effect is denoted by  $\alpha$ .

$$Y_{i,t} = \alpha_i + \beta_1 X_{i,t} + \varepsilon_{i,t}$$

To determine whether there is a difference between units in the fixed effects model, a group significance test should be done. Under the null hypothesis that the constant term is the same between units, the F statistic is obtained. If the obtained F statistic is greater than the table value, the null hypothesis will be rejected. In this case, it will be accepted that there is a group effect, in other words, there is a difference between units.

Another model to be used in practice is the random-effects model. If the individual effects are not related to the explanatory variables in the model and the fixed terms of the units are randomly distributed according to the units, the structuring of the model should be adjusted accordingly. In random effect models, changes that occur depending on sections and/or time are included in the model as a component of the error term. The reason for this is that the loss of degrees of freedom encountered in fixed-effect models is eliminated in random effect models. In this study, a one-way random effects model is used. In other words, to show ‘i’ sections and ‘t’ time, the model showing that the difference between sections is a component of error terms in the model is estimated. X is the vector of explanatory variables in the model, Y is the dependent variable,  $\beta$  denotes variable coefficients and  $\alpha$  denotes constant.

$$Y_{i,t} = \alpha_i + \beta_1 X_{i,t} + \varepsilon_{i,t}$$

$$\varepsilon_{i,t} = \mu_i + v_{i,t}$$

Here, it is accepted that the error terms are independently and identically distributed such that their variances are equal to zero.  $\mu$  is the error term that includes the unobservable random differences that occur in units, while ‘v’ is the term that includes the remaining errors. Individual error terms expressing the ‘ $\mu$ ’ cross-section effect are not related to each other and the ‘v’ panel error term. From the model, the model consisting of the combination of two error terms under normal distribution assumptions is obtained.

In the table below, the explanations of the dependent and independent variables used in the models and the source information from which these variables are obtained are given. For the dependent variables, the combination of hypotheses formed with independent variables was listed respectively. (1), (2), (3), (4) symbolizes with an order life penetration, non-life penetration, life density, and non-life density equations respectively. These models are inspired by the combination of different studies. In these equations, increasing income is expected to positively affect insurance consumption (Outreville, 1996). High insurance consumption is expected from a low level of foreign participation in the domestic market (Outreville, 1996). Studies have well demonstrated the negative impact of inflation on life insurance demand (Fortune, 1973). Higher demand for insurance products may occur due to uncertainty in regions with a higher share of the urban population (Beck & Webb, 2003). Life expectancy is inverse to death probability, there must be an inverse relationship between life expectancy and insurance consumption (Li, Moshirian, Nguyen, & Wee, 2007). Studies show that as the number of dependents in the household increases, the need for security of households increases, so it shows a direct proportion with insurance consumption and several dependents (Browne & Kim, 1993). Economic freedom brings with it more investment, production, consumption, and therefore a positive relationship is expected between insurance consumption and economic freedom.

**Table 10.2 Data Definitions, Hypotheses, and Sources**

<b>Variables</b>	<b>Definitions</b>	<b>Hypothesis</b>				<b>Source</b>
<b><u>Dependent Variables</u></b>						
Life insurance penetration	Life Insurance Premiums/GDP	(1)				GFDD
Non-Life insurance penetration	Non-Life Insurance Premiums/GDP		(2)			GFDD
Life insurance density	Life Insurance Premiums/Population			(3)		GFDD
Non-Life insurance density	Non-Life Insurance Premiums/Population				(4)	GFDD
<b><u>Independent Variables</u></b>						
GDP per capita	GDP Per Capita (current US\$)	+	+			WDI
Foreign Direct Investment	Foreign direct investment, net inflows (% of GDP)	-	-	-	-	WDI
Inflation	Inflation, consumer prices (annual%)	-	-	-	-	WDI
Urban Population	Urban population (% of the total population)	+	+	+	+	WDI
Life expectancy	Life expectancy at birth, total (years)			-	-	WDI
Dependency Ratio	The age dependency ratio (% of working-age population)	+	+	+	+	WDI
The Economic Freedom Index	Economic Freedom Summary Index	+	+	+	+	*

GFDD=Global Financial Development Database, WDI=World Development Indicators, WGI=World Governance Indicators, \*= The Heritage Foundation and The Wall Street Journal

## **11. INSURANCE DETERMINANTS IN OECD COUNTRIES**

### **11.1. Dependent Variables Explanation**

In this study, the four dependent value hired as penetration and density of life and non-life insurances in The Organization for Economic Development and Cooperation (OECD) countries consisting of 36 countries, taking into account the annual data between 1996 and 2017, to measure the effects of economic variables on the insurance development of countries and tested with panel data analysis method.

