



Hacettepe University Graduate School of Social Sciences
Department of Economics

**THE ANALYSIS OF 2008 GLOBAL ECONOMIC CRISIS: THE CASE
OF TURKISH MANUFACTURING INDUSTRY**

İsmail ÇAKMAK

Ph. D. Dissertation

Ankara, 2019

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MANUFACTURING INDUSTRY

İSMAİL ÇAKMAK

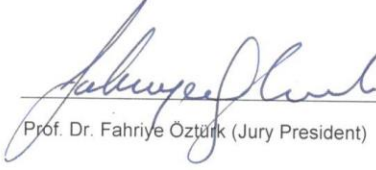
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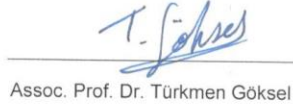
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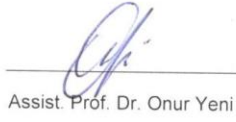
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ETİK BEYAN

Bu çalışmadaki bütün bilgi ve belgeleri akademik kurallar çerçevesinde elde ettiğimi, görsel, işitsel ve yazılı tüm bilgi ve sonuçları bilimsel ahlak kurallarına uygun olarak sunduğumu, kullandığım verilerde herhangi bir tahrifat yapmadığımı, yararlandığım kaynaklara bilimsel normlara uygun olarak atıfta bulunduğumu, tezimin kaynak gösterilen durumlar dışında özgün olduğunu, Tez Danışmanının **Doç.Dr. Selcen ÖZTÜRK** danışmanlığında tarafımdan üretildiğini ve Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü Tez Yazım Yönergesine göre yazıldığımı beyan ederim.


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ABSTRACT

ÇAKMAK, İsmail. *The Analysis of 2008 Global Economic Crisis: The Case of Turkish Manufacturing Industry*, Ph. D. Dissertation, Ankara, 2019

This study aims to analyze the impact of the 2008 global economic crisis on Turkish manufacturing industry. Economic impacts of crisis have long been investigated; however, this study differentiates by using a new perspective on the issue. Micro-econometric differences in differences method is used in junction with forecasting method. In the study, importance of the manufacturing industry is revealed for Turkish economy by analyzing all sectors operating in the economy. This study also aims to predict what would have happened in the Turkish economy, if the 2008 crisis did not exist and whether the manufacturing industry showed early signals or not. Results indicate that profit levels of Turkish manufacturing sector are affected from the 2008 global economic crisis at two digit sub-sectors level and showed early signals for the crisis. Further, it was found that profit values of manufacturing sector bounced back and even actual profits exceeded the estimated profits in the later years.

Keywords

Turkish economy, 2008 crisis, forecasting, manufacturing sector, differences in differences

ÖZET

ÇAKMAK, İsmail. *2008 Küresel Ekonomik Krizi Analizi : Türk İmalat Sanayi Örneği*, Doktora Tezi, Ankara, 2019

Bu çalışmanın amacı 2008 küresel ekonomik krizinin Türk imalat sanayine olan etkilerini analiz etmektir. Krizlerin ekonomik etkileri uzun zamandır incelenmiş de bu çalışma konuya yeni bir bakış açısı getirerek farklılaşmaktadır. Bu bağlamda çalışmada mikro ekonometrik farkların farkları (differences in differences) yöntemi ile tahmin analizi (forecasting analysis) beraber kullanılmıştır. Çalışmada imalat sanayinin Türkiye ekonomisi için önemi, Türkiye’de faaliyet gösteren tüm sektörler analiz edilerek ortaya konmuştur. Bu çalışma ayrıca 2008 küresel ekonomik kriz olmasaydı Türkiye ekonomisinin ve imalat sanayinin nasıl ilerlediğini ve imalat sanayinin krizin öncül sinyallerini gösterip göstermediğini tahmin etmeyi hedeflemiştir. Çalışmanın sonucunda Türkiye imalat sanayinin iki basamak alt sektör boyutundaki kar değerlerinin 2008 küresel ekonomik krizden etkilendiği ve imalat sanayinin krizin öncül sinyallerini gösterdiği tespit edilmiştir. Buna ek olarak sonraki yıllarda imalat sanayi kar değerlerinin kriz öncesi seviyeye geldiği hatta gerçek kar değerlerinin hesaplanan kar değerlerini de geçtiği tespit edilmiştir.

Anahtar Kelimeler

Türkiye Ekonomisi, 2008 krizi, tahmin analizi, imalat sanayi, farkların farkları yöntemi

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LIST OF ABBREVIATIONS

ARM	: Adjustable Rate Mortgage
BLUE	: Best Linear Unbiased Estimation
CDS	: Credit Default Swap
DID	: Differences in Differences
EU	: European Union
EUROSTAT	: Statistical Office of the European Communities
FDIC	: Federal Savings and Loan Insurance Corporation
FRM	: Fixed Rate Mortgage
GBS	: Entrepreneur Information System
GDP	: Gross Domestic Product
GLS	: Generalized Least Squares
GMM	: Generalized Method of Moment
GSE	: Government Sponsored Enterprise
ILO	: International Labour Organization
IMF	: International Money Fund
ISIC	: International Standard Industrial Classification of all Economic Activities of the United Nations
MBS	: Mortgage Backed Security
N.E.C	: Not Elsewhere Classified
NACE	: European Classification of Economic Activities
OECD	: The Organization for Economic Co-operation and Development
OLS	: Ordinary Least Squares
SEE	: State Economic Enterprises
SME	: Small and Medium Sized Enterprises
STC	: Special Consumption Tax
TL	: Turkish Lira
TURKSTAT	: Turkish Statistical Institute

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INTRODUCTION

The 2008 crisis has been vastly researched in recent years. These studies tried to determine not only microeconomic and macroeconomic effects of the crisis but also observe its consequences. In addition, few studies have tried to predict whether there were any early signals for the 2008 crisis by looking at past economic parameters. In the broadest sense, the word of crisis expresses a deterioration or a danger in the system and countries try to avoid this danger. For this reason, as mentioned above, predicting the crisis earlier is very important in order to minimize the effects of the crisis and / or undertaking correct measures.

In the literature, it is also observed that the concept of financial crisis and economic crisis are used interchangeably. However, these two concepts are very different from each other. Financial crisis refers to the deterioration in financial parameters such as money, banking and interest rates. The term economic crisis, either in financial sector or in real sector, refers to the deterioration spread to whole economy.

In the view of such information, this study has multiple aims. This study aims to determine whether the manufacturing industry is affected by the crisis. If it is, the current study tries to determine that these effects are statistically significant or not. To achieve these goals, differences in differences (DID) analysis is decided to conduct on the manufacturing sector's two-digit profit variables. However, only the actual profit values will be not enough for the use of DID analysis. Therefore, forecasting analysis will be conducted and to use as an experimental group, estimated profit values will be obtained for the years 2006-2014. Thus, this study offers a test on whether the manufacturing sector (and / or other sectors) is affected by the crisis significantly.

