

EFFECTS OF ECONOMIC CRISES AFTER 1990 ON THE TURKISH
INSURANCE SECTOR

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PELIN ÖZBEK

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Approval of the Graduate School of Social Sciences

Prof. Dr. Melahat Altunışık
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. Nadir Öcal
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Assist. Prof. Dr. Esma Gaygısız
Supervisor

Examining Committee Members

Prof. Dr. Erdal Özmen	(METU,ECON)	_____
Assist. Prof. Dr. Esma Gaygısız	(METU,ECON)	_____
Dr. Hande Ayaydın	(METU,BA)	_____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name : Pelin ÖZBEK

Signature : 

ABSTRACT

EFFECTS OF ECONOMIC CRISES AFTER 1990 ON THE TURKISH INSURANCE SECTOR

Özbek, Pelin

M.S., Department of Economics

Supervisor: Assist. Prof. Dr. Esma Gaygısız

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In this thesis, effects of economic crises after 1990 on the Turkish insurance sector are analyzed with special emphasis on 1994, 2001 and 2008 crises. In the first step, EGARCH model is used to measure the exchange rate uncertainty. Then, a time series model for the aggregate analysis and a panel data model for the disaggregate analysis which both include the estimated exchange rate uncertainty together with other macroeconomic and firm specific variables are set up. The results indicate that aggregate and disaggregate analyses suggest different variables in explaining the premium production which is used as a proxy for the performance of the insurance sector. Nevertheless, the common conclusion was that the growth of premium production decelerates during the crisis periods at a varying degree depending on the year of crisis. 2001 crisis is found to be the crisis which has the most detrimental impact on the Turkish insurance sector. On the other hand, effects of the 2008 crisis are found to be relatively limited.

Keywords: Insurance; Economic Crisis; Exchange Rate Uncertainty; EGARCH;
Panel Data

ÖZ

1990 SONRASI EKONOMİK KRİZLERİN TÜRK SIGORTACILIK SEKTÖRÜNE ETKİLERİ

Özbek, Pelin

Yüksek Lisans, Ekonomi Bölümü

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Bu tezde, 1990 sonrası ekonomik krizlerin Türk sigortacılık sektörüne etkileri özellikle 1994, 2001 ve 2008 krizlerine vurgu yapılarak analiz edilmiştir. İlk aşamada döviz kuru belirsizliğini ölçmek için EGARCH modeli kullanılmıştır. Daha sonra, diğer makroekonomik ve firmaya özel değişkenlerle birlikte, tahmin edilen döviz kuru belirsizliğini de içeren toplulaştırılmış analiz için bir zaman serisi modeli, ayırtırılmış analiz için ise bir panel veri modeli kurulmuştur. Sonuçlar toplulaştırılmış ve ayırtırılmış analizlerin sigortacılık sektörünün performansını temsil etmekte kullanılan prim üretimini açıklamada farklı değişkenler önerdiklerini göstermektedir. Bununla birlikte, ortak sonuç kriz dönemlerinde prim üretiminin büyümesinin kriz yılina bağlı olarak değişen oranlarda yavaşlığıdır. 2001 krizinin Türk sigortacılık sektörü üzerinde en zararlı etkiye sahip kriz olduğu; diğer taraftan, 2008 krizinin etkilerinin ise görece sınırlı olduğu bulunmuştur.

Anahtar Kelimeler: Sigortacılık; Ekonomik Kriz; Döviz Kuru Belirsizliği; EGARCH; Panel Veri

To My Husband and My Family

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CHAPTER 1

INTRODUCTION

Economic crises can stem from either the internal dynamics of the economy or contaminate the economy though they are originated from external sources. The recent economic crisis of 2008 showed that a sudden deterioration in the economic balances can emerge for any reason and its unpredictably pervasive impacts can capture the whole financial system. Especially in a world of high globalization and interconnectedness it is not always possible to be isolated from such negative externalities. Besides the external developments, internal dynamics of the economy can be to the same extent responsible for the emergence of economic crises. Unsustainable economic policies, chronic defects in the structure of the economy, insufficient and short sighted measures can bring the economy to the edge of an economic crisis. In general, such crises are associated with recession, lowered income, difficulties in rolling over the public and private sector debt and long lasting volatility and uncertainty in the economy.

Turkish economy witnessed three major economic crises after 1990 which had a profound impact on the economy as a whole. In different sectors of the economy their impact were felt in varying degrees. Within the financial system, banks can be said to be relatively more influenced by the 1994 and 2001 crises. However the impact of the 2008 crisis was limited compared to previous ones.

Insurance sector is also an important component of the financial system with its special role in providing risk transfer, increasing savings, compensating the losses and contributing to the economic growth. Undoubtedly, economic crises have

repercussions in this sector as any other sector in the economy. Especially due to the decreased level of purchasing power of the agents in the economy, a fall in the business volume of insurance companies was inevitable during the crisis periods. Moreover, their links with the rest of the world through reinsurance and rising share of foreign capital in the sector increased the vulnerability of the sector to external shocks. On the other hand, as an extension of the distinct feature of the business conducted in the insurance sector, liquidity concerns were not as alarming as in the banking sector. On top of that, with regards to the 2008 crisis, the lack of complex financial instruments related with mortgage securities, collateralized debt obligations and monoline insurance, the sector was not affected by the crisis as its counterparts in the world and therefore it was not at the core of the crisis.

Despite its importance, studies with regards to the effects of the economic crises on the Turkish insurance sector lack an empirical backing and comprehensive research. Most studies focus on the effects of the 2008 crisis and address the issue in a qualitative framework. On the other hand, it is essential to examine the reflections of the economic crises in a quantitative manner as well and expand the study to cover more than one crisis period. From this point of view, this thesis fills this gap in the sense that it includes both quantitative analysis and covers three economic crises affecting Turkish economy after 1990. The thesis is organized in the following way: In Chapter 2 a general overview of the insurance sector is presented, while in Chapter 3 characteristics of the Turkish insurance sector constitutes the main focus. In Chapter 4 specific attention is given to the economic crises and their impacts on the insurance sector. Chapter 5 focuses on the empirical analyses of the performance of the insurance sector in Turkey and the impacts of economic crises and in Chapter 8 some concluding remarks are presented.

CHAPTER 2

GENERAL OVERVIEW OF INSURANCE

2.1 INTRODUCTION

Throughout the history human beings have been exposed to different and numerous kinds of risks, dangers and hazards which threaten their lives, properties and people around them. Furthermore, there is always an uncertainty associated with future. Under these circumstances the motive for the humans arises naturally to protect themselves from potential risks and hedge against the uncertain events in the future. Insurance is one of the most appropriate and rational ways to serve the need of protection of the lives and properties against these uncertainties and dangers (“*Sigortacılıkla İlgili Temel Bilgiler*”, 1996).

Insurance sector is one of the most important components of the financial sector with its unique characteristics and significance both at the individual and country level. Apart from its primary function as to absorb the risk and compensate the losses in return for a certain price, in modern times it has become a major source of saving and fund creation. According to the Sigma report of the Swiss Re (2010) worldwide insurance premiums in 2009 amounted to approximately 4 billion USD. Even only this figure indicates the status and size of the insurance sector in the world economy. Although in the developing countries there is a long way to take in terms of progress and awareness, its necessity and importance has already been appreciated in the developed countries.

In this chapter, the concept of insurance, its principles, the way how it works and its role in the economy will be dealt with. Such a general overview of insurance is

expected to provide a better understanding of the response of the insurance sector to the economic crises.

2.2 WHAT IS INSURANCE?

“Insurance is an arrangement by which one party (the insurer) promises to pay another party (the insured or policyholder) a sum of money if something happens which causes the insured to suffer a financial loss. The responsibility for paying such losses is then transferred from the policyholder to the insurer. In return for accepting the burden of paying for losses when they occur, the insurer charges the insured a price, the insurance premium” (Diacon & Carter, 1992, p. 1).

“Insurance works because the insurer can collect premiums from a group of people in similar circumstances, not all of whom will suffer losses in any one year. These premiums are then pooled together, and used by the insurer to pay losses” (Diacon & Carter, 1992, p. 2).

Insurable interest can be one of the followings; property, life or liability. Insurance contracts in the property insurance, guarantee to provide compensation in the case of the materialization of the risk which violates the interest of the insured. Insurance contracts in the life insurance on the other hand, commit to pay an amount in the case of materialization of some possibilities regarding the life of the insured such as death, survival, marriage and birth. Liability insurances provide assurance against a possible reduction in the wealth of the insured as a result of the damages that may be given to the third parties (SEGEM, 2009).

In this context, components of insurance can be listed as follows; premium, interest of the insured measurable in monetary terms, incidental risk which gives birth to economic results and material damage or loss (SEGEM, 2009). Insurance can never be a medium of enrichment. The rationale behind it is to compensate the loss and in this sense to replace and bring the object to its pre-damage condition.

2.3 PRINCIPLES OF INSURANCE

“In order for a risk to be covered by insurance, it must generally meet at least four conditions: measurable in monetary terms, pure risks only (excludes speculative risks), a large number of independent exposures and fortuitous losses” (Diacon & Carter, 1992, p. 8). “Elements of insurance are the accidental occurrence of the damage, the gathering of many similar units which are under a specific threat to the same extent, the possibility of comprehension of the damage statistically (its measurable nature) and the possibility of the measurement of the damage occurred” (Türengül, 2007, p. 28). There are 5 principles of insurance: existence of an insurable interest, utmost good faith, indemnity, subrogation and close cause (SEGEM, 2009).

Existence of an insurable interest which can be measured in monetary terms is a must for the insurance. If there is no insurable interest which is measurable in monetary units, there is no validity of the insurance contract.

The access of the insurer to all of the information concerning the insurable interest of the every applicant is theoretically impossible. For this reason, in order an insurance contract to be made, essential elements regarding the insurable interest must be forwarded to the insurer in a true and correct manner. Likewise, the person who brokered the insurance contract must notify the insurer the correct and complete information regarding the insurance and insurer to the insured. Therefore utmost good faith is also a prerequisite for insurance.

The principle of indemnity is valid for the entire property and liability insurances except life and personal accident.

Subrogation is the principle that operates when third parties are involved in the sufferance of the insured. After paying the compensation the insurer legally replaces the insured and demands a portion of the paid claim at the rate of fault of the counterparty. If the insured has a right to sue the third parties due to the incurred loss, this right transfers to the insurer at the rate of paid claim. By this way, the

insurer does not obtain ill gotten gains by taking double indemnity both from the insurer and the third party.

In order the incurred risk to be compensated by the insurer, the cause of the risk should be covered in the guarantee determined in the general and special clauses.

2.4 THE ROLE OF INSURANCE IN THE ECONOMY

Insurance plays a significant role in the economic life of every country since it transfers risk, influences losses and makes investment to funds (Diacon & Carter, 1992). “Insurance companies are major institutional investors supplying long-term capital for government and industry” (Diacon & Carter, 1992, p. 272). Insurance affects the balance of payments. Either through opening a branch office, setting up a subsidiary or associated company in a foreign country or accepting insurances from the resident of another country it affects its economic relations with the rest of the world (Diacon & Carter, 1992). “Insurance business tends to be more closely supervised by governments than most other industries are. This arises from the special nature of insurance contracts that is their promissory and aleatory nature and complexity” (Diacon & Carter, 1992, p. 239).

Insurance sector is an important part of the financial system. Moreover it is a complementary part of the social security. From the insured’s perspective, insurance provides confidence, encourages taking precautions against a possible loss and is an important saving instrument. From a national perspective, insurance enables capital accumulation in an economy, contributes to the balance of payments and affects income distribution in a positive way (“*Sigortacılıkla İlgili Temel Bilgiler*”, 1996). One of the most important functions of the insurance is that it is a source of saving. A proportion of the insurance premium paid by the policyholders is kept as coverage or technical reserve by the insurance companies. The rest is used to buy real estate or securities and cause funds to accumulate and hence constitutes a source for their investment.

Insurance also motivates investors. Entrepreneurs’ decisions are affected in a positive way since with the reduced risk and confidence provided by the insurance

they can invest to new lines of business (“*Sigortacılıkla İlgili Temel Bilgiler*”, 1996). For the entrepreneur cost of capital is a vital issue. Scarcity of loanable funds causes interest rates to be high. Insurance companies not only invest directly through their accumulated saving potential but also while contributing to the investors via loans or purchase of shares and bonds and increase money supply. Increase in the saving funds that can be transferred to investment reduces interest rate and enables entrepreneurs to find cheap investment capital.

Haiss and Sümegi (2006) draws the attention to the fact that “by reducing uncertainty and volatility, insurance companies smoothen the economic cycle and reduce the impact of crisis situations on the micro and aggregate macro level” (p. 4).

“The evidence suggests that insurance contributes materially to economic growth by improving the investment climate and promoting a more efficient mix of activities than would be undertaken in the absence of risk management instruments” (Brainard, 2008, p. 1). Das et al. (2003) suggest that (as cited in Impavido & Tower, 2009) “by transferring risks from the corporate and household sectors, insurance markets facilitate economic activity that could otherwise expose parties to unacceptable risk of loss” (p. 5).

2.5 CONCLUSION

In this chapter a general overview of the insurance was presented with specific emphasis on its definition, scope, principles and role in the economy. The most remarking conclusion of this chapter is that as an effective method of risk management and loss compensation, insurance is vital for a well developed financial sector and economy.

In the organization of the thesis this chapter has a crucial role in terms of providing an initial layout to the affected term in the cause and effect analysis since without presenting such a background of the analyzed variables, the cause and effect analysis will be incomplete.

In the following chapter the focus will shift to the characteristics of the Turkish insurance sector with a motive to figure out the distinguished features of the Turkish insurance sector which determine its response to the economic crises.

CHAPTER 3

CHARACTERISTICS OF TURKISH INSURANCE

SECTOR

3.1 INTRODUCTION

Turkish insurance sector occupies only 3.2% share in the financial sector in terms of asset size in 2009 (BRSA, 2010) which is a significant indicator of both the relatively low volume of services provided by the sector and at the same time its growth potential. Although when compared with developed countries the level of maturity of the sector is not so high, especially within the last several years it showed a great improvement. Entry of the Insurance Law No: 5684 into force is one of the most radical changes in the sector from the legislative perspective. The framework of the new law is in conformity with the EU Directives so the legislation and practices in the Turkish insurance sector is to a great extent harmonized with EU acquis.

After reviewing the concept of insurance in the previous chapter, general characteristics of the Turkish insurance sector will be depicted in this chapter with special emphasis on Turkish insurance law, actors in the sector, foreign capital structure of the sector, main insurance indicators, intermediaries and investment portfolio of the insurance sector. Moreover, Turkey's rank in the world in terms of premium production, insurance penetration and density will be depicted in order to show its relative position.

Since features specific to Turkish insurance sector determine the degree of impact of the crises, this chapter will provide an insight to the insurance sector in Turkey with a motive to explore these features.

3.2 HISTORY OF TURKISH INSURANCE SECTOR

In Turkey, the roots of the insurance sector dates back to 1870s in which foreign companies were dominating. On July 12, 1900 a professional organization with the name of “Syndicate of Fire Insurance Companies Operating in İstanbul” was formed by 44 foreign companies at the TEUTONIA Hall in Beyoğlu (TSRŞB, 2008).

Insurance in its modern concept, taking its roots back from 17th century and taking significant steps in 19th century could only demonstrate a significant progress after the establishment of the Republic (Çipil, 2003). As Çipil (2003) proposes, Turkish insurance sector can be examined through three major periods from a historical perspective: Regulation period from the declaration of the Republic to 1960s, stationary period where entries to and exits from the sector are poor till 1980s and revolutionary period that gained pace with the liberalization trend and still continue.

During the Ottoman period the sector which was completely under the foreign dominance witnessed domestic company establishments with the nationalization efforts after declaration of the Republic (SEGEM, 2009). In 1925, 1929, 1935 and 1942 new companies with domestic capital were established. From this period to 1980s although there was a relative increase in the premium production, in general the insurance sector was a closed sector (Çipil, 2003). After 1980s, especially intensified liberalization practices in the financial services sectors, fueled the insurance sector as well. Nevertheless, with the economic crises a reduction in the number of insurance companies was also observed. For instance the number of insurance companies which was 69 in 1998 fell to 55 in 2003 (Çipil, 2003). Except 2001 and 1994, growth trend of the insurance sector in TL had surpassed the inflation rate and in USD it always had an increasing momentum.

Until 1990, Turkish insurance sector was a tariffed sector; however same year in parallel with the liberalization of the Turkish economy tariff system in the elementary branches except motor vehicles traffic insurance was abandoned (Ege, 2007).

In 1959 Insurance Supervision Law No: 7397 entered into force. In 2001 Individual Pension Savings and Investment System Law was accepted. “With the coming into force of Insurance Law No: 5684, published in the Official Gazette on June 14 2007, the Turkish insurance sector has gone through one of its busiest periods in terms of legislation in 2007. Through 2008, work has been conducted mostly on secondary legislation on new definitions and implementive measures which have been brought to the agenda with the new Insurance Law” (TSR\$B, 2008, p. 3). Insurance legislation in Turkey is to a great extent in conformity with the EU acquis and international standards. The insurance sector is to a certain extent compliant with IAIS (International Association of Insurance Supervisors) insurance core principles, and regarding accounting standards, IFRS (International Financial Reporting Standards) is implemented on a large scale.

3.3 GENERAL INFORMATION ON THE TURKISH INSURANCE SECTOR

According to a report by Gül and Gün (2009) there was an approximately 25% growth in the Turkish insurance market in each of the last seven years. In spite of this fact, share and effectiveness of the insurance sector in the financial sector is still relatively low. One of the most important reasons of the failure of the insurance sector to reach to an intended level of share in the financial sector is the chronic inflation. Inflation reduces the technical profitability of the sector. In an inflationary environment companies prefer to keep their profits in the company since cost of new capital rises with the inflation (Köse & Tunay, 1998).

In terms of total premiums received, Turkish insurance sector can be considered to be at a moderate state in the world. According to the Sigma report of the Swiss Re (2009) among 87 countries in the world it is the 38th country. Countries with the highest amount of premiums received are mostly industrialized countries in which

financial sector is highly developed. The first five of these are USA, Japan, Great Britain, France and Germany. Furthermore total premiums received by these five countries correspond to 61% of the world's total. When compared with these countries, it can be said that Turkish insurance sector achieved a low level of development with its share of only 0.19% in the world.

Table 1 Premiums Received in Countries (2009)

Country	<i>Total Premiums Received</i>			<i>Non – Life</i>			<i>Life</i>		
	Premiums (Million\$)	Share (%)	Growth (%)	Premiums (Million\$)	Share (%)	Growth (%)	Premiums (Million\$)	Share (%)	Growth (%)
1. USA	1,139,746	28.03	-8.07	647,401	37.32	-2.10	492,345	21.12	-14.90
2. Japan	505,956	12.44	4.73	106,856	6.16	3.70	399,100	17.12	5.00
3. Great Britain	309,241	7.61	-21.84	91,560	5.28	-16.40	217,681	9.34	-23.90
4. France	283,070	6.96	2.61	88,993	5.13	-4.30	194,077	8.32	6.10
5. Germany	238,366	5.86	-1.48	126,591	7.30	-4.00	111,775	4.79	1.50
38. Turkey	7,853	0.19	-11.55	6,704	0.39	-12.7	1,148	0.05	-4.00
OECD	3,466,714	85.26	-2.00	1,491,240	85.97	-0.70	1,975,474	84.73	-3.20
G7	2,744,580	67.50	-2.40	1,170,656	67.49	-1.30	1,573,924	67.51	-3.20
NAFTA	1,255,938	30.89	-6.90	712,249	41.06	-1.30	543,690	23.32	-13.30
EU (27)	1,481,834	36.44	2.20	575,050	33.15	-0.70	906,784	38.89	3.50
ASEAN	44,669	1.10	3.20	16,417	0.95	5.30	28,252	1.21	2.00
World's Total	4,066,095	100	-1.10	1,734,529	100	-0.8	2,331,566	100	-2.00

Source: SIGMA-Swiss Re- 2/2010

Another indicator used to depict the relative position of the countries in the world is insurance density which is measured by premiums per capita. Turkey's rank in the world implies a huge gap between Turkey and developed countries. However this gap signifies the growth potential of the sector at the same time. Since the market is not saturated it still offers opportunities of profit and high market share for the possible entrants.

Table 2 Premiums per Capita (2009, USD)

<i>Country</i>	<i>Total</i>	<i>Non-Life</i>	<i>Life</i>
1. Netherlands	6,555	4,509	2,046
2. Switzerland	6,257	2,852	3,406
3. Denmark	5,529	1,713	3,816
4. Luxembourg	5,227	1,998	3,229
5. Great Britain	4,579	1,051	3,528
67. Turkey	105	90	15
OECD	2,808	1,202	1,607
G7	3,671	1,539	2,132
NAFTA	2,789	1,581	1,207
EU (27)	2,775	1,055	1,720
ASEAN	83	28	55
World's Total	595	254	341

Source: SIGMA-Swiss Re- 2/2010

Premiums as percentage of GDP which is used as a proxy to measure insurance penetration is another indicator of insurance performance. “The Turkish insurance industry is so young and penetration as yet so under developed that opportunities are likely to exist in just about every business line, distribution channel and client type” (Gül & Gün, 2009, p. 2).

Table 3 Premiums as Percentage of GDP (2009, %)

<i>Country</i>	<i>Total</i>	<i>Non-Life</i>	<i>Life</i>
1. Taiwan	16.80	3.00	13.80
2. Netherlands	13.60	9.30	4.20
3. Great Britain	12.90	3.00	10.00
4. South Africa	12.90	2.90	10.00
5. Hong Kong	11.00	1.40	9.60
76. Turkey	1.30	1.10	0.20
OECD	8.20	3.51	4.69
G7	8.71	3.65	5.06
NAFTA	7.63	4.33	3.30
EU (27)	8.42	3.20	5.22
ASEAN	2.97	1.00	1.97
World's Total	6.98	2.98	4.01

Source: SIGMA-Swiss Re- 2/2010

Some of the main financial indicators reflecting the general characteristics of the Turkish insurance sector are presented below which are retrieved from Undersecretariat of Treasury (2009).