#### **11.1.1. Life insurance Penetration**

The first dependent value is life insurance penetration to have a comparative perspective in determining life insurance demand for OECD countries. Life insurance penetration is the life insurance premium ratio on the gross domestic product (GDP). Moreover, this indicator exhibits a share of life insurance activities inside economic capacity. Life insurance penetration is not a perfect indicator of consumption alone because it provides the total life insurance premium. The total premium can be volatile under different circumstances. A total premium may eventuate in high volume under low mortality risk parameters or high price under high mortality risk parameters. Additionally, market regulation and competition can shift life insurance prices, so the total premium is inclined to behave independently from risk parameters. Life insurance penetration takes part in the studies of Beck and Webb (2003), Kjosevski (2012), Alhassan and Biekqe (2015), Zerriaa and Noubbigh (2016), and Zerriaa et al. (2017).

### **11.1.2. Non-Life Insurance Penetration**

The second dependent value is non-life insurance penetration to have a comparative perspective in determining non-life insurance demand for OECD countries. Non-Life insurance penetration is the non-life insurance premium ratio on the gross domestic product (GDP). Additionally, this indicator exhibits a share of non-life insurance activities inside economic capacity. Non-Life insurance penetration is not a perfect indicator of consumption alone because it provides the total non-life insurance premium. The total premium can be volatile under different circumstances. A total premium may eventuate in high volume under low accident risk parameters or high price under high accident risk parameters. Additionally, market regulation and competition can shift non-life insurance prices, so the total premium is inclined to behave independently from risk parameters. Non-Life insurance penetration takes part in the studies of Outreville (1990), Nakata and Sawada (2007), and Feyen et al. (2011).

### **11.1.3. Life insurance Density**

In this study, life insurance density was used as a dependent variable to explain life insurance demand determinants for OECD Counties. Life insurance density described each country's person on average premium spending of life insurance in the constant dollar. In other words, life insurance density calculated life insurance premium divided by the population. The life insurance purchasing decision's motivation is to provide warranted income for income owner dependencies in the income owner's premature death. Risk owners tend to buy more coverage to protect potential risk factors, which will increase the premium of life insurance.

Other higher income levels will need higher death benefits, and their face value will be higher to balance. In this case, life insurance density is assumed to be

income elastic. Life insurance density was hired in former studies by Beck and Webb (2003), Elango and Jones (2011), Kjosevski (2012), Zerriaa and Noubbigh (2016) to define determinants of life insurance.

#### **11.1.4. Non-Life Insurance Density**

Non-life insurance density was used as a dependent variable to explain non-life insurance demand determinants for OECD Countries. Non-Life insurance density described each country's person on average premium spending of life insurance in the constant dollar. In other words, non-life insurance density calculated non-life insurance premium divided by the population. The main motivation for the decision to purchase non-life insurance is to protect assets against various risks that may occur. Therefore, risk owners tend to buy more coverage to protect potential risk factors, which will increase the premium of non-life insurance. The higher asset value will need higher compensation value, and their face value will be higher to balance. In this case, non-life insurance density is assumed to be price elastic. Non-life insurance density was hired in former studies by Park and Lemaire (2012), Huang and Eling (2013), and Dragos (2014) to define determinants of non-life insurance.

#### **11.2. Independent Variables Explanation**

Eight different combinations of independent variables were used to measure life and non-life insurance penetration and densities in The Organization for Economic Development and Cooperation (OECD) countries consisting of 36 countries, taking into account the annual data between 1996 and 2017, to measure the effects of economic variables on the insurance development of countries and tested with panel data analysis method.