In addition, forecasting analysis will be also applied to the sectors which are operating in Turkish economy, because, it was aimed to observe the changes in the sectors' profitability in the crisis years. In this manner, it is also tried to determine

which sector is more affected by the crisis. Besides, in this study, it is tried to answer the question of how the manufacturing industry and other sectors would have proceeded if the crisis did not exist by observing the changes of the actual and estimated profit values. Lastly, it is tried to determine whether there is a sector that shows the early warning signal for the crisis by observing the real profit and estimated profit values and to understand whether the 2008 crisis was theoretically a financial crisis or an economic crisis by looking at the findings.

As mentioned above, profit was selected as a dependent variable while analyzing the impacts of 2008 global economic crisis on the Turkish economy and manufacturing industry since profitability tends to decline in periods of recession, depression or stagnation in economies. It is possible to prove this by looking at different periods of economic history and by examining the views of economic schools. Classical economists point out that while trying to identify the important dynamics behind growth, they assumed that profit is an undeniable element (Garegani, 1998; Smith & McCulloch, 1838; Mejorado & Roman, 2013). According to classical economists, the interest rate and the profit rate are actually different from each other, and the reason for this difference is the conversion of the profit rates into active investing (Shaikh, 2011). From the Neo classical economists, Marshall argued that producers tend to maximize their profit share, reduce costs, and maximize output in the perfect competition (Schumpeter, 2010). According to Schumpeter (2010), profit plays a crucial role in development of motor vehicles, white goods and even aircraft as much as advance in positive science. Classical economists argued that, individuals act with only transaction motive, while Keynesian economists stated that individuals act with profit motive as well as transaction, precautionary and speculative motives (Davidson, 1965; Bocutoğlu, 2001; Sen, 2009). According to Keynesian theory, if the marginal productivity of capital is positive tendency due to the expectation of profitability increases, entrepreneurs tend to invest more for any output level and interest rate than they had before (Davidson, 1990). Monetarists have noted that the recession of the 1970s and early 1980s affected both developed

and developing country economies in various ways. They point out that, especially in industrial countries, decline in profitability, the acceleration in inflation and increase in unemployment occur because of the decline in labor productivity and rising public power in the economy. (Jansen, 1983). Besides, according to Marxist theory, the continuity and performance of capitalist economies depends primarily on profitability. Moreover, they stated that when the profit rates are low, unemployment increases and living standards decrease. In the Marxist theory, capitalists are relatively prosperous when profit rates are high. As a matter of fact, unemployment is low in a country's economy and living standards are generally high. Moreover, due to the capitalist system which depends on profitability, they pointed that repeated crises and stagnation in economies are inevitable (Moseley, 1997; Glyn & Sutcliffe, 1972).

While explaining the determination of profit as a dependent variable for the study, it is also necessary to mention the change in profitability in the face of other major economic crisis across the world. Thus, it will be possible to determine whether the results of the analyzes are in accordance with the theory and parallel with the past crises. In this context, it would be appropriate to start by considering the 1873 crisis, which is also regarded as a turning point (Dobb, 1991; Kaymak, 2010; Akbaş, 2017) in the history of economics. During periods of this crisis, where the effects are not only seen in the UK but also global, profitability has declined as a result of higher transportation costs and excessive accumulation of production (Clarke, 1988). The reaction of profitability was similar at the time of 1873 crisis and of 1929 economic crisis called " the great depression". Fisher stated that in his study (1933) factors such as profitability, confidence, price levels and interest rates were affected from the debt and inflation caused by the crisis. On the other hand, Bernanke (1983) stated that the crisis affects almost all sectors, but especially affects business sector. He determined that, in 1931 and 1932 period when the effects of the crisis could be observed more, the sector's profit was found negative before taxes.

After examining the profitability change in the face of crises in the 19th and 20th centuries, it is necessary to mention the changes in profitability in the years of the 2008 crisis. One of the causes for the 2008 crisis is the highly profitable speculation of over-risky investment instruments traded on derivative markets (Ackermann, 2008; Fligstein & Ahidiana, 2016; Grant & Wilson, 2008; Crotty, 2009, Eichengreen, Mody, Nedeljkovic & Sarno, 2012; Boyer, 2013; Harvey, 2010), one of the important consequences of the crisis were the economic recession and decrease of profit (Basu & Vasedevan, 2013; Tsoufidis & Tsalki, 2014).

Taking into account all these arguments, in the first part of the study, the concept of crisis, the distinction between financial-economic crisis and crisis models were explained. Besides, the development of the 2008 crisis, the measures taken by the countries and the main results of the crisis were determined. The second part of this study focuses on the related literature which was analyzed either the impacts of the crisis or early warnings. Also in this section an insight into the historical development of the Turkish manufacturing sector. In the third chapter, detailed explanations about the data, methods and results are presented. Finally, the last chapter discusses and concludes the thesis.

CHAPTER I

THE DEFINITION OF THE CRISIS CONCEPT AND 2008 CRISIS

1.1. DEFINITION OF THE CRISIS

Before defining the crisis from the financial and economic perspective, it is essential to explain what it comprise in general. The terminology of the crisis is not only used in various part of the sciences such as social sciences, engineering, medical sciences or even, arts but it is also a part of the social life. Even today, the concepts of crisis are associated with words such as; extraordinary events, disaster (Olsson, 2010), recession and depression in both academic literature and social life. The origin of the crisis word is based on Greek. The ancient Greeks used the word crisis to describe concepts such as decision, judgment and separation for the first time. While the oxford dictionary (2018) describes the crisis as "a time of intense difficulty or danger", Turkish Language Society (2018) defines as sudden physiological disorder in an organ, seen as mental depression, rare, sudden and extreme demands on something and collapse.

1.2. THE DISTINCTION BETWEEN FINANCIAL CRISIS AND ECONOMIC CRISIS

In the economic literature, while the crisis is defined, sometimes the concepts of financial crisis and economic crisis are used interchangeably. But these two concepts actually refer to different types of crises.