As of 31.12.2009, in the Turkish insurance sector there are 55 companies, 54 of them being insurance and pension companies and the 1 being reinsurance company. Out of 54 companies, 32 companies operate in non-life, 9 companies in life and 13 companies in pension branches. Among 13 pension companies, 12 companies operate also in the life branch while 1 company operates only in the pension branch. There are two companies operating in the non-life branch which have been established as branch offices of insurance companies in abroad.

The total premium production as at the end of 2009 is 12,281,118,009 TL which is 4.26% higher than 2008 in nominal terms. On the other hand, in real terms with 1981 as the base year there is a decrease of 1.58%. In total premium production the share of life and non-life branches shows a wide discrepancy. Premium production of life is 1,812,292,780 TL which corresponds to a share of 14.76% whereas premium production of non-life is 10,468,825,229 TL which corresponds to a share of 85.24%. Throughout the development of Turkish insurance sector, this situation prevailed with non-life insurance being the fueling power and life insurance being the follower.

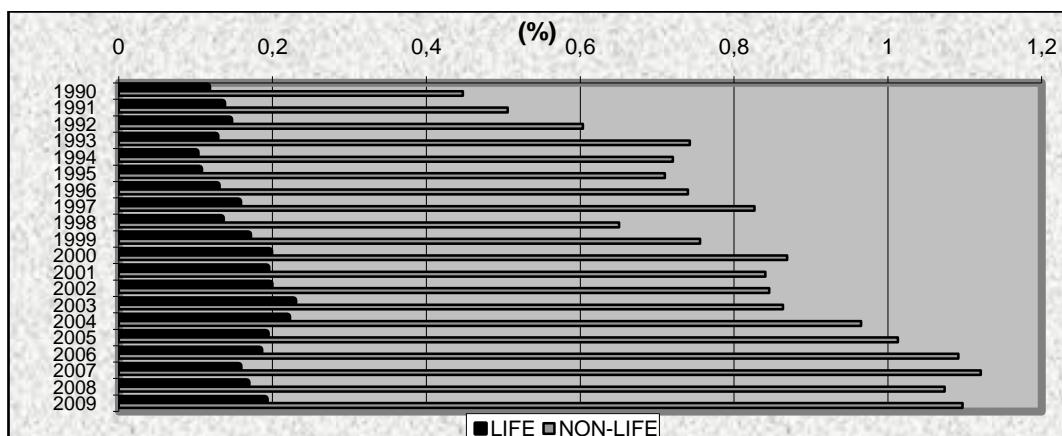


Figure 1 Share of Life and Non-life Premium Production

Source: Undersecretariat of Treasury

Premium production per capita has increased by 2.68% compared to the previous year and amounted to 169 TL whereas in terms of USD it has decreased from 127 USD to 109 USD. On the other hand, share of total premiums in the GDP increased from 1.24% to 1.29%. However despite the increase, total premiums still correspond to a very small proportion of GDP.

Following figure depicts the trend in direct premiums per capita in constant price in TL and premium/GDP.

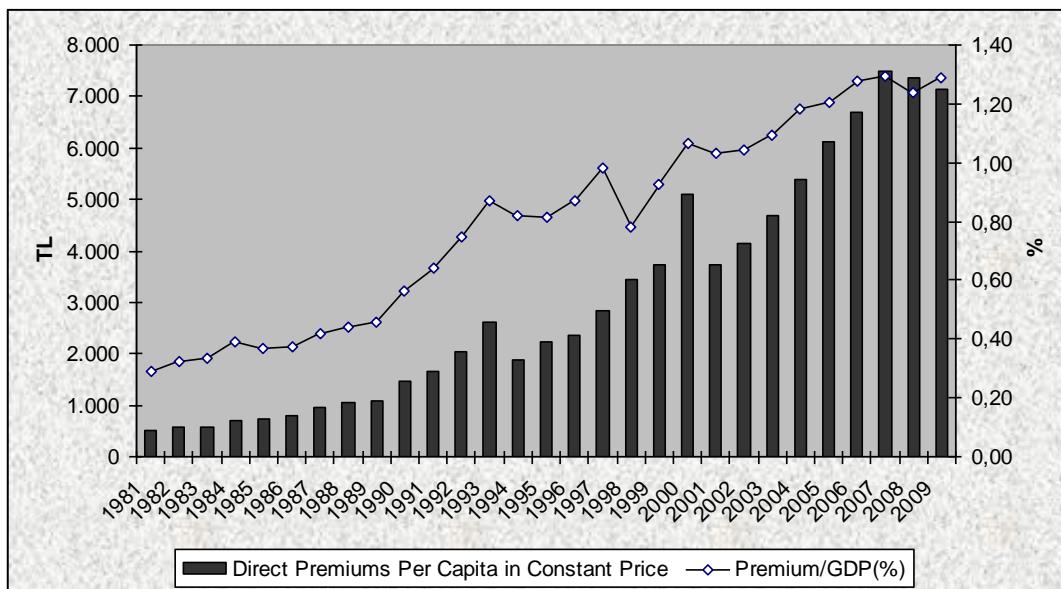


Figure 2 Direct Premiums per Capita in Constant Price and Premium/GDP (%)
Source: Undersecretariat of Treasury

Premiums in terms of USD best show the response of the Turkish insurance sector to the crisis. As it is seen in the following figure, the crisis years 1994, 2001 and 2008 are highlighted by dramatic decreases in premiums in million USD. This situation can be attributable to the combination of high levels of exchange rate and lowered levels of premium production during the crises.

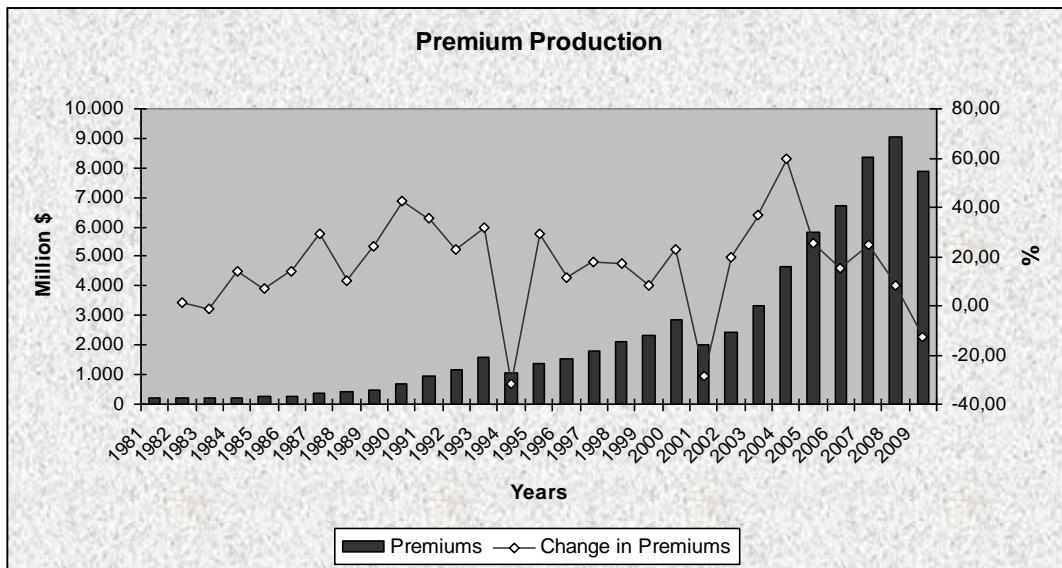


Figure 3 Amount and Change in Premiums in Years

Source: Undersecretariat of Treasury

Total assets of the sector increased by 20.13% compared to 2008 and reached 31,807,215,376 TL, total equity increased by 25.51% and reached 8,850,683,160 TL, while the total profit has decreased by 46.1% and fell to 455,313,621 TL. In sickness/health, credit, land vehicles, air vehicles, land vehicles liability and air vehicles liability branches technical loss was recorded. On the other hand, total amount of paid losses increased by 20.59% and reached 8,471,453,620 TL.

When the premium breakdown is examined in terms of insurance branches, the land vehicles branch has a share of 21.43%, land vehicles liability 17.94%, fire and natural disaster 15.56%, sickness/health 11.52%, general damage 7.36%, general liability 2.05%, credit 0.23% and other branches 9.15%. When this composition is assessed under the breakdown of sub-branches it can be concluded that motor insurance, compulsory motor third party liability insurance (traffic insurance), fire insurance, personal accident insurance and compulsory earthquake insurance are the main drivers of the Turkish insurance sector.

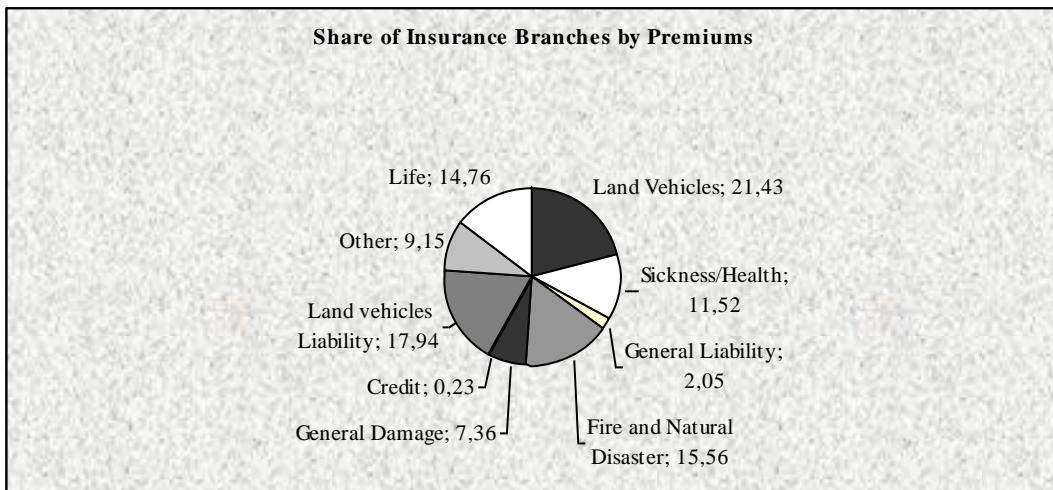


Figure 4 Share of Insurance Branches by Premiums

Source: Undersecretariat of Treasury

When companies are ranked in terms of premium production, Axa Sigorta A.Ş (10.40%), Anadolu Anonim Türk Sigorta Şirketi (10.13%), Allianz Sigorta A.Ş. (7.58%) share the first three rank. In terms of total equity, Ak Sigorta A.Ş. (30.16%), Anadolu Anonim Türk Sigorta Şirketi (9.11%) and Axa Sigorta A.Ş. (6.12%) are the first three in the ranking. In terms of profit, Axa Sigorta A.Ş. (20.40%), Anadolu Anonim Türk Sigorta A.Ş. (17.41%) and Garanti Emeklilik ve Hayat A.Ş. (16.51%) are the leading companies. In terms of total assets, Anadolu Anonim Türk Sigorta Şirketi (13.95%), Ak Sigorta A.Ş. (10.31%) and Avivasa Emeklilik ve Hayat A.Ş. (8.75%) are the top three companies. (Undersecretariat of Treasury, 2009)

Non-life technical balance was recorded as 105,012,835 TL, life technical balance as 111,098,053, pension technical balance as 10,626,541 TL, while total technical balance was recorded as 226,737,429 TL and non-technical balance as 382,666,152 TL.

Return on equity and return on assets are important indicators of profitability of the companies and below tables show the trend in terms of technical, non-technical and total profits.

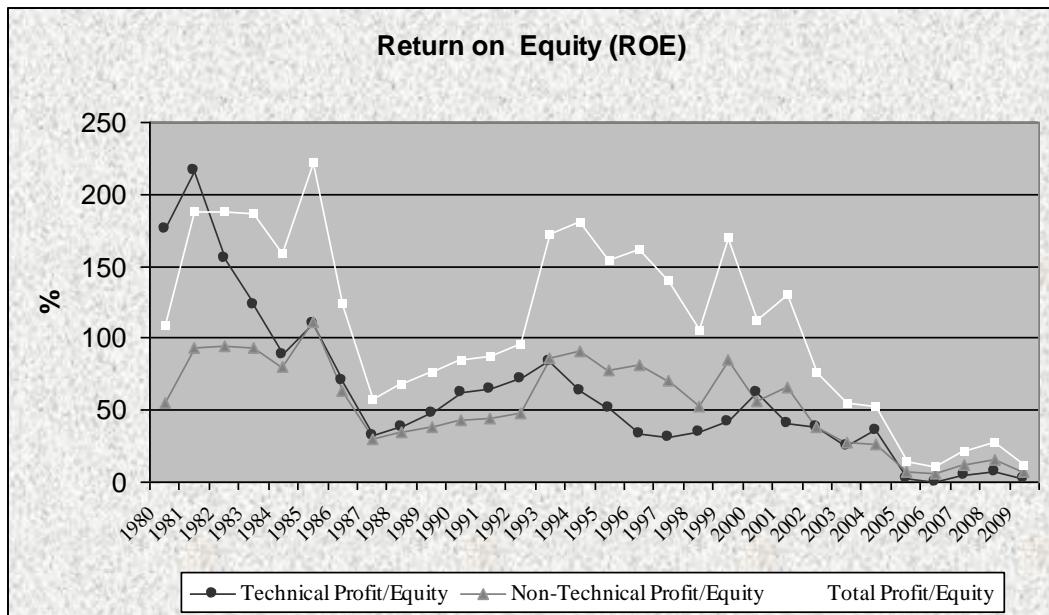


Figure 5 Return on Equity (ROE)

Source: Undersecretariat of Treasury

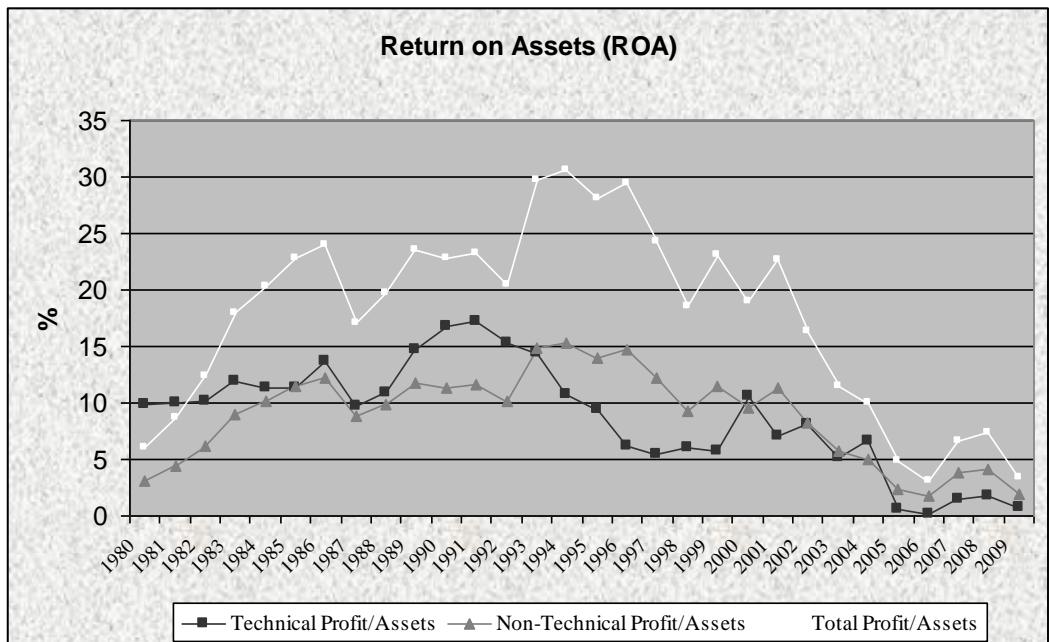


Figure 6 Return on Assets (ROA)

Source: Undersecretariat of Treasury

Total investments of the sector including reinsurance have increased by 25.43% and reached 10,805,689,996 TL. 72.5% of the total investments was composed of government bonds, treasury bonds and other government debt securities, whereas fixed assets constituted 6.91%. The net investment income was realized as 427,596,614 TL. When compared with 2008, the investment portfolio of the Turkish insurance sector witnessed an important shift. Share of government bills and notes decreased and share of stocks increased at a considerable degree from 2008 to 2009.

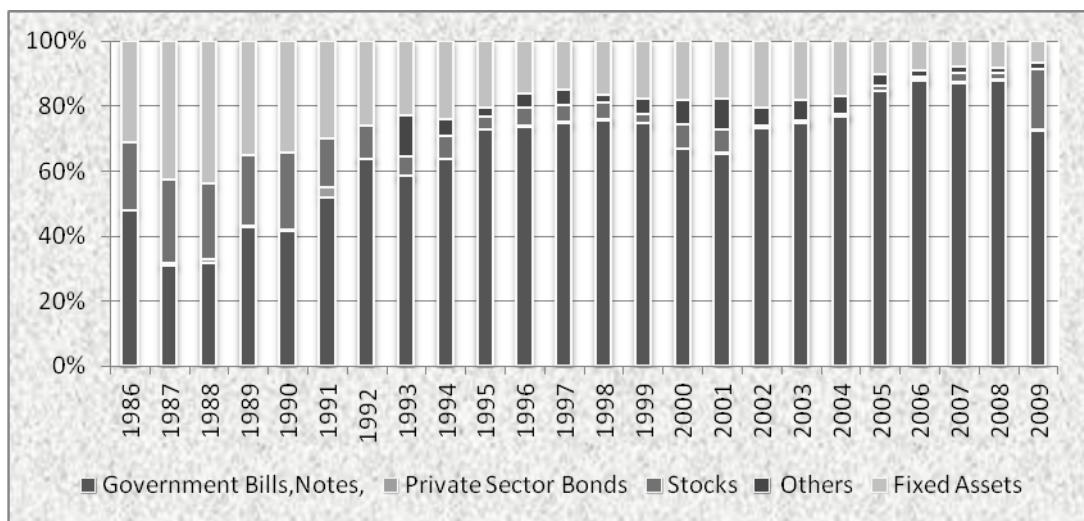


Figure 7 Investment Portfolio of Insurance

Source: Undersecretariat of Treasury

At the end of 2009, there were 34 foreign companies in the sector. Foreign companies refer to those companies whose more than 50% of the capital belongs to foreigners. 2 of these were operating as branches of foreign undertakings established abroad. Most of the foreign companies were from European countries and following figure shows the number of foreign companies by country.

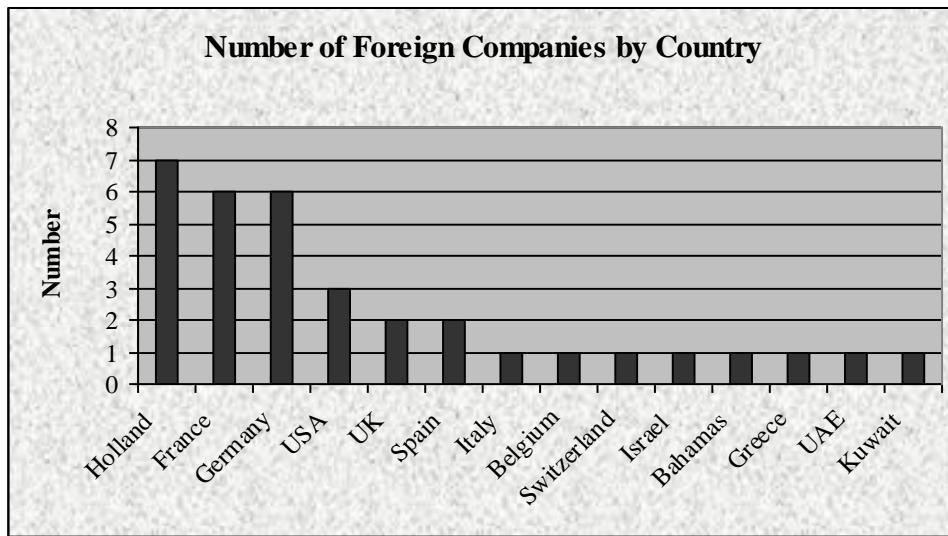


Figure 8 Number of Foreign Companies by Country

Source: Undersecretariat of Treasury

3.4 INFORMATION ON ACTORS AND INSTITUTIONS IN THE TURKISH INSURANCE SECTOR

The Turkish insurance sector is regulated and supervised by the Undersecretariat of Treasury which is authorized for supervision, both onsite and off-site, of the insurance and reinsurance companies and the whole sector in general. The insurance sector consists of insurance companies, reinsurance companies, intermediaries (brokers and insurance agencies), actuaries and insurance loss adjusters. Moreover, the Undersecretariat of Treasury is authorized to regulate independent auditing of insurance and reinsurance companies.

In the sector, as of 31.12.2009 there are 2,000 experts, 71 brokers, 114 registered actuaries and 34 authorized independent auditing companies. Total number of agents having a certificate of conformity from the Treasury is 16,293 and total number of people employed in insurance and pension companies is 15,841.

3.5 CONCLUSION

In this chapter Turkish insurance sector was reviewed from historical, legislative, qualitative, quantitative and comparative aspects. Firstly the historical development of the Turkish insurance sector was presented. Next, Turkish insurance sector's place in the world in comparison with some of the industrialized countries, OECD, G7, EU, NAFTA and ASEAN countries in terms of premiums received, premiums per capita and premiums as percentage of GDP was depicted. Lastly, information with regards to main financial indicators, actors and institutions of the sector were given.

The points touched in this chapter indicate that in spite of its relatively low share and importance in the world insurance market, Turkish insurance sector has showed a significant improvement throughout its own history and offers a high growth potential and profit opportunities for the new entrants to the sector. There is an increasing trend in terms of number of foreign companies and their share in written premiums and capital which can be considered as an indicator of the growth potential of the sector.

This chapter completes the initial review of the affected term in the cause and effect analysis which is the Turkish insurance sector. This general overview of the characteristics of the insurance sector in Turkey provides a background for the analysis ahead and should be followed with the review of the affecting term which is the economic crisis. In order to analyze the impacts of the economic crises in a sound manner, in the first step a general overview of the economic crises should be presented. With this motive in mind, following chapter focuses on the economic crises and their impacts on the insurance sector.