### **11.2.1. GDP per capita**

GDP per capita is calculated by dividing the size of the Gross National Product estimated at current prices by the mid-year population estimate, and the result of the Gross National Product Per Capita is obtained. Comparison of the per capita GDP of different countries refers to relative Income of the countries. Developing countries grow rapidly in the first stage of the development process through borrowing based on their future incomes. According to this hypothesis, developing countries with a high growth rate provide a relatively rapid increase in income at the beginning of the process. Based on the findings of the research, it can be said that increasing income is expected to positively affect insurance consumption by increasing the household's economic level. Income takes part the studies of Fortune (1973), Campbell (1980), Lewis (1989), Beenstock, Dickinson, & Khajuria (1986), Truett and Truett (1990), Kim and Brown (1993), Outreville (1996), Beck and Webb (2003).

### **11.2.2. Foreign Direct Investment**

A high level of foreign participation for a country's domestic market can reflect its attractiveness to foreign investors and increase insurance consumption. A low level of foreign participation for the domestic market may also reflect its high competitiveness and possible saturation. Therefore, high insurance consumption is expected from a low level of foreign participation in the domestic market. As a result of these two different propositions, it can be said that there is a U-shaped relationship between the foreign market share in the domestic market and the insurance demand.

Foreign Market Share takes part in Outreville's (1996) study, but in this study, it is presented as a dummy variable to control foreign insurers' presence in emerging markets. In the study of Li et al. (2007), foreign market share has been

used as foreign market share figures, which are defined as the ratio of branches and agencies of foreign-controlled enterprises to the total domestic business based on gross premiums.

### **11.2.3. Inflation**

Inflation is the rise in prices of goods and services, but goods and services may rise or fall over time. Inflation is not only an increase in the price of a particular good or service alone but a continuous increase in the general level of prices. In other words, inflation is not only if some goods' prices increase continuously or the prices of all goods increase once. Inflation is generally calculated by looking at the change in average prices of items in the basket of goods and services over a year. According to the Central Bank information, inflation is calculated with price indices that show the periodic changes in the average prices of selected goods and services in the market.

Many studies have well demonstrated the negative impact of inflation on life insurance demand. Fortune (1973) showed that inflation increased the monetary value of life insurance and turned into a less attractive product for consumers whose purchasing power decreased due to other expenses. Browne and Kim (1993) and Outreville (1996) have created a study showing that expected inflation harms life insurance consumption. Moreover, Babbel (1981), using Brazilian data for inflation, showed that inflation had a detrimental effect on demand for life insurance products.

#### **11.2.4. Urban Population**

The urban population shows the population's percentage within the municipal boundaries of provincial and district centers within the total population. While the rapid increase of the urban population and the expansion of cities accordingly, infrastructure, transportation, housing, industrial area, and energy needs increase; It also brings about environmental problems such as wastewater, noise, air pollution. Urbanization is one of the crucial processes experienced in parallel with industrialization and economic development.

Many factors play a role in the development of urbanization. Examples of these are the effects of mechanization in agriculture, rapid population growth, the attractiveness of cities in business and education, and increased communication and transportation facilities. In general, 75% of the industrialized countries' population live in cities. A crowded population is a potential negative factor for the environment. Alhassan and Biekqe (2015) found a negative relation between life insurance and urbanization in Africa because rural to urban migration can cause unemployment which brings decreasing insurance consumption.

In another point of view, it is thought that a higher level of urbanization may increase the demand for life insurance. Outreville (1996) argued that a concentration of consumers in a geographic area facilitates life insurance distribution. In another aspect, according to Beck and Webb's (2003) study, higher demand for insurance products may occur due to uncertainty in regions with a higher share of the urban population. Since cities' solidarity is low, urbanization encourages community and family members to create an individual living environment. Therefore, other sources of financial security are of increasing value in regions where urbanization is increasing. In this regard, the studies of Hwang and Gao(2003) and Beck and Webb (2003) show that there is a positive relationship between urbanization and life insurance consumption.

### **11.2.5. Life Expectancy at Birth**

Life Expectancy at Birth is the average number of years a newborn is expected to live if s/he is exposed to age-specific mortality rates in a particular period during her/his life. Life expectancy at birth is an indicator of the socioeconomic status and quality of life of countries. It is used to compare the mortality levels of countries and measure their development levels.