Different economic schools tend to explain crisis differently. Classical economists stated that crises not only would lead to bankruptcies and bank failures particularly, but also would disrupt the level of equilibrium in the economy (Laidler, 2000). Another classical economists Mill (1862) stated that, with the speculation, prices

would rise and spread to households. According to Mill, the credit system has expanded due to investors who want to make more profit. This situation brings both creditors and lenders to a more adventurous situation and the crisis can become inevitable due to the financial extension boom. In the Keynesian theory, a decrease in the productivity of capital is considered as the main reason for crises. Furthermore, decreases in capital productivity would decrease marginal propensity to consume. In crisis periods, level of prosperity drops rapidly. Market activities almost come to stopping point and cannot return to their former level by itself (Beckhart, 1936; Keynes, 2018; Stojanov, 2009). For this reason, Keynes argued that state intervention is essential for the economy and the economy cannot balance automatically. Monetarist theory have linked the concept of crisis to a panic in the banking sector. According to monetarist theory, the deterioration in the banking system will directly affect money supply and this will cause a contraction in the economy (Mishkin, 1990). In Marxist view, overproduction is the one of the important reasons for the crises. Particularly, from the beginning of the 20th century, in conjunction with the technological development, excessive production increased. Excessive production ambition caused the global economy to overestimate and create foreign debts. As a result, to finance debts, money demand has risen and profits have fallen dramatically. However, a serious fall in the stock market and a serious shrinkage in loans was observed. In addition, according to Marxist theory, workers cannot get the desired share from the growth, which is a result of excess production in a capitalist economy. Besides that, the increase in production is not reflected in the hourly wages and average salary levels of the workers (Kettel, 2006; Marx, 1867). With regard to Marxist theory, another cause of the crises is capitalism and capital accumulation itself (Kotz, 2009). In the Schumpeterian view, an innovative system that promote technological development is necessary to avoid economic crises and to have a properly functioning financial system. In a system where innovative initiatives are not financed, there will be a demand boom due to the easy loans provided and this will weaken the banking sector. According to the

Schumpeter, enterprises that do not invest in innovative initiatives will fail over time (Eichengreen, 2010).

As mentioned before, financial and economic crises are two different concepts. Financial markets, by their nature, are full of asymmetric information. Asymmetric information means that decision-makers do not know everything they need to know for making a right decision. From this point of view, financial crisis occurs from this asymmetric information in the financial markets. Adverse selection and moral hazard are the two main sources of asymmetric information (Mishkin, 1992). Adverse selection is the determination of the average price in the market due to incomplete information and these prices are in favor of the risky investors, buyers and/or sellers (Akerlof, 1978). Moral hazard can be exemplified by the fact that the borrower hides his / her own risky status from the creditors (Mishkin, 1992).

When the literature is analyzed, it is understood that the financial crises mean in general are the deterioration in the financial markets. In the determination of the financial crisis and its reasons, Bernanke focused on the banking panics firstly then investigated the stock markets and external debts (Bernanke, 1983; Bernanke & James, 1991). Although Kindleberger (2008) and Schwartz (1987) had a different intervention procedure to the financial crises, they promoted that the banking panic as the biggest reason for the emergence of financial crises. Krugman (1999a) stated that banking system problems are one of the main reasons underlying the financial crises. Contrary to this, Mishkin (1990) argued that, due to the asymmetric information, financial crisis occurs after the decreasing in the stock markets and increasing interest rates. In the same manner, Taylor (2009) explained the financial crisis with the monetarist concepts.

Mishkin (1992) stated that the financial crisis ensued from the deterioration in one or more of the five financial conditions which were listed below. These are;

- ***Increases in interest rates***: Less risky investors decrease the credit demand but riskier investors want to get credit due to adverse selection and moral hazard

even interest rates are increasing. The lenders also reduce the amount of credit given against this situation. As a result, both investments and total output level decrease in the economy.

- **Stock market declines:** Causes in a rapid depreciation of the firms' net worth due to the impact of asymmetric information.

- **Increases in uncertainty:** Increased uncertainty strengthens the possibility of an adverse selection. For this reason, creditors are less willing to give a loan. As a result, investments are reducing.

- **Bank panics:** The banking system is very important for reducing asymmetric information. Before banks can give credit, they want to get enough information about the companies that want to get credit, and they want to work with low riskier investors in the long term. However, if there is a panic in the banking sector, due to asymmetric information, investors want to withdraw their deposits from the banks and this becomes a banking crisis. The investments and the total output level decrease since banks wanted to protect themselves and the decreased demand to banks.

- **Unanticipated declines in aggregate price level:** Companies' debts are fixed in a nominal level. Decrease in prices may cause firms defaults. It also causes falling in the net value of the firms. A recession occurs in the economy and investments fall.

Radelet and Sachs (1998) stated that there are five types of financial crisis by basing on the previous crises and the models of various economists (see for example, Akerlof & Romer, 1993; Blanchart & Watson, 1982; Diamond & Dybvig, 1983; Krugman, 1979; Sachs, 1995). These are; Macroeconomic policy – induced crisis, financial panic, bubble collapse, moral hazard crisis and disorderly workout – debt overhang. On the other hand, International Monetary Fund (IMF) (1998) classified the financial crises in four main groups which called currency crisis, banking crisis, systemic financial crisis and foreign debt crisis. The currency crisis occurs when the money is extremely depreciated and when there is a speculative attack against that country's currency (Chiodo & Owyang, 2002; Flood and Marion, 1999; IMF, 1998).

As a result, central banks put money into the circulation from the international reserves or increase interest rates (IMF, 1998). 1991 Indian crisis (Cerra and Saxena, 2002), 1994 Turkish crisis (Özatay, 2000) and 1997 Asian crisis (Brown, Goetzmann & Park, 1998; Burnside, Eichenbaum & Rebelo, 2001; Kawai, 1998) might be some examples for the currency crisis. The banking crisis is that the banks fail in their business cycles and governments are trying to save them by intervening (IMF, 1998). As mentioned before, many economists determined that the banking sector as the most important instrument of financial markets and deterioration in the banking sector would cause financial crises (Mishkin, 1992). The systemic financial crisis derives from financial markets which have lost their effectiveness dramatically. The real sector is also severely affected by such a situation. The systemic financial crisis may include the currency crisis, but not every crisis will turn into a systemic financial crisis (IMF, 1998). In times of systemic crisis, policy makers must make the right decisions in the economic sense (Honohan & Laeven, 2005). According to the Claessens, Klingebiel & Laeven (2005), crisis can be turned into an opportunity and prevented the possible new crises with the right decisions taken and the right mid-term programs implemented. The foreign debt crisis is that a country's debts which based on either private or public sector are become an insolvency level (IMF, 1998).

As mentioned above, the concept of financial crisis has been used in general to describe the deteriorations in financial markets or the crises caused by the deterioration of financial instruments. Due to this reason, the financial crisis and the economic crisis mean different concepts.