CHAPTER 4

ECONOMIC CRISES AND THEIR IMPACTS ON THE INSURANCE SECTOR

4.1 INTRODUCTION

Crises are one of the fundamental phenomena of the economic theory and an issue to which a vast literature had been dedicated. In various countries, during different periods of time, crises have been prevalent in the nature of the economy. In spite of the fact that their characteristics and motive behind each of them differed, their significant impact on the economy and society can be considered as what they have in common. For the reason being the large scaled and intense impacts and adverse implications on numerous sectors and actors in the economy and the society, crises attracted attention of many scholars and deserved to be fully examined, explained and understood. In this context, different models have been developed to explain and categorize them. However due to the changing conditions of the globe and accordingly the economic environment, these models remained inadequate to explain the incoming crises and the need of development of new models arose. Evidently, future carries a potential of new crises and although the drivers and consequences may differ from the previous ones, those will share some common features. Therefore, drawing a general framework for the economic crises is considered as useful.

Turkish economy witnessed a number of economic crises throughout its history with varying causes, characteristics, impacts and policy implications. While some of them took their origins from external developments, others were triggered by internal dynamics. Deterioration in the terms of trade, devaluation of the currencies

of the countries that Turkey exports, recessions in the countries with close trade links, rapid increase in the global interest rates and outflow of short term capital can be considered as transmission channels of adverse external developments to Turkey (Kazgan, 2005). On the other hand, internal dynamics such as macroeconomic policies, degree of government intervention, populist implementations and chronic problems of the economy were also liable for the economic crises in Turkey.

In this chapter, general characteristics of economic crises, causes underlying a typical crisis, classification of crises according to their characteristics, indicators of a forthcoming crisis and three major economic crises affecting Turkey after 1990; i.e. 1994, 2001 and 2008 constitute the major focus. This kind of a general overview of the crises is considered as vital, since in an analysis of cause and effect, construction of a sound background of the analyzed variables is a prerequisite. Bearing this rationale in mind, intention is to prepare the ground for the analysis ahead.

Among the economic crises that affected Turkey 1994 and 2001 crises were principally driven by internal circumstances, whereas 2008 crisis was a global crisis which stemmed from United States and spread to the world. There are two reasons for the selection of these three specific crises. 1994 and 2001 crises had very severe and long lasting implications for Turkey. Such severe crises are considered as more appropriate for an analysis of cause and effect. The motive behind and expectation is that the impact of the economic crises on the insurance sector will be more observable with such kind of severe crises. Although the impact of the recent 2008 crisis on the Turkish economy was limited compared to 1994 and 2001 crises, its inclusion deemed necessary for the purpose of depicting the most updated and current situation in the cause and effect relationship. Moreover, by this way the changing nature of both the Turkish economy and the insurance sector will also be taken into account.

4.2 GENERAL CHARACTERISTICS OF ECONOMIC CRISES

Despite the fact that the concept of crisis is propitious to yield different interpretations for different fields of interest, extraordinary and dramatic turn of

events which influence a wide scale of area corresponds to the meaning it captures in general. In an economic sense, crisis signifies unknown or unpredictable events revealing an outcome which will considerably affect the firms at the micro level and the state at the macro level (Aktan & Şen, 2002).

Crisis is also defined as sharp fluctuations in the price and/or quantity of the goods, services, factors of production or financial markets beyond an acceptable limit of change (Kibritçioğlu, 2001). One of the most important features of the crises is that they are usually unpredictable and arise all of a sudden. Moreover crises are generally contagious in nature (Aktan & Şen, 2002), meaning that they spread to and affect other regions or economies even without a sound economic reasoning.

Crises may occur in various ways such as a rapid contraction in the output, a sudden fall in the general price level, bankruptcies, a sudden increase in the unemployment rate, fall in the wages, busts in the stock exchange, speculative attacks, so on and so forth (Aktan & Şen, 2002). On the other hand, Mishkin (1996) suggests that the symptoms such as increase in the interest rates, intensification of the uncertainty, collapse in the stock exchange and problems in the banking sector are warnings of a forthcoming crisis. Furthermore, instable economic, financial and political arena together with deteriorating indicators and expectations can intensify the severity of a crisis. When the economic or political circumstance in a country is perceived to be moving towards a more risky and negative direction, a speculative attack is triggered which may turn into a crisis.

Crises have been frequent in the history with varying degrees of severity and can be traced back to many years ago. However at this point, to mention about more recent and severe ones will be adequate. In this context, beyond any doubt 1929 Great Depression is one of the crises with most devastating effects. Reed (1981) summarizes the severe outcome of the Great Depression as follows: “over the four years from 1929 to 1933, production at the nation’s factories, mines and utilities fell by more than half. People’s real disposable incomes dropped 28 percent. Stock prices collapsed to one-tenth of their pre-crash height. The number of unemployed

Americans rose from 1.6 million in 1929 to 12.8 million in 1933" (p. 1). Only this piece of information is sufficient to depict how harsh the crisis was.

Moving towards the other milestones in the history of crises, post 1970 period stands as remarkable which started with the collapse of Bretton Woods system and two oil crises. 1980s represent debt crises of emerging market economies which were unable to meet their external debt obligations. 1990s on the other hand was characterized by financial liberalization accompanied with high mobility of capital and restricted impact area of crises to the regions (Delice, 2003). The frequency of the crises was also high in this period. Most noticeable ones after 1990s are as follows: 1992-1993 European ERM (Exchange Rate Mechanism) crisis, 1994-1995 Tequila crisis in Latin America, 1994-1995 currency and banking crises in Turkey, 1997-1998 Southeast Asia crisis, crises in Russia and Brazil, November 2000 and February 2001 currency and banking crises in Turkey and crisis in Argentina in 2001 (Delice, 2003).

Crises can either be attributable to internal dynamics of the economy or external shocks. Rapid changes in the political, economic, technological and natural circumstances can well trigger a financial crisis (Aktan & Şen, 2002). In general, unsustainable imbalances in the macroeconomic structure play a leading factor in the emergence of most of the crises.

According to Kansu (2004) factors such as the implementation of inappropriate exchange rate systems, incoherent policies, problems in the banking sector, the way how the budget deficits are financed, increase in the current account deficit, explicit or implicit guarantees provided by the government, political instability and adverse changes in the expectations can all be liable for bursting of a crisis.

Kindleberger (2000) suggests that the failure of a bank or a firm or decrease in the price of the primary object of speculation as it at first alone is seen to be overpriced may be a signal of an oncoming crisis.

A financially liberalized economy which is at the same time implementing fixed exchange rate regime is also deemed to be more prone to the crises. Experiences of 1990s demonstrated that the frequency of the currency crises increases in those emerging market economies where there is fixed exchange rate regime and free capital mobility (Eren & Süslü, 2001). The globalization attempts which intensified after 1990s caused the traditional function of the capital movements (i.e. direct investment) to be replaced with rather a short-term and speculative nature (Eren & Süslü, 2001). With this shift in their nature, capital movements became a source of great volatility in the economy. As Eren and Süslü (2001) explain, short term capital, in pursuit of high real interest rate attains excessive profit in the short run as it benefits from the interest rate arbitrage and eventually causes the local currency to over appreciate. This circumstance deteriorates the balance between interest rate and exchange rate and thus creates an artificial growth dependent on abroad (Eren & Süslü, 2001).

In the emerging market economies, before ensuring the appropriateness of the macroeconomic circumstances, financial liberalization brings harm rather than benefit (Eren & Süslü, 2001). According to Eichengreen (2004) in order to be immune from the defects of financial liberalization “emerging economies need to enhance liquid capital markets, build reputations for following sound and stable policies and capacity to regulate their financial markets and institutions which distinguish their developed country counterparts. At that point they will be able to confidently assert that the benefits of financial liberalization exceed the cost” (p. 250) When the economy is not ready and capable to absorb the challenges brought by financial liberalization, seeds of an economic crisis may have been planted.

Factors that trigger an economic crisis can also be embedded in a fragile banking system. Internal and external deregulation practices such as deregulation of interest rates, decrease in the required reserves, ease of entry to the market both for the domestic and foreign banks, introduction of convertibility of the local currency and liberalization of capital flows increase the interest rate risk, exchange rate risk, liquidity risk and default risk of the banking system at a considerable degree

(Turgut, 2006). With these increased risks, it is quite possible that even a relatively insignificant event can bring the economy to the edge of a crisis.

Being among the popular phenomena in the economic literature, adverse selection and moral hazard especially with their implications observed in the banking sector can also pave the way for a crisis (Eren & Süslü, 2001). Banks supporting risky projects under the state guarantee which otherwise they might not is a factor that increases the fragility of the economy.

Another reason for the emergence of an economic crisis can be traced back to the stabilization programs applied mostly in developing countries where there is fixed exchange rate system. Generally some defects are embedded in these programs in such a hazardous way that while the country is following the program in order to fix certain breakdowns in the economy, it can slide into an unexpected, deep crisis. One of the risks that these programs carry is that they encourage all sectors in the economy to borrow in terms of foreign currency (Turgut, 2006). Fixed exchange rate regime avoiding the sterilization of the capital flows causes real exchange rate to be over appreciated. The increase in the consumption and imports in expense of the savings due to over appreciation of the real exchange rate in turn, causes a current account deficit problem (Turgut, 2006).

Herding is also counted as one of the causes of economic crises. Eichengreen (2004) argues that “a variety of tests and sensitivity analyses uniformly suggest that a crisis elsewhere in the world increases the probability of a speculative attack by an economically and statistically significant amount, even after controlling for economic and political fundamentals in the country concerned” (p. 156). He claims that “The first channel is trade links, and the hypothesis is that attacks spill over contagiously to other countries with which the subject country trades. The second channel is macroeconomic similarities, where the hypothesis is that attacks spread to other countries where economic policies and conditions are broadly similar” (p. 184).

Eichengreen (2004) also argues that “currency crises are more disruptive in emerging markets, where financial markets are thin, debt is denominated in foreign currency and confidence is fragile” (p. 240).

4.3 SOME WELL-KNOWN TYPES OF CRISES

In order to analyze the crises in a more systematic manner, a categorization according to specific criteria should be made. In the literature it is possible to find out different classifications varying due to changing criteria. For instance, according to the sector they stem from they are called public-private, banking-corporate; according to the structure of the imbalances they are called flow imbalances (current account and budget imbalances) or stock imbalances (the mismatch of assets and liabilities) and according to the maturity of the financing they are called liquidity and default crises (Delice, 2003). On the other hand, another categorization classifies crises under 4 groups which are currency crises, banking crises, external debt crises and systemic crises (Turgut, 2006). Following this categorization each type of crisis will be described briefly.

4.3.i Currency Crises

Currency crises occur as a result of a sudden change in either the exchange rate or in the capital flows (Turgut, 2006). Due to a somewhat reason, agents in the economy might lose their confidence in the stability of the economic scene and anticipate a downturn in the economic balances. Although being it solely a speculation at the beginning, such kind of deterioration in the investors’ anticipation about the outlook of the economy results in massive flight of capital at the end. What this capital flight leads is a currency crisis since local currency loses its attractiveness for the speculators. Turgut (2006) suggests that especially those economies with fixed exchange rate regimes suffer from these crises, when the actors in the economy start to transfer their local currency denominated assets to foreign currency denominated assets and eventually cause international reserves of Central Bank to deplete. Generally stemming from a speculative attack, a sudden and high demand for foreign currency emerges which pushes the Central Bank to sell some of its international reserves to meet this demand.

Fratzcher (2000) associates currency crises with three distinct causes: contagion, weak economic fundamentals and unobservable shifts in agents' beliefs. Crisis in Europe, Latin America, Asia and Russia all carried features of currency crises although their underlying causes and the models used to explain them varied.

4.3.ii Banking Crises

Banking crises are defined as rushing to banks with a motive of withdrawal of the deposits generally due to lack of confidence to one or more banks (Turgut, 2006). In the case that the panic spreads and more depositors run to banks, the banking system can crack with a mass number of bank failures. One of the reasons why banks run out of liquidity is that, a high proportion of the cash that is deposited is extended as loans rather than being held.

A deterioration in the balance sheets of banks, aggravation in their asset structure namely increase in the non-performing loans, volatility in the securities market are considered as the main reasons for the banking crises (Eren & Süslü, 2001). Goldstein and Turner (1996) link the banking crises to the following factors: macroeconomic volatility (external and domestic), lending booms, asset price collapses, surges in capital inflows, increasing bank liabilities with large maturity/currency mismatches, inadequate preparation for financial liberalization, heavy government involvement, loose controls on connected lending, weakness in the accounting, disclosure and legal framework, distorted incentives and exchange rate regimes.

Banking crises tend to have a more long term nature than the currency crises and have more severe effects on the volume of the economic activity (Delice, 2003). As Delice (2003) confirms, in the econometric studies so far, a high correlation between currency and banking crises was observed. Experiences of crises show that currency and banking crises generally occur simultaneously and thus they are called twin crises (Turgut, 2006). However, as Kaminsky and Reinhart (1999) suggest there is no a unidirectional causal link between currency crises and the banking crises. As well a banking crisis can be a warning signal for a forthcoming currency crisis; a currency crisis can also deepen a banking crisis.

4.3.iii External Debt Crises

External debt crises start due to inability of a country to pay its external debts either to public or private sector. Especially when the governments have problems in rolling over the debt and in finding new sources of external credit, obligations are deferred or new repaying schedules come into force (Turgut, 2006).

External debt crises can be avoided if external debt do not exceed 40% of GNP or 200% of exports and the debt service ratio (the ratio of debt service to exports) do not exceed 25% (Wang, 2004). Yu (2001) claims that “If the short-term external debt accounts for a large proportion of total external debt, under a condition of relatively low foreign exchange reserves, this would deepen the financial crisis” (p. 15)

One of the most familiar external debt crisis occurred in East Asia in 1997. “Poor structure of financial claims - too much debt relative to equity, too much short-term debt relative to long-term, too much foreign currency debt relative to domestic currency debt was one of the main causes of the external debt crisis in East Asia” (Wang, 2004, p. 22).

4.3.iv Systemic Crises

“Systemic crises are defined as shocks to the financial system that impair crucial functions of the system, such as asset valuation, credit allocation and payments” (Marshall, 1998, p. 13). In the periods of systemic crises production losses occur, national income falls, economic losses grow and the country is pulled away from economic efficiency (Turgut, 2006).

Kole et al. (2006) suggest that “International investors suffer from the deterioration of the risk and return characteristics, as systemic crises exhibit a sharp drop in returns, an upswing in volatilities and a rise of the correlations between financial markets, all on a global scale” (p. 2).

4.4 EMPIRICAL CRISIS INDICATORS

In the literature of economic crises, some indicators that prevail in the economy are assumed to warn of a forthcoming crisis. Although there might be exceptions, the simultaneous appearance of some or all of these indicators point an increasing probability of a crisis. In this context, real appreciation of the local currency, increasing volatility in the capital flows, interest rate of external debt, risk premium and short term interest rates can be attributed as indicators of a crisis (Uygur, 2001). Moreover, increase in the following ratios is generally assumed to indicate a potential crisis (Uygur, 2001).

- a) Short term external debt/International reserves
- b) Current account deficit/International reserves
- c) Current account deficit/GDP
- d) Total or short term external debt/Exports
- e) Open position of the banking sector/ International reserves
- f) Bank loans/ International reserves
- g) M2/ International reserves

As it is seen, most of the ratios include international reserves in their denominator implying the crucial role of these reserves before the crisis period. Decrease in the amount of international reserves is one of the most important indicators of a crisis, since this accumulated amount is used as a resource by the monetary authority when there is an economic downturn. Another point that attracts the attention in the ratios is that external debt of a country makes it more susceptible to a crisis. However it should be noted that the way how the debt is financed is more important than its magnitude. As long as there are no defections in the financing of the debt which make its sustainability questionable, its nominal amount may not be an issue of concern.

4.5 THREE MAJOR ECONOMIC CRISES AFFECTING TURKEY AFTER 1990

Turkish economy experienced three major economic crises after 1990 which were in 1994, 2001 and 2008. These crises are explained in detail in the following sections.

4.5.i 1994 Crisis

In 1994, Turkey experienced an economic crisis with severe impacts on the economy such as fall in the output by 6%, rise in the inflation rate to three digit levels, devaluation of the Turkish Lira by 50%, increase in interest rates and great fall in the international reserves (Celasun, 1998). Prior to the crisis, fiscal balance had been already deteriorated as a result of liberalization practices since 1980s, coupled with mounting short-term debt. Since prerequisites of the capital liberalization, namely fiscal adjustment was absent; ground for the crisis was already prepared (Celasun, 1998). Özatay (2000) also draws attention to the weak fundamentals in the period before the crisis and summarize them as follows: “fiscal stance was poor, current account deficit was high, the Turkish Lira was overvalued, the government was illiquid according to international standards and the banking sector was relatively weak” (p. 340).

Government’s expansionary policies in the period preceding the crisis can be accused of as one of the factors underlying the accumulating deficit. Government was following highly populist and expansionary policies which in turn increased the burden on the government expenditures (Durgut, 2002). According to Celasun (1998) growth in public expenditures is attributable to “increases in total wage bill of the government, generous agricultural support policies, worsening performance of the state owned enterprises, the increased cost of military operations in the southeastern region of the country and increased interest payments after 1992” (p. 7). Social security institutions were also in need of financial support and were a source of expenditure for the government (Demirkol, 2000).

However the main driver of the crisis was the financing method of the deficit, rather than its magnitude. In fact, failure in the management of the public debt in an effective way by the government paved the way for the crisis (Durgut, 2002). At the end of 1993, Treasury domestic debt auctions were cancelled and since the necessary financing was not met via sale of bonds, government started to lean on short term advances from Central Bank (Celasun, 1998). “During the first 3 weeks of 1994, the Treasury used almost 53% of its legal limit for 1994” (Durgut, 2002, p. 40). The abandonment of domestic debt auctions and government’s reliance on Central Bank advances arose doubts about the sustainability of the exchange rate and therefore triggered a speculative attack. On top of that, concerns about the rolling over of the accumulated debt exacerbated the macroeconomic stance.

Consequently, 1994 can be considered as a disaster from the economic perspective, when massive outflow of capital, dramatic increase in the unemployment, inflation and interest rates and decrease in the output level and international reserves are taken into consideration.

Government’s response to the crisis was launching of the stabilization program which was backed by IMF on April 5, 1994 (Durgut, 2002). The program involved following measures (Durgut, 2002, p. 47):

- a) Devaluation of the Turkish Lira by 39%
- b) Abolition of the 5% tax on the revenues earned in the government securities market
- c) A one-time tax surcharge on private enterprises
- d) Liberalization of the exchange rate determination
- e) An increase in the amount of the government’s insurance coverage on bank deposits
- f) Increases in public sector prices
- g) Reduction in public expenditures
- h) Increases in interest rates to curb the downward pressure on the exchange rate
- i) Privatization of the state economic enterprises

While short term targets of the program were achieved, long term targets were resulted in a failure. Although program ensured stabilization both in the market and the Turkish Lira, high public debt and inflation remained to be unresolved problems (Durgut, 2002).

When the repercussions of the 1994 crisis for the years ahead are observed it can be stated that incorrect policies and lack of elaboration in the fulfillment of the requirements with regard to measures taken after the 1994 crisis prepared the background of the 2001 crisis (Kumcu, 2009). This argument has a merit in the sense that, chronic problems of the economy still persistent after the stabilization program such as high public sector borrowing requirement, high inflation, instable market conditions and high volatility in the interest rates contributed to the emergence of the 2001 crisis along with other factors.

4.5.ii 2001 Crisis

After 1994, Turkey witnessed another severe crisis in 2001 which was attributable to different dynamics. Indeed failure in implementing the proposed measures after 1994 crisis also triggered the 2001 crisis. As Kumcu (2009) claims if public sector borrowing requirement could have been reduced and financial sector reforms had been fulfilled in a disciplined manner, 2001 crisis could have been avoided or its severity could have been mitigated. According to Koch and Chaudhary, (2001) on the other hand, capital liberalization efforts which gained pace since 1980s, once more lies at the root of the crisis since they lacked the reinforcement of required reforms in various areas.

Prior to the crisis, macroeconomic indicators such as high inflation which carried a chronic feature, increasing public sector borrowing requirement, mounting current account deficit and widening open positions of the banks were actually signaling a forthcoming crisis. Given these vulnerable economic conditions, with an intention to depress the tension on the economy, a disinflation program was announced to the public in the context of the Stand-by agreement that had been ratified by the Board of Executive Directors of the IMF on December 22, 1999 (Kadioğlu et al, 2001). In the core of the program there was the goal of decreasing the inflation to one digit

level in 2002 and restoring the fiscal balance which was deteriorated due to high real interest rate. Daily adjustment of the exchange rate by the Central Bank was determined in line with the inflation targeting in order to cut off the inflationary expectations (Kadioğlu et al, 2001). The rate of increase in the currency basket composed of 1 USD + 0.77 Euro was announced to capture the one year period and all transactions were made on the predetermined values (Kadioğlu et al, 2001). Program was designed in such a way that, in order to inject confidence to the market, the timing of its termination and the reduction in devaluation rate was predetermined and announced to the public. With the end of the program the intention was that, crawling peg regime giving its way to floating exchange rate regime.

Although the implementation of the disinflation program supported by the IMF which was envisaged to cover 3 years was successful during the initial months, it resulted in a liquidity crisis after 12 months. According to Şimşek (2007) the handicap of the program was its initiation in an economic environment of high public debt, chronic inflation and vulnerable banking sector. Nonetheless, in the first period covering the months between January-August, interest rates showed a great and rapid fall, inflation was decreased to the lowest level in the last 14 years and production and domestic demand increased significantly (Kadioğlu et al, 2001). However these positive developments were not long lasting. When the expected fall in the inflation rate was not achieved, the Turkish Lira began to appreciate which in turn led the current account deficit to reach to a record level. Moreover in this period, there were adverse external factors such as the increase in the energy prices like crude oil and natural gas and depreciation of Euro in the international markets which caused the current account deficit to be higher than the expected (Kadioğlu et al, 2001). In the second half of the year, breakdowns appeared when the structural precautions remained behind the schedule, and postponement of the third pile of IMF credit increased the hesitations regarding to the sustainability of the program. Eventually capital outflows were triggered.

In the design of the program liquidity expansion was allowed only through the capital inflows. However the reverse situation was embedded in it simultaneously,

namely capital outflows resulted in an immediate liquidity contraction. Moreover since the flow of capital was in the form of portfolio investments which is very volatile, it carried a high possibility of being reversed (Özkan, 2005). Rapid widening of the current account deficit, deferring in the external credits and lack of cash flow from privatizations, negatively affected the “monetary expansion based on capital inflow” and the magnitude of the liquidity in the second half of the year (Kadioğlu et al, 2001).