Life expectancy at birth indicates the average life expectancy in a society. The average life span varies according to health services' efficiency and socioeconomic level and living conditions. Life expectancy is higher in developed countries. Since life expectancy is inverse to death probability, there must be an inverse relationship between life expectancy and insurance consumption. Life Expectancy at Birth takes part in the studies of Lewis (1989), Kim and Brown (1993), Outreville (1996), Beck and Webb (2003), Li et al. (2007), Ward and Zurbrueg (2002), Zerriaa and Noubbigh (2016).

### **11.2.6. Dependency Ratio**

Population refers to the number of people living in a specified period and within a defined area. The population used to express the number of people is divided into active and dependent populations. Active population is the name given to the number of people working between the ages of 15-64. Looking at the country's unemployment rate will be sufficient to look at the number of working people in the active population. Because every person between the ages of 15-64 cannot find the opportunity to work. A dependent population is a criterion used in the development rate of the country. People who are not of working age, whose livelihood is provided by others, or who cannot work although they are working-age constitute the dependent population. It can be said that the smaller the

dependent population, the more developed the country. The low birth rates can also explain the low dependent population.

According to Campbell (1980) and Burnett and Palmer (1984), the main factor driving the demand for life insurance is the protection of dependents against financial difficulties. In his article, Lewis (1989) emphasizes that life insurance's demand has increased with the expected value of dependents' lifetime consumption. As the number of economic dependents increases in the household, so does the need to protect wage earners from premature death. Most studies use the under 15 and over 64 data set as the proportion of economic addicts to examine population data. In this regard, Beenstock, Dickinson, and Khajuria (1986) and Browne and Kim (1993) found a significant positive relationship in their analysis. Beck and Webb (2003) study the dependence of the elderly (over 64 years) the fact that the young dependency (under 15) has argued that it is more valuable to increase the demand for life insurance. In another study, Zerriaa et al. (2017) noted that dependency ratio assisted the growth of life insurance demand in Tunisia.

#### **11.2.7. The Economic Freedom Index**

The Index of Economic Freedom is a list of agile freedom annually, together with The Heritage Foundation and The Wall Street Journal. Economic freedom refers to the degree to which individuals can make voluntary exchanges. People can exchange their goods, capital, or labor without a founding authority's permission in countries with high economic freedom levels. It can be said that the more uninterrupted this exchange is, the higher the level of economic freedom of the country. This freedom brings with it more investment, production, consumption, and therefore economic growth. In countries where there is economic freedom, individuals are protected but not restricted by the state. The things that affect people's production, investment, and consumption are things that restrict economic freedom. High taxes, too many bureaucratic procedures, foreign trade barriers, not

allowing capital and labor to exchange, etc. many things restrict economic freedom (Olson, 2014).

### 11.3. Model Specification

The four models were created for the penetration and density of life and non-life insurances in The Organization for Economic Development and Cooperation (OECD) countries consisting of 36 countries, taking into account the annual data between 1996 and 2017, to measure the effects of economic variables on the insurance development of countries and tested with panel data analysis method.

$$\begin{aligned} LIPEN_{i,t} &= \alpha_i + \beta_1 \ln GDP_{i,t} + \beta_2 FDI_{i,t} + \beta_3 INF_{i,t} + \beta_4 UR_{i,t} + \beta_5 DEPR_{i,t} + \beta_6 EFI_{i,t} \\ &+ \varepsilon_{i,t} \end{aligned}$$

$$\begin{aligned} NLIPEN_{i,t} &= \alpha_i + \beta_1 \ln GDP_{i,t} + \beta_2 FDI_{i,t} + \beta_3 INF_{i,t} + \beta_4 UR_{i,t} + \beta_5 DEPR_{i,t} + \beta_6 EFI_{i,t} \\ &+ \varepsilon_{i,t} \end{aligned}$$

$$\begin{aligned} \ln LIDEN_{i,t} &= \alpha_i + \beta_1 LEAB_{i,t} + \beta_2 FDI_{i,t} + \beta_3 INF_{i,t} + \beta_4 UR_{i,t} + \beta_5 DEPR_{i,t} + \beta_6 EFI_{i,t} \\ &+ \varepsilon_{i,t} \end{aligned}$$

$$\begin{aligned} \ln NLIDEN_{i,t} &= \alpha_i + \beta_1 LEAB_{i,t} + \beta_2 FDI_{i,t} + \beta_3 INF_{i,t} + \beta_4 UR_{i,t} + \beta_5 DEPR_{i,t} + \beta_6 EFI_{i,t} \\ &+ \varepsilon_{i,t} \end{aligned}$$