In general, real sector crises can be defined as the disruption in goods market, service market and/or labor market. The crisis in goods and services markets is due to inflation pressure (Kibritçioğlu, 2001). If the general level of prices is constantly rising above a certain level, this situation causes an inflation crisis. However, it is not possible to link inflation to a single reason. Inflation may be caused either by the increase in total demand by the excessive decline in the total supply in the goods and services markets or by the political reasons (Kibritçioğlu, 2002). Inflationary

pressure may have been caused by an excessive increase in production costs due to the input prices boost. On such an occasion, the industrial sector may enter into serious constriction, layoffs may start, and as a result, the output level may fall and crisis can occur in the economy. Oil crises can illustrate this definition. Hamilton (1996) stated that excessive fluctuations in oil prices had a serious impact on production and investments. Li, Ni and Ratti (1995) found that fluctuations in oil prices increased unemployment and affected growth negatively. Fluctuation of the food prices (Abbott, Hurt & Tyner, 2009; Ghosh, 2010) can be also illustrate of the real sector crises.

As it can be seen, financial crises and real sector crises are different concepts. While the financial crisis caused by financial instruments such as money, foreign exchange and banking; real sector crises are caused by goods, services and labor markets. The effects of these crises may also be observed in the whole economy. In such cases, the crisis evolves into the economic crisis. At this point, the economic disruption is named economic crisis because of if the crisis is spread to the whole economy due to disruption of the either financial sector or real sector.

1.3. CRISIS MODELS

Financial and economic crises differ from each other in terms of evaluation and development processes and it is not possible to understand the crises in only one aspect. For this reason, three crisis models had been developed over the years in order to understand the causes of the crises, to determine the threshold points correctly and to offer the proper solutions. These theories were explained below.

1.3.1. First Generation Crisis Models

The 1st generation crisis theories were proposed by Krugman (1979) firstly and then examined in more detail by Flood and Garber (1984). Moreover, Krugman (1999a) stated that Flood and Garber (1984) had more clearly explained the first-generation crisis theories and determined that the crisis occurs due to budget deficits associated with the fixed exchange rate regime. According to the theory, governments have to use their reserves to finance or reduce budget deficits. This type of policy is unsustainable due to the limited availability of reserves. When the reserves reach the critical level, the investors can make speculative attacks against the currency and the crisis occurs (Krugman 1999a, 1999b). Corsetti, Pesenti & Roubini (1999) stated that the 1997 Asian crisis can be explained with the first generation crisis models because the countries' budgets were exposed to speculative attacks despite their deficit was not excessive. According to the Flood and Marion (1999), in the case of a speculative attack against the local currency, interest rates should be raised against this situation and the losses should be equalized. Besides that, with the speculative attacks on the local currency, value of the currency is decreasing and this decline causes devaluation. The speculators predict that the fixed regime will not continue after such a loss therefore, they hold the long positions to buy remaining reserves (Arghyrou & Tsoukalas, 2011).

Krugman (2001) stated that there are three main reasons for crises within the framework of the first generation crisis theories. The primary reason is the wrong macroeconomic policies implemented by governments. Krugman (2001) stated that if governments implement correct fiscal policies, crises will not occur. He also determined that there would be no danger of speculative attacks in economies where budget deficits were not created and inconsistent policies were not applied such as fixed exchange rate regime. He emphasized that if such policies continue to be implemented, the economy has deserved the crisis. Secondly, although crises are suddenly evolving, they are not unpredictable. Because when the wrong policies are applied, the crisis will occur. Finally, in the framework of the first-generation crisis

theories, he stated that the crisis did not have much damage to the economy because this kind of crisis would not spread into the real economy.

1.3.2. Second Generation Crisis Models

At first, this model was suggested by Obstfeld (1994). In theory, it is emphasized that there is no contradiction in the policies implemented in the pre-crisis term, but crisis came together with own policy change. On the basis, the theory based on a relationship between investors and the government. If these expectations occur in the opposite direction, economy might face with the crisis. For example, if investors consider the high devaluation possibility in the economy, interest rates will rise and the government will not maintain a fixed interest rates due to the its costs. On the contrary, if the investors do not expect a devaluation in the economy, interest rates will remain low (Flood and Marion, 1997). Likewise, if the devaluation expectation in the economy will increase, salaries expectations will increase and eventually this will increase the probability of unemployment (Obstfeld, 1994). According to the theory, there is a cost / benefit ratio to maintain the fixed exchange regime during the crisis periods and governments decide whether fixed exchange rate will be maintained or not (Sbracia & Zaghini, 2001).

According to Krugman (2001), there are differences between the first and second generation theories. First, Krugman stated that in the first generation theories the crises were the result of the wrong economic policies of the governments, while in the second generation theories he stated that governments should avoid the policy change unless something is going right. While the crisis is as a result of the applied wrong policy in the first generation models, the crises are not inevitable according to the second generation theories. Finally, when a speculative attack occurs in fixed exchange rate regimes, unemployment and total output levels are negatively affected, while this situation is not predicted according to the second generation models.

1.3.3. Third Generation Crisis Models

The third-generation crisis theories were proposed by Krugman to explain the Asian crisis. Most of the Asian countries had low unemployment and high export values during the 1997 Asian crisis. However, financial institutions suddenly began to experience difficulties and capital movements reversed. Therefore, in the third generation crisis theories, at the first stage, the fragility in financial institutions (especially banking sector) is analyzed (Chang & Velasco, 2001; Krugman, 1999; Vaugirard, 2007).

According to the model, the capital which entering the country at a high level, affects the banking sector positively. This optimism encourage the banks behave carelessly, and banks fall into the error of uncontrolled lending. For this reason, the banking system weaken and weak banks have to rescued by governments. The weakness in a bank spread to the whole market with speculative attacks, and this cause individuals and investors to withdraw their deposits from banks. As a result, financial institutions (i.e. the whole economy) experience a major loss of reserves (Alves, Ferrari & De Paula, 1999).

On the other hand, moral hazard is the important concept in order to explain the third generation crisis models. Due to the moral hazard, excessive investment and excessive lending arise and finally crisis occurs in banking sector (Krugman, 1998; Vaugirard, 2007).

According to Chang and Velasco (2001), in the framework of the third generation crisis theories, the developing countries' economies are more affected by the crisis than developed economies. Because developing countries are more financially dependent on banking sector as compared to developed ones. Moreover, developing countries' capital access is more limited than the developed countries. If the crisis occurs in the banking sector in a developing country, banks can easily find capital from other countries or financial institutions. However, if the crisis occurs in developing countries, access to credit for these countries is not as easy as

developed countries because the flow of money to developed countries only occurs when there is no crisis in these countries.

1.4. 2008 ECONOMIC CRISIS

2008 economic crisis was one of the most devastating crisis experienced ever. Just as 1929 crisis was defined as "the great depression" (for example, Bernanke, 1983; Bernstein & Bernstein, 1989; Eichengreen & Temin, 2000; Hamilton, 1987; Obstfeld & Taylor, 1997; Romer, 1990) to explained the strong effect on economies, "the great recession" was used (for example, Ball,2014; Cetorelli & Golberg, 2012; Grusky, Western & Wimer, 2011; Reinhart & Rogoff, 2008) for the 2008 crisis in the literature in order to express similar effect with 1929 crisis. In this section, 2008 crisis' development process, measures against the crisis and its macroeconomic main results will be mentioned.