Alper (2001) links the creation of 2000 liquidity crisis to three factors: “1) inability of the Turkish government in maintaining the stream of good news and sustaining capital inflows. 2) Lack of enough backing of the program by the IMF in terms of providing sufficient insurance against exchange rate risk. 3) Existence of the “no sterilization” rule in the letter of intent which was argued to be a “design flaw” in the program since it let to interest rate undershooting” (p. 51).

The non-sterilization of the capital flows caused the money supply to be completely contingent on the capital flows which can be considered risky when there is an adverse development in the countries where capital is originated. Alper (2001) suggests that when capital flows are not sterilized the undershooting of the interest rate occurs as follows: with capital inflows money supply increases, interest rate falls, decline in the future cost of debt indicate that default risk is also decreasing, thus trigger further capital inflows. Therefore interest rate undershoots. Consumption and investment are promoted with decreasing rate of interest. However since imported goods consumption was consecutively increased, current account deficit was affected in a negative way. Consequently, international reserves fell, prompting a speculative attack. The speculative attack targeting the exchange rate could be defended at the expense of very high interest rate, huge depletion of international reserves and more importantly extra IMF credit worth 7.5 billion USD (Uygur, 2001).

One of the fundamental igniters of the crisis was the vulnerable banking sector lacking regulation and tight supervision. Especially, when the expectations regarding the reforms in the banking sector resulted in a disappointment, discomfort

in the market was intensified. When the credit lines to the banks that seem to be fragile are blocked, healthiness of the banking sector once again threatened (Özatay & Sak, 2002). As Özkan (2005) claims “capital inflows were mostly intermediated through the banking system in Turkey, just as in other emerging market economies. However the poor functioning and the under regulated banking system in Turkey substantially contributed to macroeconomic instability.” (p. 563)

In addition to the increasing rate of non-performing loans, the balance sheet of the banks carried a massive risk. There was a significant problem of open positions due to the fact that borrowing in external markets in domestic currency was not viable which is known as original sin in the economic literature. On top of that, there was also maturity mismatch namely the maturity of the assets and liabilities were not in conformity (Özatay & Sak, 2002).

In parallel with the increasing public debt, banks were holding huge amounts of government debt securities. When banks started to sell their government debt securities as they fall in an urgent short-term financing need, interest rate increased. On the other hand, state owned banks were having trouble due to their accumulating duty losses and with increasing interest rate they faced with the problem of rollover (Özatay & Sak, 2002). Decline in the price of government debt securities also increased the fragility of the banking sector since banks used them mostly as collateral, consequently with rising concerns about the sustainability of a healthy financial system direction of the capital flows were reversed, namely outflows gained pace (Alper, 2001).

As current account and budget deficits reached to an unsustainable level, lack of confidence in the government about its capability of debt repayment exacerbated the crisis (Işık et al, 2004). Nevertheless, Summers (2000) claims that “When well capitalized and supervised banks, effective corporate governance and bankruptcy codes and credible means of contract enforcement, along with other elements of a strong financial system are present significant amounts of debt will be sustainable” (p. 8). So one can conclude that, if certain measures could have been taken

regarding the soundness and effective operation of the economy prior to the crisis, such a severe crisis could be prevented.

Another main component of the disinflation program were the structural reforms committed in the letter of intent to IMF which included “pension reform, reform in agriculture sector, tax policy and administration, fiscal management and transparency, privatization and the capital market, strengthening the banking sector and banking regulation” (Özatay & Sak, 2002, p. 20). However the failure to fulfill them at the right time, especially lags in creating a well functioning and highly regulated banking sector prior to the crisis undermined the success of the stabilization program.

Consequently, exchange rate based stabilization program was abandoned with a liquidity and banking crisis. Crawling peg was abandoned in February 2001 and replaced by the floating regime. Although Central Bank interfered to the market by injecting liquidity, the loss of international reserves due to the rush to the foreign currency obliged a shift to the floating exchange rate regime (Akyüz & Boratav, 2003).

4.5.iii 2008 Crisis

Taking its origins from United States a global financial crisis burst in 2008 which had worldwide effects spreading to real economy from financial markets (Hull, 2009). In 2007, the problem arose principally from the mortgage market due to subprime mortgage borrowers whose massive default jeopardized the continuity of the existing system. The system was so complicated and interdependent that the breakdown in the first layer created a domino effect and a serious financial crisis was faced with at the end. During the turbulence, there were severe falls in the stock markets in most countries and large scale financial corporations began to fail one by one (Chari et al, 2008). Speculations regarding the prediction of the next failure created an uncertain environment and gave harm to the credibility of the system.

Federal Reserve (Fed) and U.S. Treasury took some effective measures in order to prevent the collapse of the entire financial system and imposed bail out programs

for significantly important financial institutions. They did not only nationalize and provide liquidity to those who were in trouble but also initiated programs such as TARP (Troubled Asset Relief Program), CPFF (Commercial Paper Funding Facility) and MMTIF (Money Market Investor Funding Facility) (Bobbin, 2009). In March 2008, Bear Stearns the first investment bank having trouble was acquired by Fed and JP Morgan. Following it, Fannie Mae and Freddie Mac failed in September, Lehman Brothers went bankrupt and government provided 85 billion USD credit to AIG and took 79.9% of its shares (Bobbin, 2009).

In order to trace back the roots of the crisis, first of all the housing bubble in the United States should be examined. Baily et al. (2008) explain the creation of this bubble in the housing market as follows. From mid 1990s to 2006, in United States home prices were steadily rising even though the household income was not increasing at the same rate which created a bubble in the housing sector. Low interest rates coupled with facilitated lending were key elements for the increasing trend in the housing prices. Aforementioned factors pushed the demand for housing, subsequently creating a rising pattern in the prices. Government's policy since 1990s for promoting home ownership was also influential in facilitation of mortgage lending. Subprime mortgages that are deemed riskier than others were at the center of the problem. Especially after 2003 a great proportion of the total lending was made to subprime borrowers, shifting the custom lending practices in the benefit of subprime borrowers. However starting from 2006 increase in housing prices stopped and the trend was reversed. Consequently, many people default when the decrease in the value of the house reached to a point where the mortgage loan payment is higher (Hull, 2009).

On top of the bubble in the housing sector, new and complex financial techniques and instruments which shadowed the accumulating risk underneath the transacted asset also played a key role in the emergence of the crisis (Baily et al, 2008). One of the newly introduced instruments was the collateralized debt obligation (CDO) which was compiled of securities whose ratings vary from the lowest to highest and blurred the transparency of the asset. Those were generally used for funding of subprime mortgage loans. Risk assessment of CDOs was dependent solely on the

ratings given by the credit agencies due to their complex structure (Baily et al, 2008). Nonetheless, the ratings did not fully reflect the risk underlying the mortgage. Therefore a sound assessment was not achieved. Furthermore, the transaction of CDOs was conducted mostly via over the counter markets which increased asymmetric information (Baily et al, 2008).

Securitization on the other hand, which enhanced the availability of credit lending to an extended range of customers was first perceived as an opportunity to the banks. However as more complicated instruments came to the scene, they led to the aggravation of the trouble in the financial markets (Baily et al, 2008).

Transaction of adjustable rate mortgages (ARMs) also contributed bubble to inflate more, since the low interest rates often called as “teaser” interest rates for the initial months of the repayment schedule together with low down payments made the system attractive for households with a wide range of varying incomes (Baily et al, 2008). As the restrictions regarding lending were made more flexible, number of mortgage borrowers increased sharply.

Mortgage backed securities (MBS) which represent a large group of mortgage loans with different location of origins became one of the sources of trouble as well due to their inclusion of lower rated securities (Baily et al, 2008). Such so called toxic assets which lost their functionality and liquidity in the market caused those who made investment to these securities, investment banks in U.S. and insurance companies which had insured these securities to suffer most (Aliç et al, 2009).

Integration of the financial markets at a global scale prevented the effects of crisis to remain only inside the borders of United States where the crisis was originated from. There was a high interdependency between the financial systems of countries which at the end resulted with downturns in the economies spreading from one country to another.

At this point, to examine the repercussions of the 2008 crisis on the Turkish economy is noteworthy. The first assessment with regards to implications of the

crisis on Turkey is that, due to the fact that toxic assets, mortgage related transactions and institutions which are in relation with these issues were absent, Turkey was not at the core of the crisis. However its contact with the crisis stemmed from real side of the economy rather than the financial side. One of the most crucial points to be addressed is that the deterioration of economic fundamentals in United States and consecutively in some other developed countries caused a fall in the exports, problems in rollover of the external debt and failure in attracting new capital and funds from abroad. On the other hand, Turkey was also coping with problems internally such as slow down in the growth, increase in inflation rate to two digit levels, unemployment and current account deficit (Sönmez, 2008). Hence, the economy was highly fragile and combination of both internal and external developments played a role in the formation of Turkey's position against the crisis. Nonetheless, existence of a tightly regulated and supervised banking sector especially after 2001 crisis and relatively low level of open positions of the banks was a significant difference from the previous crises and stood as powerful weapons against the recent crisis.

Notwithstanding, due to the decrease in both domestic and foreign demand; production, export and unemployment were affected in a negative way. The first round impacts on the economy can be listed as follows; rapid fall of exports to Europe especially in the last quarter of 2008, contraction in the output, increase in the unemployment, depreciation of the Turkish Lira due to capital outflows, refrainment of banks to extend credit and decrease in the consumption (TEK, 2009).

In order to mitigate the impacts of the crisis on the Turkish economy a series of precautions were taken during the turbulence. Some of these policy measures are enumerated by the Undersecretariat of Treasury (2009) as follows:

Liquidity Support

- a) Central Bank has taken many precautions to increase the liquidity of the Turkish Lira and foreign exchange in the market.

- b) In order to strengthen the capital structure of the banks a limit to profit distribution of the banks was introduced and profit distribution is tied up to the permission of Banking Regulation and Supervision Agency. (BRSA)

Tax Support

- a) For the sake of inclusion of assets in abroad to domestic financial system a regulation covering tax reductions and exemptions was made.
- b) 10% withholding tax which had been applied to domestic investors for their gains from stocks was reduced to zero.
- c) Tax liabilities prior to September 1, 2008 were allowed to be paid in installments with 3% interest rate for a period of 18 months.
- d) The withholding of 15% in Resource Utilization Support Fund which had been applied to the loans extended to the real persons was reduced to 10%.
- e) In order to revive domestic demand in some sectors, private consumption tax rate was reduced temporarily.

Employment Support

- a) The duration of the incentive for the young and woman employment was extended.
- b) Unemployment benefit was increased by 11%.
- c) Consultancy in entrepreneurship and training was given.
- d) Job training was started to be supported under internship.
- e) For additional employment on top of the existing one, premium support was provided.

Investment Support

- a) In the context of Promotion of the Investment and Employment Law No: 5084, benefit period of the incentives with regard to income tax, insurance premium and energy support was extended for 1 year.
- b) A new incentive system consisting of three groups; Investment in Major Projects, Regional and Sectoral Promotion System and the General Incentive System was established. Some of the supports that the system brings are

corporate/income tax discount, premiums to Social Security to be funded by the Treasury, interest rate support, investment place allocation, VAT exception and customs tax exemption.

- c) Investment in large projects in the 12 sectors that require high-tech, capital and research and development were supported.

Regulation on the Credit and Guarantees Extended to Manufacturers and Exporters

- a) In order to support the real sector, zero or low interest credit support to SMEs (small and medium enterprises) was given.
- b) Credit scope and limits from Eximbank were increased for the firms.
- c) The paid-in capital of Eximbank was raised to 1.5 billion TL from 1 billion TL.
- d) For the purpose of easier access to funding opportunities for SMEs Credit Guarantee Support implementation has started.

Regulation on the Use of Credit and Credit Cards

- a) A legal regulation concerning the restructuring of the credit card debts was made.

Even though, the introduction and implementation of these measures acted as mitigators, their inadequacy can be observed from the changes in some of the macroeconomic indicators during the crisis. Most remarkable change was observed in the growth and unemployment figures. “In the first quarter of 2009, the Turkish economy recorded the sharpest quarterly decline of the last three decades in GDP with -14.3% and the highest unemployment rate with nearly 16%” (Uygur, 2010, p. 2).

4.6 IMPACTS OF ECONOMIC CRISES ON THE INSURANCE SECTOR

Insurance sector attracts less attention in the literature in terms of its responsiveness to the financial crises when compared with the banking sector. This can be

attributable to its relatively low share in the financial sector; however cannot be a motive for its understatement. In order to shed a light to this issue which lack adequate interest and research to date, it is deemed necessary to highlight the effects of economic crises on the insurance sector. Despite the typical and predictable effects of an economic crisis on an arbitrary sector of the economy, some extraordinary impacts due to the unique characteristics of the insurance sector appear as well. From this perspective, it is also worthwhile to figure out the issue.

4.6.i Typical Impacts of Economic Crises on the Insurance Sector

Economic crises are generally associated with a slowdown in the economy both at the production and foreign trade level. Due to the contraction in the output, an increasing rate of unemployment in certain industries follows. Another typical feature of economic crises, with the lack of confidence a generalizing panic and speculative attack comes next.

From the insurance point of view, such changes in the economy as a result of a crisis have some repercussions. The first and immediate impact stems from the lowered gross national income (GNI) per capita. Individuals are motivated to spend less due to their decreased income. Insurance is not an exception in this sense. Demand for insurance is expected to decrease with the decreased GNI per capita. On the other hand, it is also understandable that the need for insurance increase in crises period, since cost of compensation of a loss is much more detrimental compared with tranquil periods. Nonetheless, the probability of occurrence of a loss and its potential negative consequences are not taken into account in these times. Instead of its benefit, its cost is weighted more which turns to be a motivation for cancellation of policies, not renewing the existing ones and not buying a new insurance. Decrease in the number of policyholders then affects the major source of income for the insurers which is premium income.

Another impact of the crises for the insurance sector stems from inflation. Inflation creates an uncertain economic environment which is a great handicap for the most of the sectors in the economy. Especially for the life insurance, high rates of inflation lead to a devaluation of the future benefits from purchasing life insurance

(Hussels et al, 2005). Given this environment, individuals will be reluctant to purchase a life insurance.

In the case of an economic crisis with widespread effects such as the 2008 financial crisis, increasing cost of reinsurance can also be a concern which affects insurance companies. Reinsurers are companies to which insurers transfer or cede some of the financial risk they assume. In this framework they insure the insurance companies. In crisis periods the amount ceded to the reinsurers may bring more cost to insurers than normal times.

Integration of the financial markets can be a source of disadvantage since turmoil in a certain market can easily and quickly become pervasive. Especially after 1990s insurance companies and banks merged and established big financial groups (Özyüksel, 2009). This kind of interdependency is likely to have consequences such as deterioration of the financial group from the banking side affecting the affiliated insurance company.

From a micro perspective insurance companies are affected in various ways. Influence of an economic crisis can have reflections on both the balance sheet and income statement items of an insurance company. In the balance sheet, cash and cash equivalents due to liquidity contraction can be reduced. On the other hand, liabilities, technical provisions, equity capital and net loss may show a dramatic increase. The net outcome of such changes inevitably leads to deterioration in the balance sheet. For the income statement, while written premiums and technical income may decrease, increases in the paid claims and technical expense can be expected. Moreover, instability and high degree of volatility in the economy during an economic crisis, cause increasing risk and falling returns which may affect the investments of the insurance sector.

For the non-life companies rather than investment risk, rising claims due to increased fraud is a troublesome issue (Wells et al, 2009). In the periods of crisis there is a tendency to resort to insurance which is perceived as a source of monetary return. Insurance is tried to be used as an instrument of enrichment which gives rise

to fraudulent activities. This change in the behavior of policyholders not only cause claims to mount, but also deteriorates the normal frequency pattern of the claims and cause technical reserves of the companies to reduce.

Change in the policyholder attitude towards insurance during a crisis also creates a negative impact. From the policyholders' point of view insurance is generally perceived as a luxurious item which is among one of the first items to be abandoned in an economic slowdown. Insurance is treated as bringing only a cost but not a benefit especially in times of crisis. When the lowered income is tried to be allocated to various expenditure items in a most effective way, insurance is not given the deserved proportion. This approach which is generally observed in developing countries impedes the potential progress of the sector and causes it to lose strength during crises.

In this context, policyholders surrendering their policies with a need of cash can be considered as a typical response (Impavido & Tower, 2009). If such behavior becomes widespread especially life insurers are hurt, since some types of life insurance serve as saving instruments and when an immediate cash is necessitated in an economic slowdown policyholders may choose to take their accumulated savings even in expense of penalties for early termination (Impavido & Tower, 2009).

Economic crisis which is accompanied by contraction in the output, foreign trade, decrease in usage of credit and slowdown of sales naturally implies a fall in the number of goods and services that can be insured. Moreover decrease in the number of new established companies causes potential demand from corporate sector for various types of insurance to cut off. In addition, demand for group health insurance which is offered to the employees by the employers as a benefit can fall when existing companies are closed.

On the other hand, impact of 2008 crisis on the insurance sector carries some differentiated features due to the specific characteristic of the 2008 crisis which originated from the problems emerged in the subprime mortgages. Following figure

depicts these channels of influence. The reflection of these effects on the assets of the insurers was softening non-life market which means lowered premiums and profits but increased competition. Although it is a concern for the insurers, for consumers it signifies opportunities to grasp in terms of lowered premiums. From the liability side, crisis caused insurers to seek for alternative capital in order to overcome the deterioration in the asset side.

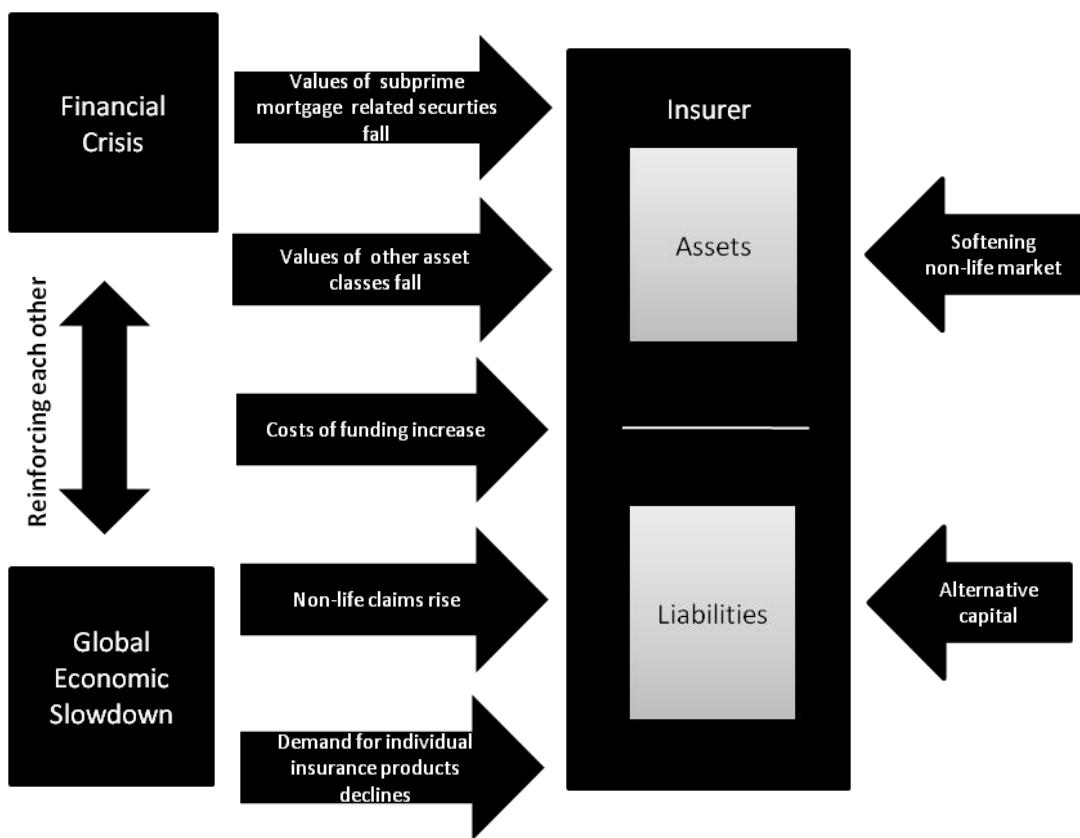


Figure 9 Impact of 2008 Crisis on the Insurance Industry

Source: "Global Economic Outlook: How the Financial Market Turbulence Affects Insurance" by T. Hess.

Impavido and Tower's (2009) observations with regards to effects of the 2008 crisis on the insurance sector in general are as the following:

"More significantly, a small group of insurers and reinsurers, including AIG, the monoline insurers and, to a much lesser extent, Swiss Re, extended their insurance business to write credit derivatives on structured finance assets, exposing themselves to major mark-to-market losses when these assets fell in value. While there has been only one significant failure of an insurer (AIG), others have received government funds. In Japan, the relatively small insurer Yamato Life, failed because of exposure to alternative investment vehicles. In the Netherlands, the ING Group (banking and insurance) has accepted a EUR 10 billion capital injection and Aegon EUR 3 billion from the government to recapitalization fund" (p. 22)

On the other hand, structure of the business conducted in insurance also carries preventive features against crises. Insurance companies are generally less affected from the economic crises compared with banks. This situation can be attributable to "the distinct business models which expose them to lesser risks" (Liedtke, 2009, p. 3). One of the most crucial issues of concern for banks which arises during a crisis is liquidity risk. When a large number of depositors decide to withdraw their deposits from banks with a panic, banks can fall short of liquidity since they keep only a small portion of the deposit and extend loans with the rest. Such a case is not feasible for the insurance sector as "insurers have structurally low exposure to liquidity risk—because they are premium funded and claims are made as contracted rather than on demand, and because their assets are predominantly marketable" (Impavido & Tower, 2009, p. 29). Moreover, their commitments are spread to years, therefore in the medium term the reduction in their income can be compensated.

4.6.ii Impacts of Economic Crises After 1990 on the Turkish Insurance Sector

Reflections of the crises on the Turkish insurance sector have been generally high above the change in the economy (Erdoğan, 2003). If real GDP growth and real premium production growth are taken as proxies for observing the impact of the

crises on the economy and the insurance sector, the difference can be seen more obviously. For instance in 1994 while GDP decreased by 5.5% in real terms, insurance sector contracted by %61.1 in real terms. Similarly, in 2001 crisis decrease of output by 9.4% was reflected in 47.5% decrease in the insurance sector (Erdoğan, 2003).