In these equations, there are four dependent values. LIPEN represents the life insurance penetration. LIDEN represents the life insurance density. NLIPEN represents the non-life insurance penetration. NLIDEN represents the non-life insurance density. These four equations have eight independent values. GDP is the gross domestic price per capita in the current US\$. LEAB is life expectancy at birth

in total years. FDI is the percentage of GDP for foreign direct investment net inflows. INF is inflation for consumer prices in annual percentage. UR is the Urban population in the percentage of the total population. DEPR is the age dependency ratio in the percentage of the working-age population. EFI is the overall score of the economic freedom index and  $\varepsilon$  is the error landmark. In the equations, ‘i’ means country and ‘t’ means year, and the constant term unit effect is denoted by  $\alpha$ . Considering the following descriptive statistics, some very large independent variables are used in the models by taking their natural logarithm. In other words, GDP, LIDEN, and NLIDEN arguments are used with the natural logarithm.

**Table 11.1 Descriptive Statistics**

Var.	Min	1st Q	Median	Mean	3rd Q	Max	Std.	Ske w	Kurtosi s	NA
LIPEN	0.003	1.049	2.543	3.048	4.674	18.074	2.492	1.4	3.2	9
NLIPEN	0.002	1.469	1.887	1.904	2.314	4.998	0.687	0.6	2.0	9
LIDEN	0.333	150.0	733.1	1,119	1,633	9,139	1,185	1.6	3.7	9
NLIDEN	0.299	207.8	580.1	641.1	935.5	3,903	503.3	1.2	3.4	9
GDP	2,327	14,330	27,215	30,949	43,070	118,824	20,941	1.2	2.1	-
LEAB	67.57	76.41	78.86	78.30	80.90	84.10	3.276	(0.8)	0.0	-
FDI	(58.32)	1.318	2.808	5.23	5.49	86.59	9.840	3.4	23.0	6
INF	(4.478)	1.155	2.188	3.44	3.53	85.67	7.030	8.1	79.0	-
UR	50.65	67.94	77.45	75.97	84.81	97.96	11.18	(0.3)	(0.6)	-
DEPR	36.21	46.95	49.76	49.92	52.82	69.35	5.256	0.3	1.0	-
EFI	49.70	64.70	69.80	69.79	75.30	83.70	6.911	(0.2)	(0.6)	1

LIPEN: Life Insurance Penetration, NLIPEN: Non-Life Insurance Penetration, LIDEN: Life Insurance Density, NLIDEN: Non-Life Insurance Density, GDP: Income, LEAB: Life Expectancy at Birth, FDI: Foreign Market Share, INF: Inflation, UR: Urban, DEPR: Dependency Ratio, EFI: The Economic Freedom Index

**Table 11.2 Correlation Matrix**

Corr.	LIPEN	NLIPEN	LIDEN	NLIDEN	GDP	LEAB	FDI	INF	UR	DEPR	EFI
LIPEN	1.000	0.539	0.841	0.429	0.351	0.434	0.050	-0.245	0.242	0.030	0.305
NLIPEN	0.539	1.000	0.436	0.656	0.375	0.417	-0.041	-0.260	0.203	-0.233	0.359
LIDEN	0.841	0.436	1.000	0.698	0.708	0.535	0.148	-0.235	0.297	0.112	0.434
NLIDEN	0.429	0.656	0.698	1.000	0.910	0.619	0.128	-0.250	0.385	0.020	0.528
GDP	0.351	0.375	0.708	0.910	1.000	0.686	0.217	-0.274	0.403	0.098	0.494
LEAB	0.434	0.417	0.535	0.619	0.686	1.000	0.032	-0.470	0.469	0.161	0.366
FDI	0.050	-0.041	0.148	0.128	0.217	0.032	1.000	-0.051	0.098	-0.059	0.153
INF	-0.245	-0.260	-0.235	-0.250	-0.274	-0.470	-0.051	1.000	-0.172	0.150	-0.274
UR	0.242	0.203	0.297	0.385	0.403	0.469	0.098	-0.172	1.000	0.395	0.414
DEPR	0.030	-0.233	0.112	0.020	0.098	0.161	-0.059	0.150	0.395	1.000	-0.058
EFI	0.305	0.359	0.434	0.528	0.494	0.366	0.153	-0.274	0.414	-0.058	1.000