1.4.1. Development of the 2008 Crisis

It is generally known that the 2008 global economic crisis caused by the deterioration of the American mortgage sector. Due to the loans which were not paid in time by the house owners, the mortgage crisis occurred and crisis expanded towards to financial institutions and affected real sector. But this definition will not be enough to understand the real reasons of the crisis.

In the US, the foundation of mortgage system was laid in the early 1930s with the establishment of Federal Home loan banks, Federal deposit insurance corporation (FDIC) and federal savings and loan insurance corporation. The main objective of Federal Home loan banks, which has approximately 8000 members, such as banks, credit institutions, financial institutions, insurance companies and housing finance companies, was to provide funds for those who want to own property through the mortgage system. Federal home loan banks did not pursue high returns as much as

publicly traded companies, and because they gained leverage from all benefits of government-sponsored enterprise (GSE) (which were explained below), they could offer customers low-cost borrowing options (Ashcraft, Bech & Frame, 2010). Federal deposit insurance corporation was established to protect borrowers against bank insolvencies (Randall, 1966). With this institution, depositors' confidence increased and they began to invest more deposits in banks. In this way, banks were able to provide more mortgage loans. Federal Housing Administration was established not only to give a credit to borrowers but also regulate the system and preventing the credit institutions (via mortgage insurance) from the profit loss due to the mortgage system. GSEs are state-owned companies to increase efficiency and direct credit flow. The most important of these companies are Freddie Mac and Fannie Mae, which allow mortgage loans to be sold in the secondary market which was explained below in detail (Weiss & Jones, 2017).

The primary and secondary market diversification should be analyzed properly in order to understand why mortgage market had caused the 2008 crisis. The primary market is basically that those who want to be a homeowner, receive loans from lenders. Mortgage loans are taken from banks and / or financial institutions that can provide loans. The lender analyzes the borrowers' ability to pay before the loan utilization then depending on the evaluation process, lenders give the loan. Borrowers might choose three kinds of mortgages: (1) Fixed rate mortgage (FRM) (which is the most used species): mortgage rate is never change, (2) adjustable rate mortgage (ARM): mortgage rate depends on the selected index, and (3) balloon mortgage: full payment must be paid in the expiry date. Lenders also require down payment and / or mortgage insurance as a collateral from borrowers. In addition, if the borrowers cannot pay their loans on time, the property of the house passes to the lending institution and the institution shall have the right to sell the house (Weiss and Jones, 2017).

Secondary markets mean that the lending institution keeps the created mortgage in its own portfolio or sells it to another financial corporation to create new resources

for the mortgage market (Saunders and Thomas, 1997). When a mortgage loan is sold in the secondary market, all the risks about the loan were taken by the credit buyer. The institution that buys the credit in the secondary market can hold the credit as a whole or can securitize the mortgage (Ambrose, LaCour-Little & Sanders, 2005). Securitization contains the corporation which has a multiple mortgage loans and issuing a mortgage-backed security (MBS). MBSs might sell loans as a whole or in pieces. Investors are not to be the owners of the mortgages which they invest, but they gain right to get the flow of payment which come from mortgages (Weiss and Jones, 2017).

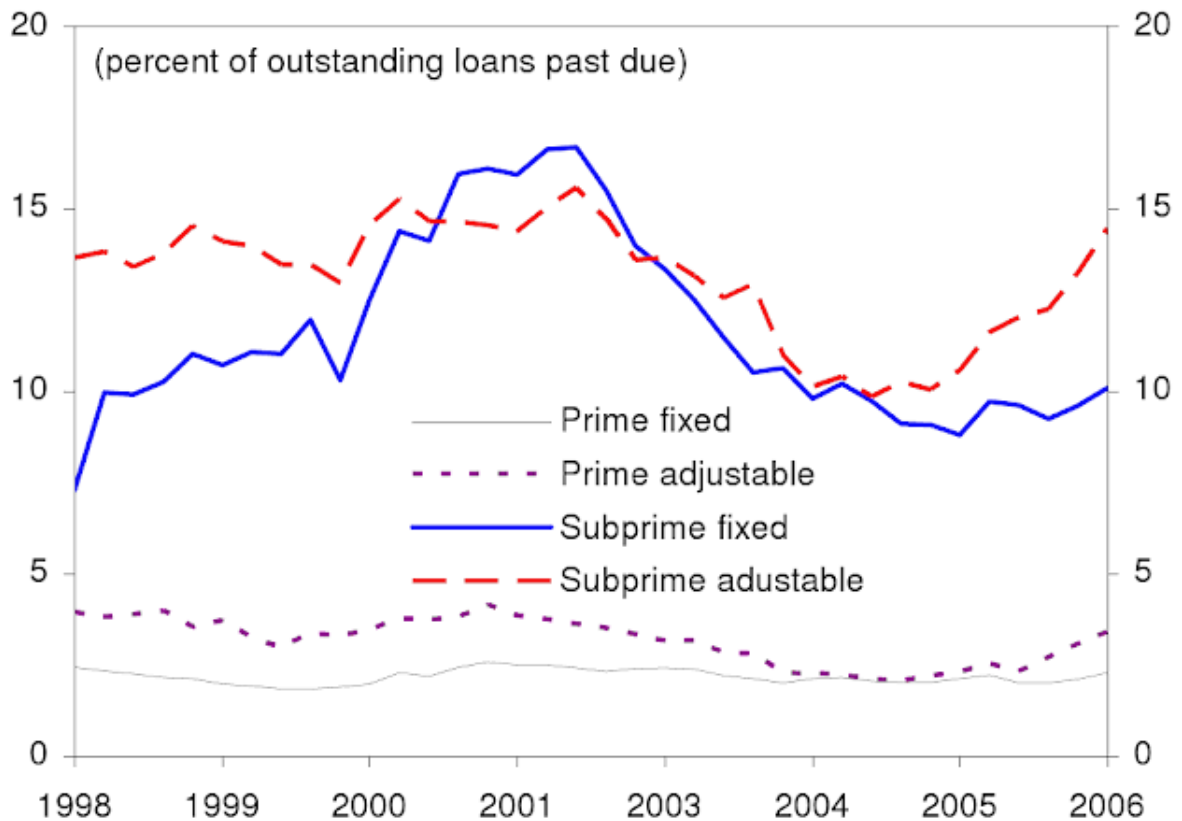
The system has been working well for the first 60 years since the foundation of Freddie Mac and Fannie Mae. Meanwhile there were major crises in the housing sector but all of these crises could be managed. However, from the early 2000s, the securitization process started to become more extensive and more complex (riskier and less risky mortgages were gathered together). Even the most specialized investors were forced to decide which mortgages were safer and which could be more investable. Again, during this period, banks created risky mortgage loans and sold them to banks which can be able to be pooled and securitized the mortgages. In the meantime, credit rating agencies have also listed these loans as safe, based on incomplete and inaccurate information received from banks which were the mortgages creators. Investors funded to risky mortgages by relying on this information. (Zandi & Deritis, 2011).