High levels of inflation have been the most important contributor of the downturn in the insurance sector during the crisis periods. Although in 1994, 2001 and 2008 an increase of premium production in nominal terms was realized, increase in the inflation rate was so high that the real premium production decreased compared with the previous year. Throughout time, decreases in total direct premiums and direct premiums per capita in real terms were observed only during the crisis periods. The following table indicates that when real decrease in direct premiums and direct premiums per capita are taken as the reference points, 2001 crisis can be said to affect the insurance sector most. 1994 crisis follows in terms of the magnitude of the negative effect on real premium production and real premiums per capita. When compared with 1994 and 2001 crises, the effect of 2008 crisis can be considered as relatively limited. Another point that attracts attention in the table is that the effect of 2008 crisis was felt more fiercely in 2009.

Table 4 Change in Direct Premiums and Direct Premiums per Capita in Constant Price

Year	Change in Direct Premiums in Constant Price (%)	Change in Direct Premiums Per Capita in Constant Price (%)
1990	38.91	35.94
1991	14.59	12.19
1992	25.52	22.74
1993	31.34	28.27
1994	-26.20	-27.88
1995	20.89	17.82
1996	9.59	6.88
1997	15.64	18.59
1998	25.86	23.83
1999	7.00	5.45
2000	38.41	36.45
2001	-30.86	-31.82
2002	12.50	10.97
2003	19.29	17.39
2004	17.23	15.41
2005	14.99	13.26
2006	10.84	9.64
2007	6.75	11.72
2008	-0.33	-1.60
2009	-1.58	-3.07

Source: Undersecretariat of Treasury

In terms of profitability, impact of crises should be assessed under two distinct profit categories; financial and technical profit. Technical profit corresponds to the earnings due to the main business conducted in the insurance company whereas financial profit corresponds to the earnings due to the investments. Analysis of the profitability of the Turkish insurance sector through time points out a concrete conclusion. During periods of crisis generally increase in the financial profits are relatively higher than the technical profits. As the following table indicates, in 1994 financial profits had increased by 2,211% compared with the previous year whereas an increase of 60% was recorded in technical profit. In 2001 increase in the financial profits was 704% while the increase in the technical profit was limited to 2%. However the situation was reversed in 2008 as the increase in the technical profit exceeded the increase in the financial profit.

Table 5 Technical and Financial Profits of Insurance Sector

	TL		Change in (%)	
	Technical Profit	Financial Profit	Technical Profit	Financial Profit
1984	14,386	-1,500	61	31
1985	22,105	110	54	107
1986	30,320	-3,363	37	-3,157
1987	40,381	-3,452	33	3
1988	82,685	-7,563	105	-119
1989	184,630	-37,732	123	-399
1990	428,880	-136,694	132	-262
1991	821,380	-267,415	92	-96
1992	1,382,990	-465,330	68	-74
1993	2,758,000	80,000	99	117
1994	4,421,000	1,849,000	60	2,211
1995	7,824,000	3,889,000	77	110
1996	12,044,000	16,526,000	54	325
1997	22,704,000	27,803,000	89	68
1998	50,620,000	26,370,000	123	-5
1999	107,513,000	109,797,000	112	316
2000	280,740,000	-28,594,000	161	-126
2001	286,213,000	172,644,000	2	704
2002	437,395,883	6,204,740	53	-96
2003	392,925,413	37,506,461	-10	504
2004	653,477,945	-166,858,360	66	-545
2005	94,523,104	250,374,122	-86	250
2006	27,417,368	286,239,374	-71	14
2007	313,113,460	514,657,872	1,042	80
2008	485,328,030	601,227,650	55	17
2009	226,737,429	382,666,152	-53	-36

Source: Undersecretariat of Treasury

During 2001 crisis there were many exits from the market due to deteriorating financial positions of the companies. In this respect, 7 insurance companies' right to conclude further insurance and reinsurance contracts was revoked, 5 insurance companies went bankrupt, licenses of 4 insurance companies were cancelled and 1 reinsurance company was liquidated (Gözlemen, 2008).

In 2008 crisis, “AIG had to be rescued by an enormous injection of public capital and explicit financial guarantees from the government” (Liedtke, 2009, p. 2). AIG’s position against the crisis stemmed from the excessive risk taking behavior of the company and its involvement with credit default instruments. The business it has been conducting involved other than traditional ways of insurance. However since in Turkey and likewise in the Turkish insurance sector credit derivatives are not

extensively in use, one of the most important channel of influence can be said to be missing. In this context, the way of business conducted in Turkey can be considered as traditional and thanks to this fact, sector was not directly affected from the 2008 crisis.

Furthermore the revisited Turkish insurance legislation includes tight provisions regarding the rights and interests of policyholders. Therefore insurance companies are highly bounded with legal regulations which prevent them to invest in risky areas.

During the first months of the crisis, there was a great volatility in the stock exchanges of the most countries. This fact also affected many institutions that have invested in stocks. From this perspective as well Turkish insurance sector was immune to shocks from stock exchange since a very low proportion of the total investments were devoted to stocks. Following table shows the composition of the investments of the Turkish insurance sector from 1986 onwards.

Table 6 Investment Composition of Turkish Insurance Sector

Years	Government Bills, Notes	Private Sector Bonds	Stocks	Others	Fixed Assets	Total Investments
1986	36	0	19	0	27	82
1987	52	1	55	0	89	197
1988	103	4	86	0	164	358
1989	305	3	162	0	263	732
1990	528	6	312	0	450	1,296
1991	1,210	84	321	0	688	2,303
1992	2,662	0	424	0	1,098	4,184
1993	5,809,560	5,835	621,328	1,071,328	2,087,849	9,595,900
1994	13,981,728	21,660	1,591,871	1,215,828	4,891,773	21,702,859
1995	35,046,200	0	2,129,400	1,215,800	9,025,400	46,201,000
1996	91,639,300	770,600	7,000,400	5,325,500	18,753,400	123,489,200
1997	195,908,000	1,331,900	13,740,100	12,975,900	37,079,400	261,035,300
1998	365,099,357	15,374	25,249,600	13,106,960	74,552,489	478,023,780
1999	639,223,091	545,416	24,246,117	40,841,499	142,640,141	847,496,264
2000	1,057,335,183	1,675,776	118,421,403	121,501,467	266,760,232	1,565,694,061
2001	1,628,873,664	7,795,287	185,534,949	237,365,325	435,889,726	2,495,458,952
2002	2,583,317,089	19,616,000	15,173,161	200,576,261	689,976,038	3,508,658,549
2003	3,753,032,442	9,727,583	23,862,000	314,593,799	898,848,542	5,000,064,366
2004	4,925,307,909	3,834,000	45,351,697	371,905,292	1,095,571,632	6,441,970,529
2005	5,203,415,809	2,244,823	67,306,532	245,249,958	541,968,243	6,060,185,364
2006	5,262,265,332	7,016,200	52,625,489	105,761,963	509,516,474	5,937,185,458
2007	6,175,747,732	18,846,195	117,339,841	134,314,136	497,290,430	6,943,538,333
2008	7,094,059,833	6,226,700	162,211,673	133,867,915	658,689,453	8,055,055,573
2009	7,390,240,892	23,330,441	2,012,758,241	156,590,444	684,070,801	10,266,990,819

Source: Undersecretariat of Treasury

In Turkey premium production is directly affected from the developments in the automotive sector. Contraction in this sector in 2008 was alarming and had its repercussions in the premium production of motor insurance. As Duygulu (2009) draws attention, data from the Automotive Industry Association confirms that industry's total production of vehicles shows a 50% reduction in November 2008 compared with the same period last year. In the last quarter of 2008 a reduction of 23% and 17% was recorded in premium production and number of policies respectively (Duygulu, 2009). From the profitability perspective the situation is the

same. A reduction of 582% in technical profit of motor insurance was recorded from end 2008 to end 2009.

Similarly, real estate sector has close links with insurance sector. In 2008, due to economic difficulties and high mortgage interest rates, the number of housing purchases has fallen compared to previous year. Certainly this had a negative impact on the home insurances. However instead of a reduction in the amount of home insurances a reduction in the rate of increase was the case. (Karataş, 2008)

As of 31.12.2009, the amount of minimum capital which the insurance companies are required to hold according to the Turkish insurance legislation was 3,991,637,966 TL which increased by approximately 18.2% compared to 2008. This situation can be considered as an increase in the risk exposure of the sector since what causes an increase in the minimum capital requirement is the increase in the risk exposure of the sector according to the Turkish insurance legislation. An analysis on total policy quantity unveils that the branch feeling the impact of global crisis the most is life branch which faced shrinkage of 42% (Nart, 2009).

Individual pension system was in a limited way affected from the crisis. Despite the crisis the pension funds, pension contributions and number of participants have increased by 39.5%, 39.5% and 19.7% respectively from 2007 to 2008 according to the data retrieved from Pension Monitoring Center.

4.7 CONCLUSION

In this chapter, first of all economic crises were investigated from various perspectives in order to understand their impacts on the insurance sector. Then, three major economic crises that affected Turkey after 1990 were explained with specific emphasis on 1994, 2001 and 2008 crises. Lastly the impacts of the economic crises both on a typical insurance sector and Turkish insurance sector were reviewed.

One of the most remarkable conclusions of this chapter is that when real decrease in direct premiums and direct premiums per capita are taken as the reference points,

2001 is the crisis which insurance sector is affected from most. 1994 crisis follows in terms of the magnitude of the negative effect on real premium production and real premiums per capita. When compared with 1994 and 2001 crises, the effect of 2008 crisis can be considered as relatively limited.

After having completed the descriptive analysis of the impacts of the economic crises on the Turkish insurance sector, it is important and necessary to support the analysis with empirical findings. Following chapter fulfills this task with presenting an econometric point of view to the subject and quantifying the aforementioned effects of the economic crises on the Turkish insurance sector.

CHAPTER 5

EMPIRICAL ANALYSES OF THE PERFORMANCE OF THE INSURANCE SECTOR IN TURKEY AND THE IMPACTS OF ECONOMIC CRISES

5.1 INTRODUCTION

Assessment of a cause and effect relationship can be complete and sound only if it is supported by an empirical analysis based on econometric theories and tools. So far, economic crises and the insurance sector which constitute the subjects in the cause and effect relationship are examined in detail. At this stage quantification of the impact of the crises on the insurance sector is necessary to confirm the validity of the proposed effects.

In this chapter econometric analysis will be divided into three components. In the first part Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) model will be utilized to account for the exchange rate uncertainty. Exchange rate uncertainty is deemed to be a significant factor affecting the insurance sector especially during the crisis periods. Then the result obtained from this analysis will be used as an independent variable in the time series and panel data models. Time series model includes macroeconomic variables that affect the performance of the insurance sector. The last part of this chapter will be devoted to panel data analysis which will shed light to the company specific factors affecting Turkish insurance sector. Entire econometric analysis spans a 30 year time period from 1980 to 2009 which is considered as sufficient to make inference with regards to the Turkish insurance sector.

5.2 LITERATURE REVIEW

In order to observe the effects of the crises on the insurance sector, at the first place a proxy which is assumed to measure the performance of the insurance sector is needed to be defined. In this context, direct premium production of the companies is chosen as the proxy for the performance of the Turkish insurance sector.

In the literature, discussions regarding the determinants of insurance premiums generally examine life and non-life insurances separately. Moreover the vast majority of the studies are focused on life insurance rather than non-life. Findings of the several studies emphasize the individual factors as the major source of demand for insurance instead of macroeconomic variables. In general, inflation rate, interest rate, income and growth as being the macroeconomic variables are found to have an impact on premium production (Browne & Kim; 1993; Grace & Hotchkiss, 1995; Beck & Webb, 2003; Hussels et al., 2005; Horng & Chang, 2008; Horng et al., 2009). However, variables such as exchange rate, unemployment rate, international reserves, number of new established companies and number of cars in the economy were not found to be utilized as determinants of insurance premiums.

In the study of Hussels et al. (2005) three categories of insurance determinants have been identified; economic, legal/political, and social factors. A strong, well-functioning legal system and a stable political environment are found to be the significant factors which stimulate the insurance demand. What follow next are the economic variables such as national income, an aging population, increased financial development, and low rates of inflation. However, the study also draws attention to the fact that the impact of these determinants can vary across lines of coverage and geographical regions.

Horng and Chang's (2008) study on the demand for non-life insurance in Taiwan suggests that individual's income and wealth, the price of insurance, the probability of loss and the individual's degree of risk aversion influence insurance purchases of an individual.

Guo, Fung and Huang's (2009) study on the dynamic impact of macro shocks on insurance premiums suggests that “although real shocks originating from oil price and aggregate supply explain the behavior of insurance premiums well, financial market shocks are the main driving force behind the recent increasing volatility in insurance premiums in U.S. market” (p.225).

Grace and Hotchkiss (1995) examined the long run relationship between real GDP, inflation and the short-term interest rate on the insurance underwriting cycle, as measured by the combined ratio¹ using cointegration techniques. Their findings suggest that “although the property-liability industry is linked to the long run performance of the national economy, short run shocks in economic variables have little effect on the combined ratio in the short run” (p. 738).

For the life insurance the most significant factor that affects the demand is found to be the income. Beck and Webb (2003) draws the attention to the fact that income is found to be positively related with the use of life insurance in many studies.

As Beck and Webb (2003) confirms, demand for life insurance is found to be explained by wealth, expected income over a person's lifetime, interest rates, the cost of life insurance policies (administrative costs), and the assumed subjective discount rate for current over future consumption by Yaari (1965) and Hakansson (1969).

Beck and Webb's (2003) study proposes that life insurance consumption increases when both current and permanent income, private savings rate and real interest rate are high, inflation is low and banks are well developed. On the other hand, inflation and its volatility are expected to be negatively related with the consumption of life insurance. “Because life insurance savings products typically provide monetary

¹ Combined ratio is the sum of the loss and expense ratios not reflecting investment income or income taxes. This ratio measures the company's overall underwriting profitability, and a combined ratio of less than 100 indicates an underwriting profit (AM Best, 2010).

benefits over the long term, monetary uncertainty has a substantial negative effect on the life insurance industry.” (p. 12)

Cummins (1973) suggests that macroeconomic variables like GNP and permanent income have correlations with flows of life insurance and insured pension reserves.

In the study of Horng et al. (2009) findings suggest that demand for insurance is positively affected by the economic growth not only in the long run but also in the short run. In other words, there is a strong link between increase in insurance demand and economic growth, with income elasticity generally greater than one.

In the Browne and Kim's (1993) research factors that lead to variations in the demand for life insurance across countries are identified and important factors are found to be the dependency ratio, national income, government spending on social security, inflation, the price of insurance and whether Islam is the predominant religion in a country. The finding in the study is that life insurance is positively correlated with national income and wealth (as proxied by social security expenditures) and negatively correlated with inflationary expectations suggest that economic development and economic stability greatly increase life insurance consumption.

Lim and Haberman's (2003) study which is focused on the determinants of life insurance premiums in Malaysia notes that the economic downturn affected the performance of the insurance industry in 1998. The major findings of this study indicate that life insurance demand in Malaysia has strong links with the savings deposits rate and price change in insurance. However, savings deposits rate is not found to have a negative sign as expected.

Sen and Madheswaran (2007) investigated the crucial economic and socio-political variables which can play a significant role in explaining the life insurance consumption pattern in 4 SAARC (South Asia Association for Regional Cooperation) countries, 2 countries from Greater China Region and 6 ASEAN (Association of Southeast Asian Nations) countries for the 11 year period (1994-

2004). What they come up with as a conclusion is that if income is exogenously considered to be a crucial factor in explaining insurance consumption, economic variables of importance would be gross domestic savings, level of financial sector development and inflation. Although real interest rate was not significant in their cross country analysis, it turned out to be significant in their time series analysis.

Tunay and Tunay's (2009) study which investigates the fragility of the Turkish insurance sector against crisis using panel data, panel logit and panel VAR models suggest that vulnerability of the insurance sector is strongly affected by macroeconomic structure. Inflation and growth are taken as proxies for the macroeconomic structure and they are found to explain the fragility in a significant way.

5.3 FACTORS THAT EXPLAIN PERFORMANCE OF THE INSURANCE SECTOR IN TURKEY

Direct premium production of the companies is chosen as the proxy for the performance of the Turkish insurance sector. Factors utilized for explaining the performance of the insurance sector in Turkey are categorized as macroeconomic and firm specific variables.

Firm specific variables that are used for explaining premium production include total assets, net profit after tax, nominal capital and share of firm's assets in total assets of that year. Moreover model will also contain a dummy (DUMFOR) which takes the value of 1 if the company is foreign and 0 if it is not. For these firm specific variables the expected signs in the model are shown in the following table.

Table 7 Expected Signs of the Variables in the Model

Independent Variables	Symbol	Expected Sign
Total Assets	ASSETS	+
Net Profit After Tax	PROFIT	+
Nominal Capital	CAPITAL	+
Share of Firm's Assets	ASSETSHARE	+

The reasoning why above variables are chosen as explanatory variables is that they are assumed to represent the size of a company and determine the capacity of the firm's premium production. All of them have a positive expected sign since an increase in each implies an increase in the capacity of the firm's premium production. For instance, for the case of profit Grace and Hotchkiss (1995) claim that "an exogenous shock causes an increase in profits, which, in turn, increases the firm's capacity to write insurance" (p.1). Below table shows the correlation between these variables and premium production. Although there may be bidirectional causality, it is obvious that there is a high correlation among these variables and premium production.

Table 8 Correlations Between Premiums and Other Firm Specific Variables

	Profit	Capital	Assets
Premiums	0.906713	0.98934	0.982058

For the macroeconomic variables, the rationale is to incorporate those variables which are under direct exposure in crisis periods to the model. In this sense, these variables can be said to represent periods of crisis due to the fact that what trigger them to take extraordinarily higher or lower values compared with tranquil periods are crises. In other words, crises affect these variables and these variable affect the insurance industry creating an implicit link between crises and insurance. In this context, inflation, growth rate, exchange rate, interest rate, international reserves, number of cars, number of net established companies, balance of payments, unemployment rate, GNI per capita, number of insurance companies and exchange rate uncertainty will be utilized as macroeconomic variables.

What these variables correspond in meaning are explained as follows. Inflation corresponds to the percentage change in the consumer prices for all items on the same period of the previous year. Growth rate is the annual percentage growth rate

of GDP at market prices based on constant local currency. Data on exchange rates correspond to the daily exchange rates for USD (selling) which are converted to TL. International reserves are net international reserves measured in millions of USD. Number of cars corresponds to the total number of cars including land vehicles. To calculate the number of net established companies, number of closed companies is deducted from the number of new established companies for the relevant year. GNI per capita refers to gross national income (GNI) per capita converted to international dollars using purchasing power parity rates. Number of insurance companies includes insurance companies established in Turkey and Turkish organizations of insurance companies established abroad. Exchange rate uncertainty will be derived from the residuals of the EGARCH model that will be presented in the forthcoming section of this chapter. Direct premium production corresponds to direct premiums in 1981 constant prices. Moreover for the crisis years 1994 and 2001, two dummy variables will be included in the model, which take the value 1 in the corresponding crisis year and 0 for the rest. Following table shows the independent variables, their corresponding symbols and expected signs.

Table 9 Expected Signs of the Variables in the Model

Independent Variables	Symbol	Expected Sign
Inflation	INF	+ or -
Growth rate	GROWTH	+ or -
Exchange rate	EX	+
Interest rate	INT	-
International reserves	INTRES	?
Number of cars	CAR	+
Number of net established companies	ESTAB	+
Balance of payments	BOP	?
Unemployment rate	UNEMP	-
GNI per capita	GNIPC	+ or -
Number of insurance companies	FIRM	+
Exchange rate uncertainty	EGARCH	-

Inflation can affect the premium production in two ways. It causes purchasing power of the individuals to erode and consequently the general level of expenditure to be lowered. Insurance is not an exception in this sense. As Browne and Kim (1993) confirm, in terms of life insurance, Greene (1954), Fortune (1973), and Babbel (1981) have depicted that life insurance is significantly and negatively affected by inflationary expectations. Since the long term return expected from the life insurance contracts are threatened in an inflationary environment, the life insurance products lose their attractiveness in the eyes of the consumers. On the other hand, D'arcy (1979) claims that "the effect of inflation on insurance companies is that the renewal of the same number of exposures in future years generates higher written premiums" (p. 99). "During inflation, it is assumed that the average premium per exposure increases in line with the inflation rate. The company would write the same number of exposures that it would have under no inflation, but each exposure generates an inflated premium" (D'arcy, 1979, p. 100). Which of these two different aspects with regards to the effect of inflation on the insurance premiums overweighs determines the sign of inflation in the model.

Balance of payments and international reserves are in fact variables that are not considered as directly related with the insurance premium generation. Actual reasoning to incorporate these variables to the model is to benefit from their relationship with the crises. During the crisis periods, international reserves generally fall at a considerable degree. On the other hand, balance of payments shows a varying pattern of behavior in the crises. The relationship between these variables and the insurance sector is vague and lacks empirical support. Therefore before getting the estimation results, the impact of changes in these variables on the insurance sector is unpredictable.

Growth rate is one of the most sensitive indicators during the periods of crisis which begins to fall when the severity of the crisis increases. In this sense, the effect of decreasing growth rate on the insurance industry can be attributed as the indirect effect of crises, since decreasing growth rate stems from the emergence of the crisis. In the literature although the focus is mainly on the contribution of the insurance sector to the economic growth, the causality also runs from the reverse side. Studies

of Ward and Zurbruegg (2000) for nine OECD countries from 1961 to 1996 suggest that while Granger causality runs from the insurance industry to economic growth in some countries, in others the reverse is true. It is both a theoretical and empirical fact that crises are generally associated with slowdowns in the economic growth. Indeed, this downturn in the economy creates a domino effect for most of the sectors in the economy including the insurance sector. In fact, effect of the growth rate on insurance sector is transmitted substantially via the change in the income per capita. Falling rates of growth results with falling income per capita, which in turn leads individuals to be less willing to spend. Insurance is still perceived as a luxurious item for the most part of the population in Turkey. Therefore its consumption can be one of the first to be abandoned during a crisis. Moreover decrease in the economic growth causes investments to slow down which in consequence end with decreasing premium production (Ertekin & Baştürk, 2005). On the other hand, decreasing growth rate and income per capita may motivate the risk-averse individuals to purchase more protection for their properties during a crisis, since compensation of a possible loss by their own means would be much more detrimental with the lowered income. Briefly, growth rate and GNI per capita can either be positively or negatively related with the insurance premium production depending on the behavior of the agents in the economy.