LIPEN: Life Insurance Penetration, NLIPEN: Non-Life Insurance Penetration, LIDEN: Life Insurance Density, NLIDEN: Non-Life Insurance Density, GDP: Income, LEAB: Life Expectancy at Birth, FDI: Foreign Market Share, INF: Inflation, UR: Urban, DEPR: Dependency Ratio, EFI: The Economic Freedom Index

The correlation matrix, similar to the covariance matrix, reveals the relationships of the variables with each other. Unlike the covariance matrix, the size of the numbers gains importance in addition to the signs in the correlation matrix. In other words, the number values in the covariance matrix cannot be interpreted, but by looking at the sign, it is decided whether the ratio between the variables is inverse or correct. In the correlation matrix, a value between -1 and 1 is given for every two vectors' relationship. If this value is close to 1, it is said that there is a strong direct ratio between the two data vectors whose correlation is examined, and a strong inverse ratio if it is close to -1. If the correlation value is close to 0, there is no linear relationship between the data. From this perspective, the table above shows that there is a high correlation between GDP and LEAB. In addition, LIDEN and NLIDEN also show a high correlation with GDP. Therefore, it would be more appropriate to use LEAB instead of GDP when constructing LIDEN and NLIDEN models.

## 12. MODEL RESULTS AND DISCUSSION

In the panel data analysis method, according to the assumptions regarding the constant term, slope coefficient, and error term; the method of estimation also differs. According to the different assumptions made, the "fixed effects model" or "random effects model" is preferred in panel data analysis. The general approach is to use the fixed effects model and the random-effects model that in cases where all members of a particular group are included in the model, the fixed effects model is recommended for example, for a model that includes all OECD countries (Hawtreya & Liangb, 2008). The random-effects model is recommended for other cases. Although this approach has an intuitive nature, the "Hausman test" is generally used to make a healthier choice between both models.

In panel data analysis, the Hausman test is utilizable to differentiate between the fixed effects model and random effects model (Arellano, 1993). The fixed-effects model is a frequently used model that has desirable features in terms of statistical properties in panel data. However, if the random-effects model gives more effective results than the fixed effects model, the random-effects model should be used. Therefore, it may be necessary to identify the more effective between two models, both of which are consistent but differ in ineffectiveness. In the literature, this efficiency test, in other words, the Hausman test, which fits the chi-square distribution with  $k$  degrees of freedom, is used to choose between the fixed effects model and the random-effects model. For this purpose, the 4 different regressions were evaluated for the fixed effects model and the random-effects model.

**Table 12.1 Hausman Test**

	(1) LIPEN	(2) NLIPEN	(3) lnLIDEN	(4) lnNLIDEN
Chi-square	423.76	175.09	134.34	97.8
df	6	6	6	6
p-value	< 2.2e-16 **	< 2.2e-16**	< 2.2e-16**	< 2.2e-16**

\*\*5% significance level; (1) Life Insurance Penetration, (2) Non-Life Insurance Penetration, (3) Natural Logarithm of Life Insurance Density, (4) Natural Logarithm of Non-Life Insurance Density

In the Hausman test, the rejection of the null hypothesis shows that the coefficients obtained from the random-effects model and the coefficients obtained from the fixed effects model are the same and that the fixed effects model cannot be rejected. In the above, the Hausman test, the p-value for all models are significant then fixed effect is appropriate to use instead of random effect for these models.

In addition to the basic assumptions, some assumptions are made when the fixed effects estimation method within the group is used from the unbalanced panel data. The reason for encountering unbalanced panel datasets is data deficiencies that occur randomly. For example, the desired date cannot be observed for the unit country in some years, or some observations are not disclosed because some data are of strategic importance for the countries, and countries do not share them with the public within the scope of state secrets.