In the mid-2000s, the total value of securitized mortgages by the GSEs had approached \$ 3 trillion. This value corresponded to almost 35 percent of the total mortgage dept. In this period, the value of mortgages kept by GSEs in their portfolios reached to 1.5 trillion dollars (Lehnert, Passmore & Sherlund, 2008).

In this period, house prices started to rise due to the increase in the housing market and the increase in the risk appetite arising from the secondary market. However, after 2005, it was observed that homeowners had been unable to pay their mortgages. Therefore, the lenders could not get their payments back and the MBSs

traded in the secondary market started to be directly affected. Especially the distortion of the securitized subprime adjustable rate mortgages (ARMs) was the most striking. Figures 1 and 2 illustrate this process clearly.

Figure 1: Distribution of outstanding loans by type

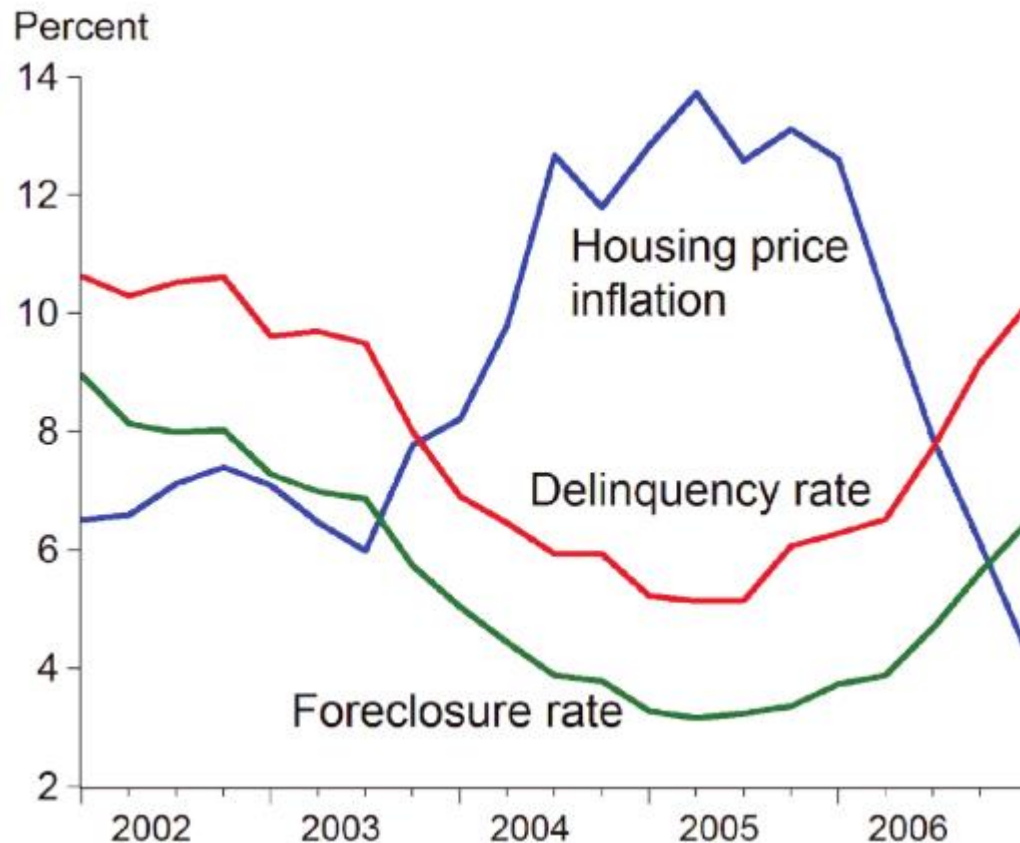


Source: Mills and Kiff, 2007

Figure 1 shows that fixed mortgages which trading in only primary sectors, are the most risk-free mortgage type. Further, it was also seen, those who use this type of loans were better at repaying their loans than others. On the other hand, as noted earlier, it was determined that ARMs were became the riskiest species after 2002, in addition, this mortgage type was the most negative in terms of repayments after 2005. When the figure 1 was examined, the dramatic differences between prime and sub prime's outstanding loans can be observed. Either fixed or adjustable outstanding loans rate which traded in the primary market, were not more than 5

percent between 1998 and 2006. On the other hand, the fluctuation in the secondary market mortgages was more than 10 percent. Furthermore, it was observed that, after 2005, the secondary market outstanding loans rate increased faster than the prime market.