Exchange rate is an important indicator for most of the sectors in the economy. Uncertainty created by its volatility discourages future investments and thus threatens economic progress. Especially devaluations affect the insurance sector in a negative way. Corporations which decide to stop making new investments in a devolutionary environment hinder potential insurance demand by these corporations. In addition due to decreasing imports, demand for shipping insurances also decrease (Ertekin & Baştürk, 2005). Consequently a positive relationship between exchange rate and insurance premiums is expected.

Exchange rate uncertainty is expected to be negatively correlated with premium production since economic agents will be discouraged to increase their expenditures when there is uncertainty in the economy. For them to be motivated to purchase insurance, a high volatility in the crucial economic indicators should not be present.

Increase in the interest rates makes the bank deposits more attractive instruments for saving purposes and therefore causes funds to outflow from the insurance sector (Ertekin & Baştürk, 2005). In this respect, expectation is that a negative relation between interest rate and insurance premium prevails.

Inclusion of number of cars as an explanatory variable to the model actually stems from the characteristic of Turkish insurance sector. Share of the premium production in motor insurance and compulsory motor third party liability insurance in total non-life premium production is 44% as at the end of 2009 according to the data retrieved from Undersecretariat of Treasury. Such a high percentage proves the significance of these branches as the prominent factors in the Turkish insurance sector. During crises the number of cars in the economy either fall or increase with a decreasing rate compared with tranquil periods. Especially reduced imports cause such a change in the number of cars. What the falling number of cars signifies for the insurance sector is falling demand for motor and motor third party liability insurance. That is to say, a positive relationship between number of cars and insurance premiums is expected in the model. Indeed this effect is valid for the non-life insurance; however since the share of non-life insurance in the Turkish insurance sector outweighs the life insurance the aforementioned link is not expected to be violated.

Number of net established companies is another variable which is in direct relationship with insurance sector. Insurance premiums generated from corporate sector constitute an important portion of the total premium production. Especially demand for the products of insurances such as fire, theft, hazardous material, profit loss, breakdown of machine, construction, etc. which address primarily the corporate sector is affected from the number of established companies. To this end, expected sign for the relationship between number of net established companies and insurance premium production is positive.

Unemployment rate is another variable which is affected in a severe and a negative manner during the crises. When the number of unemployed increase in the economy it might have a two way impact on the insurance sector. On one hand, demand for

unemployment insurance increases with the motivation of compensation of the financial losses due to the loss of job, on the other, unemployed people decrease their expenditure on insurance along with many other items in order to manage with the loss of income. From another point of view, decrease in the employment results in decreasing amounts of health insurance which is provided by the private companies as a benefit to their employees. Although there are two opposite side effects of the unemployment rate on the insurance sector, the expectation is that the negative effect of the increase in the unemployment rate will outweigh its positive impact on the premium production.

Number of insurance companies in the sector is expected to be positively related with the insurance premium production as each additional company corresponds to additional source of premium generation.

5.4 DATA AND METHODOLOGY

5.4.i Analysis in Aggregate Level (Time Series)

In this section, annual data for the period covering 1980-2009 is utilized for the time series econometric analysis. Data on inflation, growth rate, exchange rate, interest rate, international reserves, number of cars, number of net established companies, balance of payments, unemployment rate, GNI per capita, number of insurance companies and direct premium production are extracted from the databases of OECD, World Bank, Republic of Turkey Prime Ministry Undersecretariat of Treasury, Central Bank of the Republic of Turkey and Turkish Statistical Institute.

In order to observe the effects of the crises on the insurance sector, at the first place a proxy which is assumed to measure the performance of the insurance sector is needed to be defined. In this context, direct premium production of the companies including both life and non-life is chosen as the proxy for the performance of the insurance sector and its level in the 1980-2009 period measured in 1981 constant prices is assumed to be the dependent variable.

In this framework, following model is set up which will be estimated by utilizing ordinary least square (OLS) method.

$$\begin{aligned} \text{PREM}_t = & \beta_0 + \beta_1 \text{INF}_t + \beta_2 \text{GROWTH}_t + \beta_3 \text{EX}_t + \beta_4 \text{INT}_t + \beta_5 \text{INTRES}_t + \beta_6 \text{CAR}_t \\ & + \beta_7 \text{ESTAB}_t + \beta_8 \text{BOP}_t + \beta_9 \text{UNEMP}_t + \beta_{10} \text{GNIPC}_t + \beta_{11} \text{FIRM}_t + \beta_{12} \text{EGARCH}_t \\ & + \beta_{13} \text{DUMMY94} + \beta_{14} \text{DUMMY01} + u_t \end{aligned} \quad [7.1]$$

5.4.ii Analysis in Disaggregate Level (Panel Data)

During the time period covering 1980-2009, taking into account the entries to and exits from the sector, a total of 105 companies operated in the Turkish insurance sector according to the reports about insurance and private pension activities in Turkey published by Insurance Supervision Board. However since the number of companies in the sector differs from one year to another the data set is said to be unbalanced. In order to transform this unbalanced data set to a balanced one, those companies which were not active during the entire time period were eliminated. As a result 15 companies which have been operating for 30 years from 1980 to 2009 constituted the base for the balanced data set. The analysis in this part will be conducted on the basis of this balanced data set.

In this part, panel data analysis techniques will be utilized to observe the effects of both firm specific factors and macroeconomic variables on the premium production of the Turkish insurance sector. Macroeconomic variables include exchange rate, inflation rate, interest rate, number of cars, number of net established companies, growth, unemployment rate, GNI per capita and exchange rate uncertainty.

“Using a panel allows to exploit both cross-company and time series variation in the data and to control for differences across companies and over time not accounted for by any of the explanatory variables” (Beck & Webb, 2003, p. 17).

For the analysis in this part following model is set up in which i denotes the companies and t denotes the time.

$$\begin{aligned}
\text{PREM}_{it} = & \beta_0 + \beta_1 \text{ASSETS}_{it} + \beta_2 \text{PROFIT}_{it} + \beta_3 \text{CAPITAL}_{it} + \beta_4 \text{ASSETSHARE}_{it} + \\
& \beta_5 \text{DUMFOR}_{it} + \beta_6 \text{EX}_{it} + \beta_7 \text{GNIPC}_{it} + \beta_8 \text{ESTAB}_{it} + \beta_9 \text{UNEMP}_{it} + \beta_{10} \text{INF}_{it} + \\
& \beta_{11} \text{INT}_{it} + \beta_{12} \text{GROWTH}_{it} + \beta_{13} \text{CAR}_{it} + \beta_{14} \text{EGARCH}_{it} + \beta_{15} \text{DUMMY94} + \\
& \beta_{16} \text{DUMMY01} + u_{it}
\end{aligned} \quad [7.2]$$

5.5 EMPIRICAL RESULTS

5.5.i Time Series Properties of the Variables

Following graphs depict the behavior of each variable under investigation in the analysis in aggregate level during 1980-2009 period. What these graphs indicate in the first instance is that the 1994, 2001 and 2008 crisis years are noticeable with their extraordinary behavior.

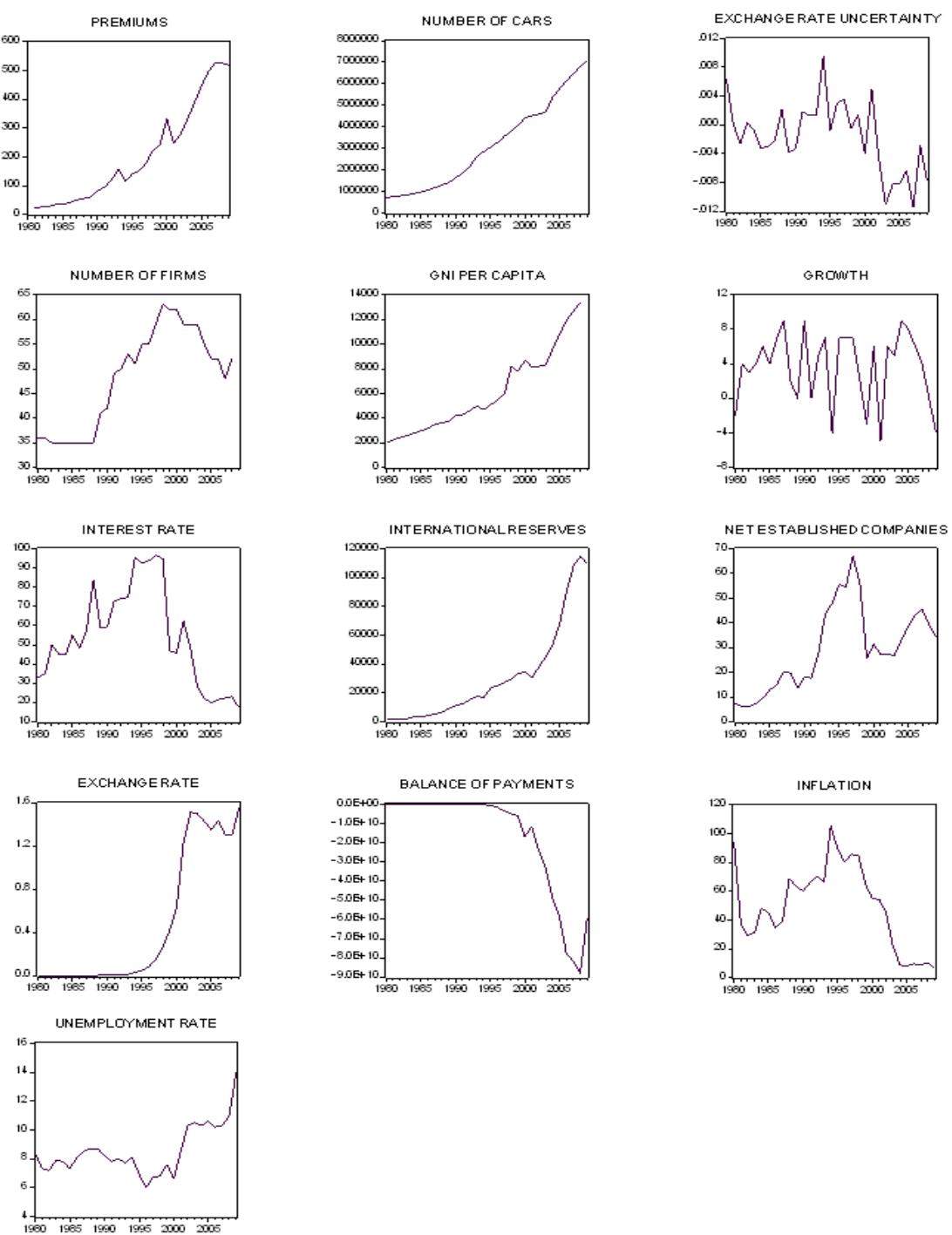


Figure 10 Dependent and Independent Variables During 1980-2009

Before conducting the regression analysis, it will be better to display the interaction and correlation between each of the variables. Below table shows that there is high

correlation between BOP vs. CAR, BOP vs. EX, BOP vs. GNIPC, BOP vs. INTRES, CAR vs. EX, CAR vs. GNIPC, CAR vs. INTRES, EX vs. GNIPC, GNIPC vs. INTRES and INF vs. INT.

Table 10 Correlations Among Independent Macroeconomic Variables

	BOP	CAR	EX	FIRM	GNIPC	INF	INT	INTRES	ESTAB	UNEMP	GROWTH	EGARCH
BOP	1.00	-0.86	-0.85	-0.31	-0.90	0.74	0.68	-0.96	-0.33	-0.77	0.01	0.65
CAR	-0.86	1.00	0.89	0.75	0.98	-0.48	-0.41	0.94	0.61	0.65	-0.10	-0.50
EX	-0.85	0.89	1.00	0.53	0.87	-0.67	-0.64	0.84	0.28	0.79	-0.07	-0.64
FIRM	-0.31	0.75	0.53	1.00	0.67	0.13	0.16	0.49	0.73	0.07	-0.07	-0.07
GNIPC	-0.90	0.98	0.87	0.67	1.00	-0.50	-0.42	0.96	0.56	0.63	0.03	-0.52
INF	0.74	-0.48	-0.67	0.13	-0.50	1.00	0.85	-0.61	0.20	-0.69	-0.20	0.81
INT	0.68	-0.41	-0.64	0.16	-0.42	0.85	1.00	-0.55	0.37	-0.69	0.00	0.68
INTRES	-0.96	0.94	0.84	0.49	0.96	-0.61	-0.55	1.00	0.48	0.75	-0.12	-0.58
ESTAB	-0.33	0.61	0.28	0.73	0.56	0.20	0.37	0.48	1.00	0.01	0.12	0.01
UNEMP	-0.77	0.65	0.79	0.07	0.63	-0.69	-0.69	0.75	0.01	1.00	-0.19	-0.60
GROWTH	0.01	-0.10	-0.07	-0.07	0.03	-0.20	0.00	-0.12	0.12	-0.19	1.00	-0.39
EGARCH	0.65	-0.50	-0.64	-0.07	-0.52	0.81	0.68	-0.58	0.01	-0.60	-0.39	1.00

The first step of constructing a time series model is to determine whether the variables are stationary or not to avoid spurious regression problem and violate of assumption of the Classical Regression Model (Mun et al, 2008). Augmented Dickey Fuller (ADF) test is used to test for unit root in the variables. Following table displays the result of the ADF test for each variable in the time series analysis.

Table 11 Augmented Dickey-Fuller Test for Unit Root on the Variables in Aggregate Analysis

Variables	With intercept	With trend and intercept	None
PREM	4.692155*	1.335994	2.549912
INF	-1.617808	-1.694902	-1.666922
GROWTH	-5.439789*	-5.355718*	-3.219646*
EX	-0.242746	-2.134732	0.460939
INT	-1.274638	-1.700371	-0.704245
INTRES	4.642155*	0.552440	5.306168*
CAR	3.557778	-1.926786	9.339536*
ESTAB	-1.628707	-1.535472	-0.274577
BOP	-2.970653	-6.400379*	-3.217227*
UNEMP	0.568210	-0.606822	1.242885
GNIPC	3.604675	0.460914	4.779574*
FIRM	-1.768308	-0.569105	0.822424
EGARCH	-1.870078	-3.758329	-1.540620
DUMMY94	-5.385165*	-5.285849*	-5.291503*
DUMMY01	-5.385165*	-5.388797*	-5.291503*

Notes: * indicates level of significance at 5% level. Lag lengths are determined automatically by Eviews 5.0.

For the variables whose level is non-stationary, ADF test is conducted on their first differences, which yields the following result indicating that they become stationary after integrated of order 1.

Table 12 Augmented Dickey-Fuller Test for Unit Root on the First Difference of the Variables in Aggregate Analysis

Variables	With intercept	With trend and intercept	None
DPREM	-5.712665*	-5.690273*	-4.455276*
DINF	-6.228742*	-6.315304*	-6.362460*
DEX	-2.710122	-2.843898	-2.412387*
DINT	-5.132556*	-5.690977*	-5.490783*
DCAR	-3.118036*	-4.131589*	-1.306977
DESTAB	-4.290488*	-4.297977*	-4.321365*
DUNEMP	-3.601649*	-3.931041*	-3.419868*
DFIRM	-2.020776	-4.775564*	-1.854344
DEGARCH	-8.870862*	-6.217432*	-8.976190*

Notes: * indicates level of significance at 5% level. Lag lengths are determined automatically by Eviews 5.0

For the variables in the panel data model unit root tests of Levin Lin Chu and Im Pesaran Shin are utilized. Below table shows these unit root test results.

Table 13 Levin Lin Chu and Im Pesaran Shin Tests for Unit Roots on the Variables in Disaggregate Analysis

Variables	Levin Lin Chu test (t)	Im-Pesaran-Shin test (t-bar)
PREMIUMS	12.858	2.728
PROFIT	-2.863	-1.492
CAPITAL	11.014	1.225
ASSETS	12.382	1.913
ASSETSHARE	-6.263*	-1.851*

Note: * indicates level of significance at 5% level.

Both tests indicate that premiums, profit, capital and assets are non-stationary whereas the share of assets is stationary. Following table shows the unit root test results applied to the first differences of the logarithms of the non-stationary variables. Results tell that variables become stationary when their logarithms are integrated of order one. However since net profit after tax can be negative for some firms its logarithmic difference series contains gaps which avoids performing panel unit root tests of Levin Lin Chu and Im-Pesaran-Shin that are developed for balanced data sets.

Table 14 Levin Lin Chu and Im Pesaran Shin Tests for Unit Roots on the Logarithmic Differences of the Variables in Disaggregate Analysis

Variables	Levin Lin Chu test (t)	Im-Pesaran-Shin test (t-bar)
DLNPREM	-60.688*	-9.914*
DLNCAPITAL	-34.572*	-8.239*
DLNASSETS	-60.685*	-11.705*

Note: * indicates level of significance at 5% level.

5.5.ii Measuring Foreign Exchange Rate Uncertainty in Turkey

In this part, the aim is to measure the foreign exchange rate uncertainty which will be included as an independent variable to the model that will be set up to estimate the impact of crises after 1990 on the Turkish insurance sector. Such a variable which can be considered as a proxy for the volatility in the economy is deemed to be essential in the estimation of the response of the sector to the crises since one of the most prominent characteristics of the economic crises is the high uncertainty that they cause. On this account, inclusion of this variable will provide a better estimation and understanding of the effects of the aforementioned crises on the Turkish insurance sector.

In order to measure the volatility of the exchange rate exponential generalized autoregressive conditional heteroscedasticity (EGARCH) method will be utilized. EGARCH method has a couple of advantages compared to ARCH and GARCH methods in the sense that “it hampers the effect of outlying shocks in the estimation of uncertainty and enables the separate treatment of the negative and positive shocks” (Berument et al, 2001, p.1).

Weekly frequencies for the period covering 1980-2009 constituted the base for the analysis in this part and TL/USD (selling) exchange rate data is extracted from the database of Central Bank of the Republic of Turkey.

In the first step to check whether the exchange rate series is stationary or not Augmented Dickey-Fuller (ADF) test is conducted. Following table shows the test results which imply that the level variable has unit root, whereas the first difference of its logarithm is stationary. To this end, first difference of the logarithm of the exchange rate will be used as the dependent variable in the EGARCH model.

Table 15 Augmented Dickey-Fuller Test for Unit Root on Exchange Rate

Variables	With intercept	With trend and intercept	None
EX	-0.125147	-1.854225	0.790127
DLNEX	-16.31700*	-20.40988*	-14.23232*

Notes: * indicates level of significance at 5% level. Lag lengths are determined automatically by Eviews 5.0.

Mean equation (7.3) and conditional variance equation (7.4) are given below:

$$DLNEX_t = \beta_0 + \beta_1 DLNEX_{t-1} + \beta_2 \sigma_t^2 + \varepsilon_t \quad [7.3]$$

$$\log(\sigma_t^2) = \alpha_0 + \alpha_1 |(\varepsilon_{t-1}) / (\sigma_{t-1})| + \alpha_2 [(\varepsilon_{t-1}) / (\sigma_{t-1})] + \alpha_3 \log(\sigma_{t-1}^2) \quad [7.4]$$

In the model, σ_t^2 is the conditional variance. $\varepsilon_{t-1} / (\sigma_{t-1})$ represents the standardized residuals of a previous period and if its coefficient α_2 is statistically significant then there is asymmetry in the volatility. Below table shows the estimation results.

Table 16 EGARCH(1,1) Model Results

	Coefficient	z-statistic	Prob.
β_0	0.007676*	27.43902	0.0000
$DLNEX_{t-1}$	0.098683*	5.377584	0.0000
α_0	-0.453204*	-17.71497	0.0000
α_1	0.381235*	25.08110	0.0000
α_2	0.045026*	3.847791	0.0001
α_3	0.976917*	301.1539	0.0000
R^2	0.007654		
Log likelihood	4316.087		

Note: * indicates level of significance at 5% level.

Estimation results indicate that all parameters in the model are statistically significant. The statistical significance of α_2 implies that asymmetry effect is present in the model. Namely, the impact of positive shocks on the conditional variance of exchange rate is not the same as the impact of negative shocks. Moreover α_3 taking the value 0.9769 which is close to 1 indicates that “if there is an expected shock, the fluctuations will not die out in the short run” (Geng, 2006, p. 11). In other words, the shocks on the volatility of exchange rate are persistent.

In order to check whether the ARCH effect is eliminated after the above modelling, ARCH-LM test is conducted and the below table shows that no ARCH effect exists anymore after employing EGARCH(1,1) specification to the exchange rate series.

Table 17 ARCH-LM Test Results

F-statistic	3.390969	Probability	0.065744
Obs*R-squared	3.387950	Probability	0.065675

5.5.iii Empirical Results of the Aggregate Level Analysis

After running the regression with the stationary variables using OLS following model is obtained. Estimation results are summarized in the following table.

Table 18 Estimation Results for Model 1

Independent Variables	Dependent Variable: DPREM =PREM_t - PREM_{t,1}		
	Coefficients	t-statistic	Prob.
C	-52.30488 *	-5.654434	0.0002
DPREM(-1)	0.138079	1.403784	0.1907
DEGARCH	-235.5181	-0.368592	0.7201
INTRES	-0.002016 *	-6.478827	0.0001
GNIPC	0.023436 *	6.366573	0.0001
GROWTH	-0.948480	-1.101604	0.2964
DESTAB	1.924453 *	4.406180	0.0013
DUNEMP	-10.37135 *	-3.288188	0.0082
DINF	0.194592	0.932092	0.3732
DINT	-0.496382	-2.006416	0.0726
BOP	-3.12E-11	-0.142129	0.8898
DCAR	-3.90E-05	-1.917783	0.0841
DFIRM	-1.173908	-1.740854	0.1123
DEX	-0.525040	-0.017311	0.9865
DUMMY94	-66.66541 *	-5.665129	0.0002
DUMMY01	-141.3340 *	-6.760485	0.0000
R-squared	0.989092	Prob(LM-test)	0.364556
Adjusted R-squared	0.972729	AIC	6.553623
F-statistic	60.44863	SIC	7.327836
Prob(F-statistic)	0.000000	Mean VIF	22.69

Note: * indicates level of significance at 5% level.