**Table 12.2 Determinants of Life and Non-Life Insurance Consumption**

Variable	Fixed Effect			
	(1) LIPEN	(2) NLIPEN	(3) LIDEN	(4) NLIDEN
<b>Log GDP</b>	1.5346*** (0.1384)	0.5394*** (0.0328)	-	-
<b>LEAB</b>		-	0.4076*** (0.0157)	0.2513*** (0.0101)
<b>FDI</b>	-0.0076 (0.0083)	-0.0104*** (0.002)	0.0138*** (0.0039)	0.0054** (0.0025)
<b>INF</b>	-0.0241* (0.0129)	0.0013 (0.0031)	-0.0225*** (0.0062)	-0.0060 (0.004)
<b>UR</b>	0.0033 (0.0092)	0.0056** (0.0022)	-0.0162*** (0.0044)	-0.0053* (0.0029)
<b>DEPR</b>	0.0038 (0.0178)	-0.0438*** (0.0042)	0.0005 (0.0083)	-0.0124** (0.0053)
<b>EFI</b>	0.0296** (0.0143)	0.0084** (0.0034)	0.0502*** (0.0063)	0.0427*** (0.0041)
<b>R<sup>2</sup></b>	0.26459	0.45191	0.63965	0.63875
<b>Adjusted R<sup>2</sup></b>	0.22351	0.4213	0.61953	0.61857
<b>F-statistic</b>	44.014 on 6 and 734 DF	100.867 on 6 and 734 DF	217.156 on 6 and 734 DF	216.302 on 6 and 734 DF
<b>p-value</b>	< 2.22e-16	< 2.22e-16	< 2.22e-16	< 2.22e-16
<b>Countries</b>	36	36	36	36
<b>Observations</b>	776	776	776	776

\*\*\* %1 significance level, \*\* 5% significance level, \*10% significance level; (1) Life Insurance Penetration, (2) Non-Life Insurance Penetration, (3) Natural Logarithm of Life Insurance Density, (4) Natural Logarithm of Non-Life Insurance Density

Note: Augmented Dickey-Fuller unit root test was applied and the variables were observed as stationary.

R-squared is a measure by which input variables explain the variance of the predicted variable. Variance is a measure in statistics that determines how far apart points are from each other, in other words, it is defined as the mean of the squares of the differences between the individual point and the expected value. R-Square is a relative term related to the model. The closer the R squared value is to 1, the more it explains the variability of the response data around the mean. A high R-Squared value does not always mean a model is good or bad. For example, the increase in the number of explanatory variables in the regression analysis also increases the R-square criterion of the model. Therefore, it will be more appropriate to evaluate the performance of the model in the adjusted r-square in regression analysis. The

absence of a high numerical difference between the classical and corrected values for R-square indicates that there is no problem in the estimated regression model. The p-value of the models is statistically significant.

In the first model, three independent variables for fixed effects provided significant results for life insurance penetration. These independent variables are Log GDP, INF, and EFI. Based on these results, consumer price inflation harms life insurance consumption in OECD countries. Moreover, this result for inflation is consistent with the results of Browne and Kim (1993) and Outreville (1996). GDP Per Capita and economic freedom are directly proportional to life insurance demand. As Beck and Webb (2003) mentioned, GDP per capita is a good predictor for life insurance. Fortune (1973) showed that income is a beneficial factor in the sale of life insurance. Thus, it is supported that it has a positive effect on GDP per capita life insurance penetration as a factor reflecting income. On the other side of the coin, three independent variables for fixed effect give insignificant results for life insurance penetration. They are FDI, UR, and DEPR. This means that foreign direct investment, urban population ratio, and the age dependency ratio do not have an impact on the demand for life insurance for OECD countries.