Figure 2: ARMs' House Prices, Delinquencies and Foreclosures

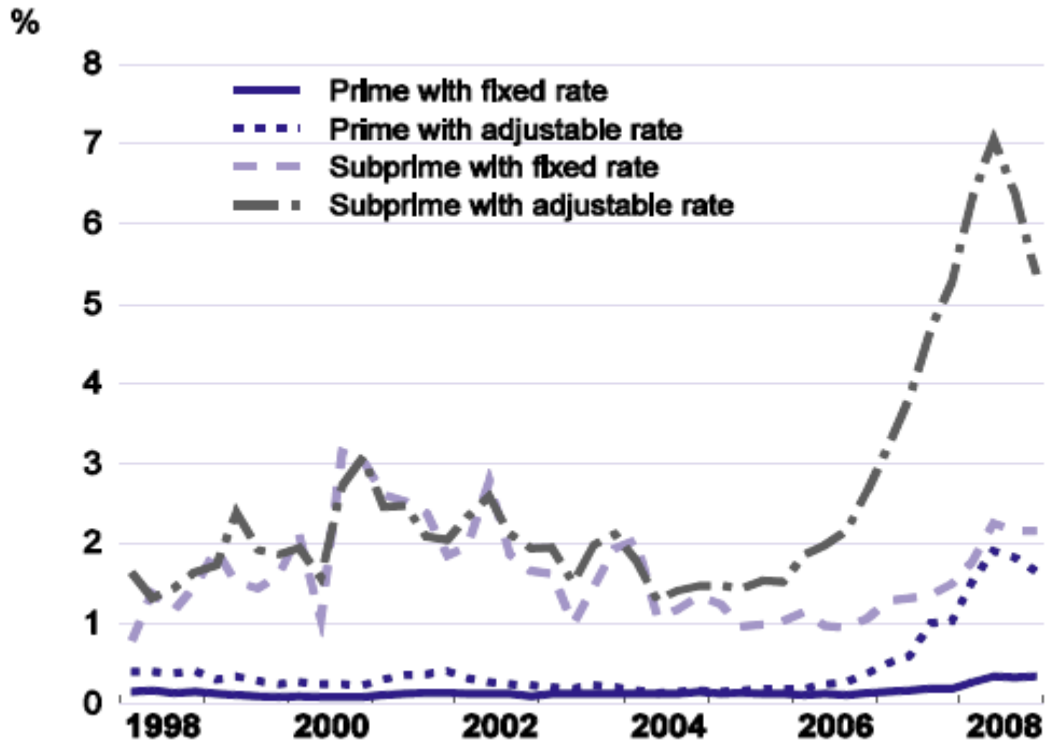


Source: Taylor, 2013

Figure 2 shows the ARMs' foreclosure and delinquency ratios over the years. It was understood from the Figure 2 that the ratio of delinquency in ARMs increased significantly after 2005. This result was also similar with figure 1. The most remarkable point here was the inverse relation between home prices inflation and foreclosure and delinquency. Especially at the end of 2005, it was observed that

home prices inflation started to decrease and foreclosure and delinquency started to increase.

Figure 3: Foreclosure rates by mortgage type



Source: World Bank Report, 2009

Figure 3 shows the foreclosure ratios according to the mortgage types. It was seen that the rise of foreclosures of ARMs, which were also seen from figure 1 (but can be seen until 2006), peaked in 2007. This increasing trend was observed not only in ARMs, but also other types of mortgage foreclosures. Especially in 2007, it was observed that adjustable fixed mortgage foreclosures approached the subprime fixed rate mortgage foreclosures.

This rise in the ARMs finally caught the attention of the government in mid-2007. Because up to that time, government officials preferred to provide a surveillance rather than intrusive to the market and thought that the market would self-regulate (Zandi & Deritis, 2011). Sheila Bair who was the chairman (later on) of the FDIC told

to congress that if the FRMs were offered for the ARM borrowers to avoid foreclosure and to continue living in their homes, they could accept it (Bair, 2007).

Housing market (especially subprime/secondary market) were directly affected by the decline in housing prices, rising in delinquencies & foreclosures and the lack of low-interest loans from banks. After 2007, the banks such as IKB, BNP Paribas and UBS, Merrill Lynch and Citigroup, which had a considerable share in the mortgage market, were directly affected by this situation. Some of these banks had experienced funding problems and some of them had also disclosed losses. This panic spread rapidly to other financial institutions (Claessens, Dell'Ariccia, Igan & Laeven, 2010; Mizen, 2008; Cecchetti, 2008).

To sum up, the US mortgage market found serious buyers from both the US and the rest of the world because of their high return on securitized mortgages, which depends on mortgage repayments and house prices. The reason for the rapid and uncontrolled growth of the market was the confidence that American housing prices would not lose its value and the high credit rating of the credit rating agencies to these mortgages. However, credit rating agencies had not been able to rate the risks correctly (especially in the Alt-A mortgages because, in the past, repayments of the mortgages in this group or higher group were made timely). With the foreclosures and delinquencies, the deterioration in the high-risk mortgages began to be noticed and the credit rating agencies started to reduce the high rating given to these mortgages. The investors, who saw the risk, started to withdraw their money from the system. Correspondingly, the funds rapidly depreciated due to the sale pressure. Moreover, serious liquidity shortage occurred in the market (Baker, 2008; Erdönmez, 2009; Hellwig, 2009; Kotz, 2009; Wallison, 2009; White, 2009).

1.4.2. The measures against 2008 crisis

Especially in late 2008, due to increase in borrowers' outstanding loans and decrease in the value of the mortgages they collected, Freddie Mac and Fannie Mae are placed in government conservatorship. With the bankruptcy of Lehmann Brothers, there was a perception that no banks were safe in the market. The liquidity crisis occurred in the market with these excess speculations. The stock market was seriously affected and thus, the crisis has reached to a new level (Bordo, 2008). Countries, especially the US government, took various measures to minimize the effects of the crisis. Table 1 shows the countries' crisis precautions.

Table 1: Selected Countries' Crisis Precautions

	Bank Liabilities				Fund commercial paper	Fund asset backed securities	Ban or restrict short selling
	Increase deposit insurance	Guarantee or buy bank debt	Inject capital	Nationalize			
United States	+	+	+	+	+	+	+
Germany	+	+	+				+
France	+	+	+				+
Italy	+		+				+
UK	+	+	+	+	+	+	+
Canada		+			+	+	+
Australia	+	+				+	+
Austria	+	+	+				+
Belgium	+	+	+				+
Czechia							

Greece	+	+	+				
Hungary	+	+	+				
Iceland	+		+	+			+
Ireland	+	+	+	+			
Korea		+					
Norway	+	+	+				
Portugal	+		+				
Sweden	+	+	+				
Spain	+	+				+	+
Turkey							
Mexico		+					
Japan		+	+		+	+	+

Source: OECD Report, 2009

As it was seen from the table, US had taken all the measures shown in the table to minimize the impacts of the crisis. Similarly, England also used all instruments in the face of the crisis. Further, it was also observed that, almost all countries either transferred the capital to banks and/or guaranteed or bought their debts. Moreover, it was seen that only the US, the UK, Iceland and Ireland have taken the banks to their control. It may also be seen from table 1 that, Turkey and Czechia did not preferred to use any selected instruments from mid-2008 to 2009.

Table 2: Costs of Bailout Packages (until February 2009)

	Total Amount of Measures	%GDP
US	700bn \$+787bn \$	10.1
Germany	492bn €	19.8
France	360bn €	10.9
Italy	40bn €	2.6
England	400bn £	28.6
Austria	100bn € + 26bn \$	36.9
Greece	28bn €	11.2
Ireland	450bn \$	235.7
South Korea	100bn \$	10.3
Netherland	200bn €	26.5
Portugal	20bn €	6.1
Sweden	206bn \$	50.5
Spain	150bn €	14.3
Japan	632bn \$	14.1
Norway	57.4bn \$	23.2
Brazil	13bn \$	1.0
Russia	86bn \$	6.6
China	3.7bn \$	1.4