Diagnostic Checking:

For the testing of autocorrelation, Breusch-Godfrey Serial Correlation LM test is conducted and the below table shows that the model is not autocorrelated.

Table 19 Breusch-Godfrey Serial Correlation LM Test Results for Model 1

F-statistic	0.293878	Probability	0.600908
Obs*R-squared	0.822137	Probability	0.364556

Jarque-Bera statistic depicted below together with the figure of residuals shows that the model does not have the problem of non-normality.

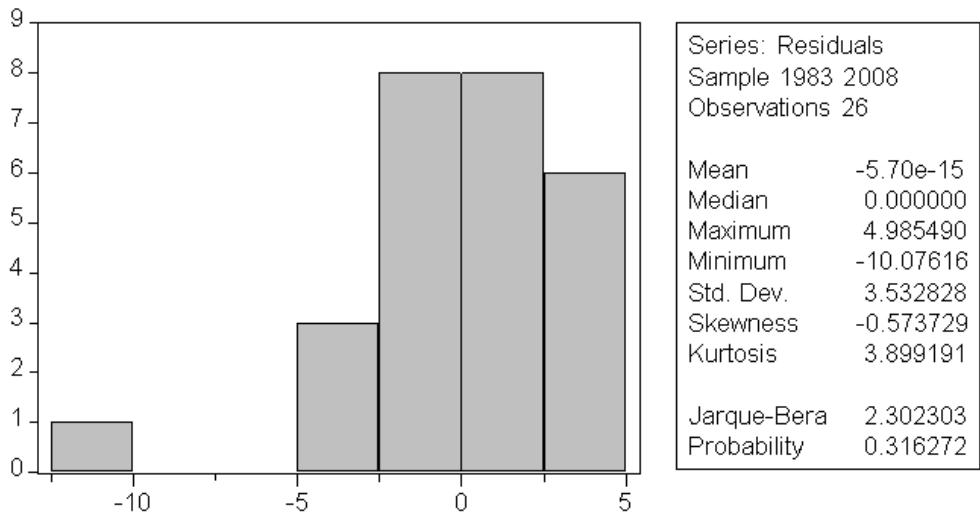


Figure 11 Jarque-Bera Results for Model 1

From the analysis of the t-statistic of each variable, it is seen that international reserves, GNI per capita, first difference of net established companies, first difference of unemployment rate and crisis dummies are statistically significant in explaining the premium production. On the other hand, while most of the variables in the model are insignificant, F-statistic shows that the model itself is significant which increases the suspicions regarding multicollinearity.

For the multicollinearity analysis, each independent variable is regressed on the rest of the independent variables and R^2 of these regressions are used to calculate variance inflation factor. Following table summarizes the results and shows that exchange rate, balance of payments, GNI per capita and international reserves cause the problem of multicollinearity in the model.

Table 20 Variance Inflation Factor (VIF) for Variables in Model 1

Variables	VIF
DPREM(-1)	8.81
DEX	14.85
DFIRM	2.97
DCAR	7.33
BOP	31.64
DINT	10.63
DINF	6.44
DUNEMP	4.40
DESTAB	11.37
GROWTH	9.58
GNIPC	114.38
INTRES	77.62
DEGARCH	8.64
DUMMY94	4.27
DUMMY01	13.47
MEAN VIF	22.69

In short, both due to the insignificant variables and multicollinearity embedded in the model, the model is not preferable and therefore following restricted model is set up by omitting the insignificant variables.

Table 21 Estimation Results for Model 2

Independent Variables	Dependent Variable: DPREM = PREM_t - PREM_{t-1}		
	Coefficients	t-statistic	Prob.
C	-48.70390*	-8.309425	0.0000
DEGARCH	-588.2062	-1.800647	0.0885
INTRES	-0.001679*	-9.836862	0.0000
DESTAB	0.936383*	5.279961	0.0001
GNIPC	0.019835*	11.94337	0.0000
DUNEMP	-8.516035*	-3.768439	0.0014
DFIRM	-1.227341*	-2.305934	0.0332
DUMMY01	-125.8730*	-13.22733	0.0000
DUMMY94	-55.89838*	-7.056614	0.0000
R-squared	0.970021	Prob (LM-test)	0.438033
Adjusted R-squared	0.956697	AIC	6.970711
F-statistic	72.80211	SIC	7.402656
Prob(F-statistic)	0.000000	Mean VIF	4.81

Note: * indicates level of significance at 5% level.

Diagnostic Checking:

Breusch-Godfrey Serial Correlation LM test results which is shown below implies that the model does not suffer from autocorrelation.

Table 22 Breusch-Godfrey Serial Correlation LM Test Results for Model 2

F-statistic	0.521020	Probability	0.603653
Obs*R-squared	1.650921	Probability	0.438033

In order to detect for the heteroscedasticity in the model, White test is conducted and the result of the test summarized as below suggests that model is immune from differing variances.

Table 23 White Heteroscedasticity Test for Model 2

F-statistic	0.767954	Probability	0.684683
Obs*R-squared	12.75909	Probability	0.545575

Furthermore, following graph and Jarque-Bera statistic show that series are normally distributed.

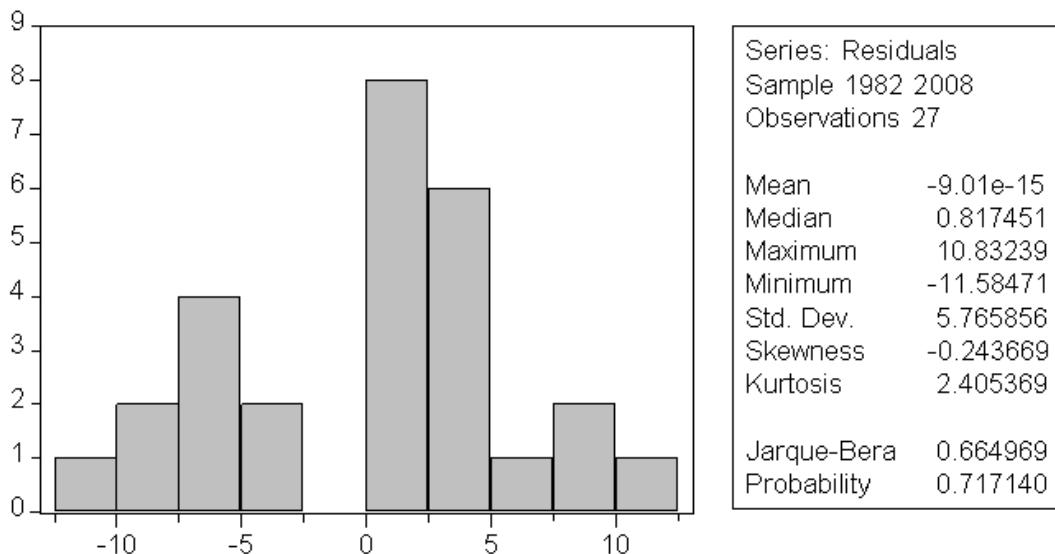


Figure 12 Jarque-Bera Results for Model 2

t-statistic for each of the variable indicates that there is a significant relationship between all of the independent variables and the dependent variable except exchange rate uncertainty. F-statistic also confirms the validity of the model. First difference of the number of firms, first difference of unemployment rate and international reserves have negative impact on first difference of direct premium production. On the other hand, GNI per capita and first difference of net established

firms are positively related with premium production. Only number of firms has a different sign in the estimated model than the expected. Increase in the first difference of number of firms by one unit results in the decrease of first difference of direct premium production by 1.23 units.

R^2 which takes the value of 0.97 signifies the explanatory power of independent variables in the model. It can be interpreted as the model explains 97% of the variance.

For the multicollinearity analysis, following table summarizes the variance inflation factors of the independent variables and results show that there is no multicollinearity in the model due to low mean VIF.

Table 24 Variance Inflation Factor (VIF) for Variables in Model 2

Variable	VIF
DFIRM	1.19
DUNEMP	1.46
GNIPC	15.23
DESTAB	1.15
INTRES	15.00
DEGARCH	1.45
DUMMY94	1.26
DUMMY01	1.71
MEAN VIF	4.81

For the purpose of making a sound comparison and accordingly obtaining the best model, to set up a new model with a different set of independent variables is deemed necessary. Three additional variables are included in the second model to set up a third model which are first difference of one lag of the premium production, first difference of interest rate and first difference of number of cars. The last two of these were statistically significant at 10% level in the first model. That's why their impact is not preferred to be ignored at all. On the other hand, first difference of one

lag of premium production is included with a motive to add a dynamic nature to the model. Estimation results of this third model are demonstrated in the following table.

Table 25 Estimation Results for Model 3

Independent Variables	Dependent Variable: DPREM = PREM_t - PREM_{t-1}		
	Coefficients	t-statistic	Prob.
C	-53.28311*	-9.922882	0.0000
DPREM(-1)	0.181857*	2.887875	0.0119
DESTAB	1.509431*	6.271978	0.0000
DUNEMP	-7.964317*	-3.409243	0.0042
DFIRM	-0.692605	-1.550241	0.1434
DCAR	-3.33E-05	-2.143034	0.0502
DINT	-0.277970	-2.021082	0.0628
INTRES	-0.001861*	-11.35082	0.0000
GNIPC	0.021873*	11.64492	0.0000
DEGARCH	-481.0985	-1.058673	0.3077
DUMMY01	-138.6839*	-14.60778	0.0000
DUMMY94	-53.30787*	-8.428693	0.0000
R-squared	0.985893	Prob (LM-test)	0.802975
Adjusted R-squared	0.974808	AIC	6.503094
F-statistic	88.94500	SIC	7.083754
Prob(F-statistic)	0.000000	Mean VIF	7.68

Note: * indicates level of significance at 5% level.

Diagnostic Checking:

Breusch-Godfrey Serial Correlation LM test results which is shown below implies that the model does not suffer from autocorrelation.

Table 26 Breusch-Godfrey Serial Correlation LM Test Results for Model 3

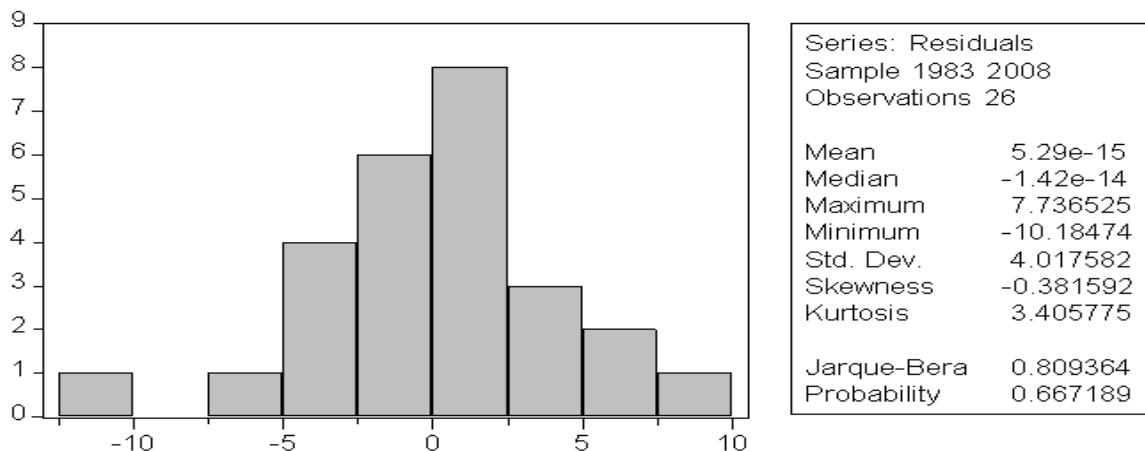
F-statistic	0.103015	Probability	0.902903
Obs*R-squared	0.438863	Probability	0.802975

In order to detect for the heteroscedasticity in the model, White test is conducted and the result of the test summarized as below suggests that model is immune from differing variances.

Table 27 White Heteroscedasticity Test for Model 3

F-statistic	0.636593	Probability	0.786316
Obs*R-squared	18.66856	Probability	0.543454

Furthermore, following graph and Jarque-Bera statistic show that series are normally distributed.

**Figure 13 Jarque-Bera Results for Model 3**

For the detection of multicollinearity, variance inflation factor (VIF) for each of the independent variables in the model is calculated and shown below. Results indicate that there is no multicollinearity in the model due to low mean VIF.

Table 28 Variance Inflation Factor (VIF) for Variables in Model 3

Variable	VIF
DPREM(-1)	3.91
DFIRM	1.41
DUNEMP	2.61
GNIPC	32.24
DESTAB	3.74
DINT	3.56
DCAR	4.62
INTRES	23.34
DEGARCH	4.73
DUMMY94	1.33
DUMMY01	3.01
MEAN VIF	7.68

In order to decide which of the three models best explains the impact of crises in the Turkish insurance sector, Akaike information criterion and Schwarz criterion will be utilized. Following table shows the results and suggests selecting the Model 3 since it exhibits the lowest value in both of the criteria.

Table 29 Model Selection Criteria

	Model 1	Model 2	Model 3
Akaike info criterion	6.553623	6.970711	6.503094
Schwarz criterion	7.327836	7.402656	7.083754

t-statistics for the variables indicate that first difference of one lag of the premium production, first difference of net established companies, first difference of unemployment rate, international reserves, GNI per capita and crisis dummies are statistically significant. F-statistic also confirms the validity of the model. International reserves, first difference of unemployment rate and dummy variables have negative impact on first difference of direct premium production. On the other hand, one lag of the first difference of premium production, GNI per capita and first difference of net established firms are positively related with first difference of premium production. The signs of the significant variables in the model are in parallel with what is expected.

R^2 which takes the value of 0.9858 signifies that the model explains 99% of the variance.

Taking the 2008 crisis year as the base, coefficients of dummies defined for 1994 and 2001 crisis years imply that all other things being equal, 1994 and 2001 crises caused a reduction in the direct premium production of 53 and 139 units respectively. It is obvious that the insurance sector was affected more severely in 2001 crisis since the premium production fell almost three times more than 1994 crisis.

Increase in the first difference of net established companies, one lag of the first difference of the premium production and GNI per capita by one unit cause first difference of direct premium production to increase by 1.51, 0.18 and 0.02 units respectively. On the other hand, increase in first difference of unemployment rate by one unit causes first difference of direct premium production to decrease by 7.96 units.

The results from the time series analysis indicate that Turkish insurance sector is affected most from the changes in the unemployment rate which is among the variables that is directly influenced during economic crises. The negative effect of the unemployment rate on the premium production outweighs its positive effect. Namely, unemployed people reduce their insurance demand during a crisis.

5.5.iv Empirical Results of the Disaggregate Level Analysis

After ensuring that all the variables are stationary, the next step is to estimate the panel data model. Estimation will be based on both static (covering fixed effects and random effects) and dynamic assumptions.

5.5.iv.i Fixed Effects Model

In the fixed effects model, “although the intercept may differ across companies, each company’s intercept does not vary over time; that is, it is time invariant” (Gujarati, 2003, p. 642). Following model is set up to account for the fixed effects model.

$$\begin{aligned} \text{DLNPREM}_{it} = & \beta_0 i + \beta_1 \text{DLNASSETS}_{it} + \beta_2 \text{DLNPROFIT}_{it} + \beta_3 \text{DLNCAPITAL}_{it} + \\ & \beta_4 \text{DASSETSHARE}_{it} + \beta_5 \text{DUMFOR}_{it} + \beta_6 \text{DEX}_{it} + \beta_7 \text{DLNGNIPC}_{it} + \\ & \beta_8 \text{DLNESTAB}_{it} + \beta_9 \text{DUNEMP}_{it} + \beta_{10} \text{DINF}_{it} + \beta_{11} \text{DINT}_{it} + \beta_{12} \text{DGROWTH}_{it} + \\ & \beta_{13} \text{DLNCAR}_{it} + \beta_{14} \text{DEGARCH}_{it} + \beta_{15} \text{DUMMY94} + \beta_{16} \text{DUMMY01} + u_{it} \end{aligned} \quad [7.5]$$

Dependent variable which is the logarithmic difference of premium production represents the growth rate of premium production during the period 1980-2009. For the independent variables the rationale for the transformations is given below.

For the variables which represent rates (share of assets, exchange rate, unemployment rate, inflation rate, interest rate and exchange rate uncertainty) their first differences are utilized in the model. Taking the first difference of these variables transform them to their absolute changes from one period to the next. In the model relevant coefficient shows the effect of the increase in the relevant variable’s absolute change on the growth rate of the premium production. Since these variables represent rates their absolute changes generate meaningful interpretations in the model. That’s why instead of their logarithmic difference, their first difference is used.

For other variables (lag of premium production, assets, profit, capital, firm number, international reserves, GNI per capita, number of new established firms and number of cars) logarithmic differences are used which transform the level variables to the growth rate. Since the scale of each of these variables differentiated, a logarithmic

transformation was required to normalize them. Furthermore since the dependent variable is represented in growth rate, transforming these independent variables to growth rates eases the interpretation of these variables.

“The subscript i on the intercept term β_{1i} suggests that the intercepts of the companies may be different; differences may be due to special features of each company” (Gujarati, 2003, p. 642). Following table summarizes the fixed effects model results.

Table 30 Fixed Effects Model Results

Dependent Variable : $\text{LN(PREM}_t - \text{LN(PREM}_{t-1}$			
Independent Variables	Coeff.	t-stat	Prob.
CONSTANT	0.079	1.31	0.191
$\text{LN(ASSET)}_t - \text{LN(ASSET)}_{t-1}$	0.915*	12.11	0.000
$\text{LN(PROFIT)}_t - \text{LN(PROFIT)}_{t-1}$	0.011	0.68	0.497
$\text{LN(CAPIT)}_t - \text{LN(CAPIT)}_{t-1}$	-0.033*	-2.11	0.035
$\text{ASSHA}_t - \text{ASSHA}_{t-1}$	-0.077*	-5.31	0.000
DUMFOR	-0.042	-0.72	0.472
$\text{LN(FIRM)}_t - \text{LN(FIRM)}_{t-1}$	-0.923*	-3.00	0.003
$\text{LN(INTRES)}_t - \text{LN(INTRES)}_{t-1}$	-0.163	-1.18	0.239
$\text{EX}_t - \text{EX}_{t-1}$	0.515*	2.36	0.019
$\text{LN(GNIPC)}_t - \text{LN(GNIPC)}_{t-1}$	-0.259	-1.05	0.296
$\text{LN(ESTAB)}_t - \text{LN(ESTAB)}_{t-1}$	-0.108	-1.18	0.239
$\text{UNEMP}_t - \text{UNEMP}_{t-1}$	0.011	0.40	0.689
$\text{INF}_t - \text{INF}_{t-1}$	0.001	0.62	0.534
$\text{INT}_t - \text{INT}_{t-1}$	0.008*	4.71	0.000
$\text{LN(CAR)}_t - \text{LN(CAR)}_{t-1}$	0.876	1.50	0.135
$\text{EGARCH}_t - \text{EGARCH}_{t-1}$	-0.316*	-3.22	0.001
DUMMY94	-0.445*	-2.77	0.006
DUMMY01	0.079*	1.31	0.191
R ²			0.4399
F-test			0.35 (p=0.9870)
Wooldridge test for autocorrelation			4.050 (p=0.0638)
Modified Wald test for heteroscedasticity			45.78 (p=0.000)
AIC			62.57
BIC			133.02

Note: * indicates level of significance at 5% level.

Estimation results indicate that model is statistically insignificant according to the F-test. It can be concluded from the above results that the fixed effects model failed to generate a significant model. This result avoids accepting the main assumption of

the fixed effects model that the individual specific effects are correlated with the independent variables.

5.5.iv.ii Random Effects Model

“The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the independent variables included in the model” (Reyna, n.d., p. 25). “Ideal random effects assumptions include all of the fixed effects assumptions plus the additional requirement that unobserved effects in the regression are independent of all explanatory variables in all time periods” (Wooldridge, 2009, p. 489). Following model is set up to account for the random effects model.

$$\begin{aligned} \text{DLNPREM}_{it} = & \beta_0 + \beta_1 \text{DLNSETS}_{it} + \beta_2 \text{DLNPROFIT}_{it} + \beta_3 \text{DLNCAPITAL}_{it} + \\ & \beta_4 \text{DASSETSHARE}_{it} + \beta_5 \text{DUMFOR}_{it} + \beta_6 \text{DEX}_{it} + \beta_7 \text{DLNGNIPC}_{it} + \quad [7.6] \\ & \beta_8 \text{DLNESTAB}_{it} + \beta_9 \text{DUNEMP}_{it} + \beta_{10} \text{DINF}_{it} + \beta_{11} \text{DINT}_{it} + \beta_{12} \text{DGROWTH}_{it} + \\ & \beta_{13} \text{DLNCAR}_{it} + \beta_{14} \text{DEGARCH}_{it} + \beta_{15} \text{DUMMY94} + \beta_{16} \text{DUMMY01} + w_{it} \end{aligned}$$

Instead of the intercept term β_{0i} in the fixed effects model β_0 takes place in the random effects model which represents a random deviation from some mean intercept (UCSD, 2005). In the following table random effects model results are demonstrated.

Table 31 Random Effects Model Results

Dependent Variable : LN(PREM)_t -LN(PREM)_{t-1}			
Independent Variables	Coeff.	z-stat	Prob.
CONSTANT	0.063	1.08	0.282
LN(ASSET) _t - LN(ASSET) _{t-1}	0.915*	12.54	0.000
LN(PROFIT) _t - LN(PROFIT) _{t-1}	0.011	0.68	0.499
LN(CAPIT) _t - LN(CAPIT) _{t-1}	-0.032*	-2.09	0.036
ASSHA _t - ASSHA _{t-1}	-0.077*	-5.38	0.000
DUMFOR	0.011	0.27	0.789
LN(FIRM) _t -LN(FIRM) _{t-1}	-0.911*	-3.01	0.003
LN(INTRES) _t - LN(INTRES) _{t-1}	-0.165	-1.22	0.224
EX _t - EX _{t-1}	0.526*	2.45	0.014
LN(GNIPC) _t - LN(GNIPC) _{t-1}	-0.273	-1.13	0.260
LN(ESTAB) _t - LN(ESTAB) _{t-1}	-0.117	-1.29	0.196
UNEMP _t - UNEMP _{t-1}	0.010	0.37	0.713
INF _t - INF _{t-1}	0.001	0.63	0.526
INT _t - INT _{t-1}	0.008*	4.87	0.000
LN(CAR) _t -LN(CAR) _{t-1}	0.994	1.74	0.082
EGARCH _t - EGARCH _{t-1}	-19.667*	-4.02	0.000
DUMMY94	-0.310*	-3.20	0.001
DUMMY01	-0.448*	-2.83	0.005
R ²			0.4446
Wald chi2			281.75 (p=0.000)
Wooldridge test for autocorrelation			4.050 (p=0.0638)

Note: * indicates level of significance at 5% level.