In the second model, five independent variables for fixed effect gave significant results for non-life insurance penetration. These independent variables are Log GDP, FDI, UR, DEPR, and EFI. With these results, foreign direct investment, and the age dependency ratio hurt non-life insurance consumption. Li et al. (2007) mentioned in their study that foreign capital increases the demand for life insurance, but it is observed in the model that there is a significant negative effect for non-life insurance penetration. In the article of Zerriaa et al. (2017) dependency ratio projected growth of life insurance demand in Tunisia however for the non-life penetration model dependency ratio provided a strong negative relation. GDP Per Capita, urban population, and economic freedom have a positive relation with non-life insurance demand. As demonstrated in the Outreville (1990) article, the GDP per capita model, which is an indicator of financial development, has a positive effect on the penetration of non-life insurances. Also, Zerriaa et al. (2017) reveal that the urban population has a positive impact on non-life insurance

penetration as well as life insurance. From another point of view, INF gives insignificant results for non-life insurance penetration for both fixed and random-effects models. In other words, consumer price inflation does not have an impact on the demand for non-life insurance.

In the third model, five independent variables for fixed effect generated significant results for life insurance density. These independent variables are LEAB, FDI, INF, UR, and EFI. In these results, consumer prices inflation, and urban population ratio are inverse proportional with life insurance density. Contrary to the claim made for the MENA region in the study of Zerriaa and Noubbigh (2016), inflation has a non-positive effect on life insurance density for OECD countries. In addition, in parallel with Alhassan and Biekqe (2015), it has been observed that the increase in the city population has a reducing effect on the life insurance density in OECD countries. Life expectancy, foreign direct investment, and economic freedom have a positive impact on life insurance density. In line with the leadership of Ward and Zurbrueg (2002) study, it can be observed with this model that there is a strong correlation between life insurance and life expectancy. In the life insurance density equation supporting the study of Li et al. (2007), it is observed that foreign direct investments play a statistically significant incentive role. Additionally, DEPR gives insignificant results for life insurance density in both fixed and random-effects models. The meaning of this is that the age dependency ratio does not affect the demand for life insurance density.

In the fourth model, five independent variables for fixed effect provided significant results for non-life insurance density. These independent variables are LEAB, FDI, DEPR, UR, and EFI. Based on these results, the age dependency ratio and urban population ratio driving down the non-life insurance density. Urbanization is an important factor for the density of non-life insurance, as sheds light on the study of Dragos (2014), as well as being a negative factor in this model. As a supporter of the result from the model, Zerriaa and Noubbigh (2016) mentioned a negative relationship between dependent ratio and insurance density. Life expectancy, foreign direct investment, and economic freedom are directly

proportional to non-life insurance density. Browne and Kim (1993) showed in their study that life expectancy is not an important determinant for life insurance, but contrary to this finding, the fourth model shows that life expectancy is an important statistical factor for non-life insurance and has a positive effect on the consumption of non-life insurance. Outreville (1996) showed that foreign investment is not a significant factor in life insurance, but when we look at foreign investment from the non-life insurance side, it is observed that it is a statistically significant positive driver. Lastly, consumer price inflation for fixed effect results insignificant for non-life insurance density. This means that consumer price inflation does not influence the non-life insurance density.

## CONCLUSIONS

This study examines the determinants of life and non-life insurance demand in OECD countries for 1995-2017, with a sample of 36 countries. Two indicators of life and non-life insurance were used and tested with panel data analysis method: insurance density and penetration. Consistent with previous studies, we find that the GDP per capita and the economic freedom driven up life insurance penetration when consumer price inflation drags down. For the non-life insurance penetration foreign direct investment, and age dependency is significant negative influence while GDP per capita, urban population and the economic freedom significant positive impact. In the life insurance density life expectancy, foreign direct investment, and economic freedom lead to a rising trend but consumer price inflation, and urban population ratio leads to a downtrend. It has been observed that the dependency ratio does not carry a statistically significant burden on the life insurance side. For non-life insurance density, the age dependency ratio and urban population ratio have a negative effect whereas life expectancy, foreign direct investment, and economic freedom provide positive support. Consumer price inflation does not seem to have a significant effect on non-life insurance demand in OECD countries. This study raises the idea that cooperation between banking and insurance industries, known as bancassurance, can help spread life insurance awareness and non-life insurance to a broader population. In a nutshell with this research, the determinants of the consumption of life and non-life insurance in OECD countries were tried to be revealed and the effects of these determinants were tried to be defined. Thus, efforts were made to assist in determining the insurance sector and indirectly the economic development moves. Since the economic freedom index is used in this study, institutional factors are not included much. In future studies, the institutional factors can be diversified and the study can be carried to a further point.

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