According to the estimation results, Wald test indicates the overall significance of the model. Furthermore there is no autocorrelation in the model. Below table showing the VIF of the variables also suggests that model is immune from multicollinearity. In short random effects model generates a statistically acceptable model.

In order to determine which of the models; fixed or random effects to choose it is deemed necessary to run a Hausman test. According to the test results, an insignificant p-value (Prob>chi2 = 1.000) is found which implies that random effects model should be preferred to fixed effects model as it is more efficient and also gives consistent results.

Table 32 Variance Inflation Factor (VIF) for Variables in Fixed and Random Effects Models

Variable	VIF
LN(ASSET) _t - LN(ASSET) _{t-1}	8.56
LN(PROPIT) _t - LN(PROPIT) _{t-1}	1.47
LN(CAPIT) _t - LN(CAPIT) _{t-1}	1.58
ASSHA _t - ASSHA _{t-1}	1.69
DUMFOR	1.17
LN(FIRM) _t - LN(FIRM) _{t-1}	1.70
LN(INTRES) _t - LN(INTRES) _{t-1}	3.96
EX _t - EX _{t-1}	4.80
LN(GNIPC) _t - LN(GNIPC) _{t-1}	2.92
LN(ESTAB) _t - LN(ESTAB) _{t-1}	2.98
UNEMP _t - UNEMP _{t-1}	2.19
INF _t - INF _{t-1}	2.75
INT _t - INT _{t-1}	2.85
LN(CAR) _t - LN(CAR) _{t-1}	11.27
EGARCH _t - EGARCH _{t-1}	3.37
DUMMY94	1.98
DUMMY01	4.85
MEAN VIF	3.53

5.5.iv.ii Dynamic Model

In the dynamic setting along with other variables one lag of the dependent variable will also be included in the model and to this end Arellano Bond (1991) estimator will be used. In this context the following model is specified.

$$\begin{aligned}
 \text{DLNPREM}_{it} = & \beta_{0i} + \beta_1 \text{DLNPREM}_{it-1} + \beta_2 \text{DLNASSETS}_{it} + \beta_3 \text{DLNPROFIT}_{it} + \\
 & \beta_4 \text{DLNCAPITAL}_{it} + \beta_5 \text{DASSETSHARE}_{it} + \beta_6 \text{DUMFOR}_{it} + \beta_7 \text{DEX}_{it} + \\
 & \beta_8 \text{DLNGNIPC}_{it} + \beta_9 \text{DLNESTAB}_{it} + \beta_{10} \text{DUNEMP}_{it} + \beta_{11} \text{DINF}_{it} + \beta_{12} \text{DINT}_{it} + \\
 & \beta_{13} \text{DGROWTH}_{it} + \beta_{14} \text{DLNCAR}_{it} + \beta_{15} \text{DEGARCH}_{it} + \beta_{16} \text{DUMMY94} + \\
 & \beta_{17} \text{DUMMY01} + w_{it}
 \end{aligned} \tag{7.7}$$

The Arellano Bond dynamic model results are presented in the following table.

Table 33 Arellano Bond Dynamic Model Results

Dependent Variable : LN(PREM)_t -LN(PREM)_{t-1}			
Independent Variables	Coeff.	z-stat	Prob.
CONSTANT	-0.115	-1.82	0.068
DLNPREM _{t-1}	0.092*	9.39	0.000
LN(ASSET) _t - LN(ASSET) _{t-1}	0.782*	10.36	0.000
LN(PROFIT) _t - LN(PROFIT) _{t-1}	0.021	1.34	0.179
LN(CAPIT) _t - LN(CAPIT) _{t-1}	-0.017	-1.12	0.264
ASSHA _t - ASSHA _{t-1}	-0.068*	-4.85	0.000
DUMFOR	-0.046	-0.68	0.496
LN(FIRM) _t -LN(FIRM) _{t-1}	-1.074*	-3.84	0.000
LN(INTRES) _t - LN(INTRES) _{t-1}	0.557*	3.71	0.000
EX _t - EX _{t-1}	0.848*	4.19	0.000
LN(GNIPC) _t - LN(GNIPC) _{t-1}	-0.133	-0.60	0.549
LN(ESTAB) _t - LN(ESTAB) _{t-1}	-0.437*	-4.88	0.000
UNEMP _t - UNEMP _{t-1}	0.056*	2.15	0.032
INF _t - INF _{t-1}	-0.016*	-6.98	0.000
INT _t - INT _{t-1}	0.020*	9.61	0.000
LN(CAR) _t -LN(CAR) _{t-1}	1.819*	3.36	0.001
EGARCH _t - EGARCH _{t-1}	-10.869*	-2.36	0.018
DUMMY94	0.204*	1.96	0.050
DUMMY01	-0.778*	-5.19	0.000
Wald chi2			352.43(p=0.0000)
Arellano Bond test for AR(3)			-0.20(p=0.8380)
Sargan test of overidentifying restrictions			252.2126 (p=0.4489)

Note: * indicates level of significance at 5% level.

Arellano Bond dynamic model is statistically significant according to the Wald test and it does not suffer from autocorrelation. Furthermore results of Sargan test of overidentifying restrictions indicate that the instruments are valid. For the test of multicollinearity variance inflation factors (VIF) of each variable in consideration are examined and demonstrated in the following table.

Table 34 Variance Inflation Factor (VIF) for the Variables in Arellano Bond Dynamic Model

Variable	VIF
DLNPREM _{t-1}	4.07
LN(ASSET) _t - LN(ASSET) _{t-1}	9.10
LN(PROFIT) _t - LN(PROFIT) _{t-1}	1.47
LN(CAPIT) _t - LN(CAPIT) _{t-1}	1.58
ASSHA _t - ASSHA _{t-1}	1.74
DUMFOR	1.18
LN(FIRM) _t - LN(FIRM) _{t-1}	1.70
LN(INTRES) _t - LN(INTRES) _{t-1}	4.97
EX _t - EX _{t-1}	4.81
LN(GNIPC) _t - LN(GNIPC) _{t-1}	2.92
LN(ESTAB) _t - LN(ESTAB) _{t-1}	3.26
UNEMP _t - UNEMP _{t-1}	2.19
INF _t - INF _{t-1}	7.59
INT _t - INT _{t-1}	4.88
LN(CAR) _t - LN(CAR) _{t-1}	11.31
EGARCH _t - EGARCH _{t-1}	3.53
DUMMY94	2.47
DUMMY01	5.09
MEAN VIF	4.10

The findings of the multicollinearity test indicate that there is no multicollinearity in the model.

Among the three models namely fixed effects, random effects and Arellano Bond, random effects model generates the best estimation results. Fixed effects model was not statistically significant at all and between random effects and Arellano Bond model, random effects model with a lower mean variance inflation factor is preferred to the dynamic model.

What the random effects model estimation results tell is that growth rate of assets and absolute changes in the exchange rate and interest rate are positively and significantly related with growth rate of premium production. On the other hand, growth rate of capital, growth rate of number of firms in the sector, crisis dummies and absolute changes in share of assets and exchange rate uncertainty enter the

regression significantly but negatively. Another finding of the model is that growth rate of net profit after tax, international reserves, GNI per capita, net established companies, number of cars, absolute changes in unemployment rate and inflation rate and dummy variable for the foreign firms are statistically insignificant in explaining the growth rate of premium production.

For the firm specific variables growth rate of assets has the expected sign, whereas growth of nominal capital and absolute change in share of assets create unexpected negative impacts on the growth rate of premium production. Dummies defined for the crisis years 1994 and 2001, taking the 2008 as the base year imply that the growth rate of premium production fell during the crisis periods. Furthermore results indicate that its severity is felt more in 2001 crisis. Exchange rate uncertainty seems to be the variable that cause the most drastic fall in the growth rate of premium production.

Appendix A and B display some models both based on time series and panel data which include different transformations for the variables. However none of them is found to yield statistically preferable estimation results.

5.6 CONCLUSION

In this chapter, the impacts of the economic crises on the Turkish insurance sector are analyzed by utilizing econometric theories and tools. An analysis in an aggregate level by using time series model and an analysis in a disaggregate level by using panel data model are conducted. In order to quantify the effects of the economic crises, first of all direct premium production was chosen as the proxy for the performance of the insurance sector. Afterwards a set of macroeconomic and firm specific variables were defined in explaining the premium production. On top of that, foreign exchange rate uncertainty in Turkey was measured in order to be included in the time series and panel data models as an independent variable.

An important inference from the empirical results is that there are differences between the analyses in aggregate and disaggregate level in terms of statistical

significance of the independent variables. In the aggregate analysis first difference of number of net established companies, international reserves, GNI per capita and first difference of unemployment rate were statistically significant variables in explaining the absolute change in the premium production. However in the disaggregate analysis these were not significant in explaining the growth rate of premium production. Nevertheless, there is a crucial common point between two analyses which is the fact that crises dummies are significant and negatively related with the dependent variable. Furthermore, 2001 crisis is found to be the crisis that caused the performance of the Turkish insurance sector to deteriorate most. 1994 and 2008 crises are found to follow it respectively.

CHAPTER 6

CONCLUSION

Economic crises due to their large scaled and intense impacts and adverse implications on numerous sectors and actors in the economy and the society attract the attention of many scholars. Models are being developed to explain them in a systematic manner and based on past experience forecasts with regards to the future crises are being done. On the other hand, as the recent 2008 crisis has showed, in a highly globalized and interconnected world it is not always possible to predict the origin and contagion effect of these crises.

In this thesis, the specific attention is drawn to the effects of economic crises after 1990 on the Turkish insurance sector. The share of insurance sector in Turkey is relatively low when compared to both banks in the Turkish financial system and the insurance sectors of the developed countries. However this fact should not mislead with regards to the importance of this sector in the economy. Insurance has an important role in the economic life of every country as it transfers risk, compensates losses, supplies long-term capital for government and industry by making investment to funds, provides saving instruments, motivates investment by transferring the risk from entrepreneurs and contributes materially to economic growth.

Despite its significance, there is a lack of comprehensive research on the effects of economic crises on this sector. Most studies are focused on banking sector and insurance sector is rather neglected. This thesis attempts to shed light to this

neglected area by both addressing qualitative aspects and using econometric analyses to quantify the effects.

Reflections of the crises on the Turkish insurance sector have been generally high above the change in the economy. For instance in 1994 while GDP decreased by 5.5% in real terms, insurance sector contracted by %61.1 in real terms. Similarly, in 2001 crisis decrease of output by 9.4% was reflected in 47.5% decrease in the insurance sector (Erdoğan, 2003). Another typical effect of the economic crises is that in general it causes financial profits to exceed the technical profits. Due to the fact that investment portfolio of the insurance companies in the sector consist mainly of government debts which are deemed to be less risky in times of crises, insurance companies obtain a certain amount of return from their financial investments and compensate their technical losses which is the result of the lowered business volume. Moreover, high levels of inflation have been the most important contributor of the downturn in the insurance sector during the crisis periods. Inflation not only discourages insurance purchases via creating an uncertain economic environment, but also reduces the purchasing power of economic agents which ends with falling demand for insurance. When real decrease in direct premiums and direct premiums per capita are taken as the reference points, 2001 crisis can be said to affect the insurance sector most. 1994 crisis follows in terms of the magnitude of the negative effect on real premium production and real premiums per capita. When compared with 1994 and 2001 crises, the effect of 2008 crisis can be considered as relatively limited. On top of that, the lack of complex financial instruments and the traditional way of business conducted in Turkey prevented the sector to be directly affected from the 2008 crisis.

Econometric analysis of the effects of economic crises after 1990 on the Turkish insurance sector was divided into three parts. First of all exchange rate uncertainty was estimated by using EGARCH model. The inclusion of this variable to the models is of great importance in the sense that it reflects the volatility in the economy and therefore essential to observe the impact of this volatility on the Turkish insurance sector. In the next step, two distinct analyses were conducted one in the aggregate level and the other in the disaggregate level. The former, included

macroeconomic variables in explaining the premium production and was based on time series. Latter, included together with macroeconomic variables firm specific variables such as net profit after tax, assets, nominal capital and share of assets and was based on panel data. The specifications were different in two models. In the aggregate analysis first difference of premium production which shows the absolute change in the premium production from one year to the next is regressed upon macroeconomic variables. On the other hand, panel data analysis estimated the effects of both macroeconomic and firm specific variables on the growth rate of premium production. In terms of statistical significance of the independent variables in the regressions aggregate and disaggregate analyses produced different results. However this is due to two reasons. First, different specifications were used in the models. Second, in order to perform the disaggregate analysis the data set is filtered to obtain a balanced data set. As a result 15 companies operating during the entire period of 1980-2009 constituted the basis for the panel data analysis whereas time series analysis contained all the insurance companies that operated between 1980 and 2009.

According to the aggregate analysis one lag of the first difference of premium production, first difference of net established companies, first difference of unemployment rate, international reserves, GNI per capita and dummies defined for crisis periods are statistically significant. In an aggregate level it can be concluded that Turkish insurance sector is affected by these variables. On the other hand disaggregate analysis based on random effects model results suggests that growth rate of assets, nominal capital, number of firms in the sector, crisis dummies, absolute changes in the share of assets, exchange rate, interest rate and exchange rate uncertainty are statistically significant in explaining the growth rate of premium production. In short, economic crises affect these macroeconomic variables and then their respective changes are reflected in the Turkish insurance sector.

As a concluding remark, it is acknowledged that Turkish insurance sector is affected by the economic crises to a certain extent, however its distinct business structure compared with banks, highly regulated and supervised operations, conservative composition of its investment portfolio, lack of risky, volatile and

complex financial instruments and the insurance legislation which is to a great extent in line with EU standards mitigated the negative impact of the economic crises on the sector. In the future if the aforementioned mitigating circumstances continue to be existent, effects of economic crises may be only due to fluctuations in the macroeconomic variables that change as a result of the crisis such as increase in inflation, fall in GNI per capita, increase in unemployment rate and increase in the volatility and uncertainty.

For the future studies with regards to this issue, evaluation of the effects of economic crises on Turkish insurance sector separately for the life and non-life insurance branches can be a guiding recommendation. In this thesis aggregate premium production was utilized in the models, however separate analysis of life and non-life insurance branches is expected to provide a better understanding of the distinctive features of these branches in determining the degree of influence from the crises.

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Appendix A :

Time Series Models Based on Different Transformations

Table 35 Alternative Time Series Model 1

Independent Variables	Dependent Variable: DLNPREM = LN(PREM_t) – LN(PREM_{t-1})		
	Coefficients	t-statistic	Prob.
C	0.030631	0.654952	0.5231
DLNPREM(-1)	-0.038863	-0.236710	0.8163
DLNESTAB	-5.924255	-1.247915	0.2325
DUNEMP	-0.018516	-0.140982	0.8899
DLNFIRM	0.347765	1.516860	0.1516
DLNCAR	0.084677	0.869598	0.3992
DINT	-0.018353	-0.742071	0.4703
DLNINTRES	-0.001268	-0.764095	0.4575
DLNGNIPC	1.037630	1.881645	0.0808
DEGARCH	-0.043163	-0.149203	0.8835
DUMMY01	-0.322404*	-3.512183	0.0035
DUMMY94	-0.201304*	-1.982762	0.0674
R-squared	0.880942	AIC	-2.227707
Adjusted R-squared	0.787397	SIC	-1.647047
F-statistic	9.417262		
Prob(F-statistic)	0.000107		

Note: * indicates level of significance at 5% level.

Table 36 Alternative Time Series Model 2

Independent Variables	Dependent Variable: DLNPREM =LN(PREM_t) – LN(PREM_{t-1})		
	Coefficients	t-statistic	Prob.
C	-0.010989	-0.202415	0.8430
DLNPREM(-1)	0.101468	0.564628	0.5827
DEGARCH	-5.122958	-1.182985	0.2597
DLNINTRES	0.122568	0.675228	0.5123
DLNGNIPC	0.320141	1.535874	0.1505
DLNESTAB	0.112491	1.214056	0.2481
DUNEMP	-0.022591	-0.837018	0.4189
DINF	-0.000597	-0.212391	0.8354
DINT	-0.000460	-0.167682	0.8696
DLNCAR	0.946654	1.885764	0.0838
DLNFIRM	-0.095716	-0.361464	0.7240
DEX	0.423703*	2.179311	0.0500
DUMMY94	-0.313289*	-2.821693	0.0154
DUMMY01	-0.455815*	-2.706315	0.0191
R-squared	0.916151	AIC	-2.424452
Adjusted R-squared	0.825314	SIC	-1.747016
F-statistic	10.08571		
Prob(F-statistic)	0.000152		

Note: * indicates level of significance at 5% level.

Appendix B :

Panel Data Models Based on Different Transformations

Table 37 Alternative Fixed Effects Model Results

Dependent Variable : PREM_t - PREM_{t-1}	Model		
	Coeff.	t-stat	Prob.
Independent Variables			
CONSTANT	-6.97E+12	-1.44	0.151
ASSET _t - ASSET _{t-1}	0.084305*	5.80	0.000
PROFIT _t - PROFIT _{t-1}	-0.26221*	-2.13	0.034
CAPIT _t - CAPIT _{t-1}	0.154652*	2.02	0.044
ASSHA _t	-3.43E+11	-0.51	0.612
DUMFOR	2.10E+13*	3.89	0.000
FIRM _t - FIRM _{t-1}	-2.29E+12*	-4.01	0.000
INTRES _t - INTRES _{t-1}	2.53E+09*	7.16	0.000
EX _t - EX _{t-1}	6.54E+13*	3.38	0.001
GNIPC _t - GNIPC _{t-1}	2.78E+09	0.73	0.467
ESTAB _t - ESTAB _{t-1}	3.26E+11	1.21	0.229
UNEMP _t - UNEMP _{t-1}	4.09E+11	0.15	0.881
INF _t - INF _{t-1}	-1.71E+11	-1.36	0.175
INT _t - INT _{t-1}	-8.38E+10	-0.43	0.666
CAR _t - CAR _{t-1}	3.11E+07	1.77	0.078
EGARCH _t - EGARCH _{t-1}	1.35E+14	0.27	0.784
DUMMY94	3.99E+12	0.43	0.665
DUMMY01	-2.61E+12	-0.17	0.864
R ²			0.5463
F-test			4.80(p=0.000)
Wooldridge test for autocorrelation			15.189(p=0.0016)
Modified Wald test for heteroscedasticity			103.31 (p=0.000)
AIC			27,154.78
BIC			27,227.51

Note: * indicates level of significance at 5% level.

Table 38 Alternative Random Effects Model Results

Dependent Variable : PREM_t - PREM_{t-1}	Model		
	Coeff.	t-stat	Prob.
Independent Variables			
CONSTANT	-1.50E+13*	-3.21	0.001
ASSET _t - ASSET _{t-1}	0.084919*	5.74	0.000
PROFIT _t - PROFIT _{t-1}	-0.22073	-1.76	0.078
CAPIT _t - CAPIT _{t-1}	0.189549*	2.45	0.014
ASSHA _t	1.23E+12*	2.35	0.019
DUMFOR	1.55E+13*	3.35	0.001
FIRM _t - FIRM _{t-1}	-2.21E+12*	-3.78	0.000
INTRES _t - INTRES _{t-1}	2.69E+09*	7.55	0.000
EX _t - EX _{t-1}	7.23E+13*	3.68	0.000
GNIPC _t - GNIPC _{t-1}	2.97E+09	0.76	0.447
ESTAB _t - ESTAB _{t-1}	2.86E+11	1.04	0.298
UNEMP _t - UNEMP _{t-1}	8.36E+11	0.30	0.763
INF _t - INF _{t-1}	-1.90E+11	-1.49	0.137
INT _t - INT _{t-1}	-7.27E+10	-0.37	0.713
CAR _t - CAR _{t-1}	3.67E+07*	2.05	0.041
EGARCH _t - EGARCH _{t-1}	1.19E+14	0.24	0.813
DUMMY94	5.78E+12	0.62	0.538
DUMMY01	-3.51E+12	-0.22	0.822
R ²			0.5240
Wald chi2			457.87(p=0.000)
Wooldridge test for autocorrelation			15.189(p=0.0016)

Note: * indicates level of significance at 5% level.

Table 39 Alternative Arellano Bond Dynamic Model Results

Dependent Variable : PREM_t - PREM_{t-1}		Model		
Independent Variables		Coeff.	t-stat	Prob.
CONSTANT		-1.77E+12	-0.41	0.681
DPREM.L1		0.037574*	3.61	0.000
ASSET _t - ASSET _{t-1}		0.078379*	7.14	0.000
PROFIT _t - PROFIT _{t-1}		-0.29208*	-3.16	0.002
CAPIT _t - CAPIT _{t-1}		0.103014	1.78	0.075
ASSHA _t		-1.12E+12	-1.88	0.060
DUMFOR		2.28E+13*	4.77	0.000
FIRM _t - FIRM _{t-1}		-2.30E+12*	-5.23	0.000
INTRES _t - INTRES _{t-1}		2.42E+09*	8.85	0.000
EX _t - EX _{t-1}		6.14E+13*	4.20	0.000
GNIPC _t - GNIPC _{t-1}		2.84E+09	0.99	0.323
ESTAB _t - ESTAB _{t-1}		2.96E+11	1.45	0.148
UNEMP _t - UNEMP _{t-1}		2.89E+11	0.14	0.887
INF _t - INF _{t-1}		-4.22E+11*	-3.59	0.000
INT _t - INT _{t-1}		5.65E+10	0.37	0.708
CAR _t - CAR _{t-1}		2.19E+07	1.58	0.115
EGARCH _t - EGARCH _{t-1}		2.82E+14	0.76	0.450
DUMMY94		9.72E+12	1.35	0.177
DUMMY01		-7.11E+12	-0.62	0.537
Wald chi2				817.74 (p=0.0000)
Arellano Bond test for AR(3)				6.59 (p=0.0000)

Note: * indicates level of significance at 5% level.