Source: Erdönmez, 2009

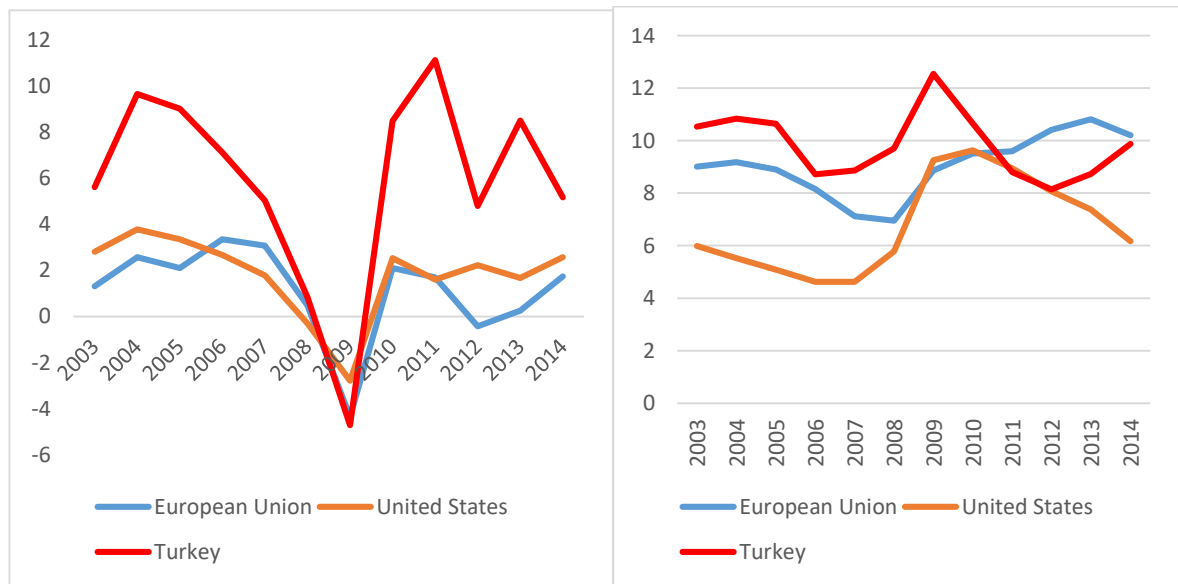
It was seen from the table 2 that the most spending was done by the US in order to get rid of the effects of the crisis. Furthermore, it was observed that in terms of total expenditure, Japan, Germany and Ireland followed the US. However, when the ratio of expenditures to GDP was considered, it was seen that Ireland was in the first place. These facts imply that the Irish economy had been seriously affected by the 2008 crisis. Similarly, the ratio of recovery expenditures to GDP was observed very high in Sweden and Austria.

1.4.3. The Consequences of the 2008 Crisis

The 2008 global economic crisis had several microeconomic and macroeconomic results. The impact of the crisis on financial markets had been discussed in previous sections. In the crisis period, many banks went bankrupt, under government guarantees, or under serious debt obligations.

The macroeconomic consequences of the crisis were also quite sharp. Figure 4 shows the growth and unemployment ratios of the selected countries, respectively.

Figure 4: Growth and unemployment rates of the selected countries (%)



Source: World Bank

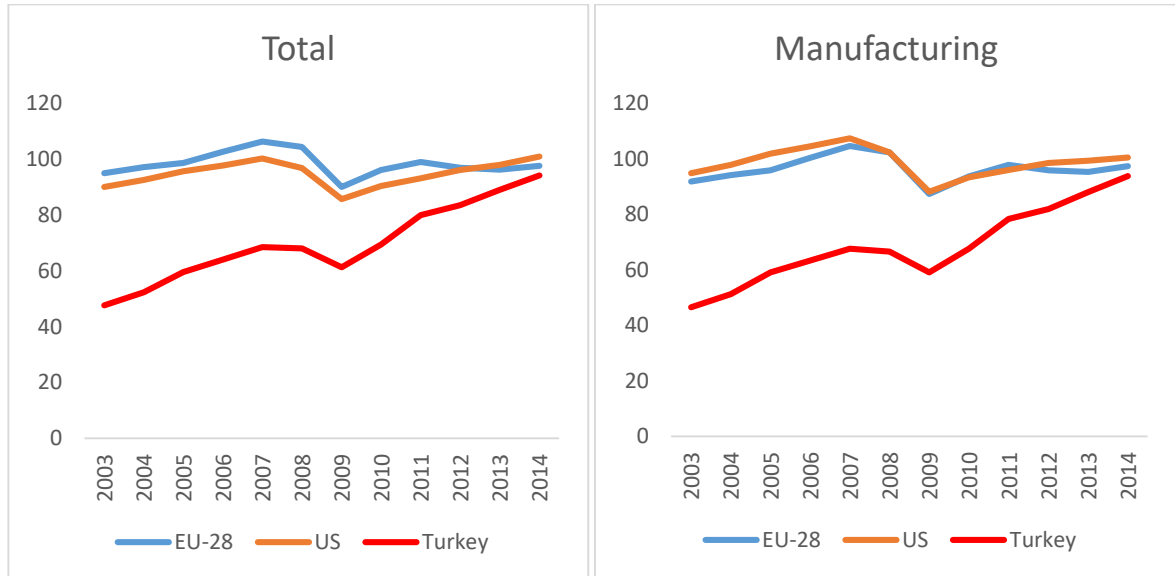
The first part of the figure 4 indicates countries' growth rates within a decade. The highest growth rates were observed in Turkey when compared to the other countries. However, when looking at the effects of the 2008 crisis, it was seen that the most affected country in terms of growth rates was also Turkey. Besides, after 2004, downtrend was observed in Turkey's growth and the growth rate turned to be negative in 2009. The decline in the US growth rate was also significant in the same

period. In 2009, it was determined that the growth rates of the EU, US and Turkey decreased by 4.34%, 2.77% and 4.70% respectively. After the crisis, it was determined that economies started to recover and growth figures reached to pre-crisis level in 2010.

In the second part of the figure shows unemployment rates of the selected countries which based upon ILO estimation. In the pre-crisis years, there was no dramatic change in the unemployment rates. But in 2009, when the effects of the crisis were the most, unemployment rates were observed at their highest levels for all countries. After 2009, declining trend was observed in Turkish unemployment rate and it came to the US and the EU countries level. Especially, the rising trend of unemployment rates in the US in the pre-crisis years was quite sharp. There is a numerous study in the literature that indicates a connection between increased unemployment and outstanding housing loans. (For example; Cordell, Dynan, Lehnert, Liang & Mauskopf, 2009; Demyanyk & Van Hemert, 2009; Mayer, Pence & Sherlund, 2009). Furthermore, after the crisis, despite the decline in the unemployment rate in the US and Turkey, it was observed that unemployment had maintained to increase in the EU.

The effects of the crisis on the real sector were also serious. As mentioned above, unemployment increased rapidly during the crisis in the US, Europe and Turkey. Moreover, industrial production was affected from the crisis dramatically. Figure 5 shows how the production values of selected countries were affected from the crisis.

Figure 5: Total and manufacturing production indexes of the selected countries (%)



Source: OECD

The first part of the figure 5 shows total industrial production index of the EU, the US and Turkey. It was seen from the figure that the total production values of the countries increased steadily until 2007. However, a sharp decline was observed after 2008 in total production values with the effects of the crisis. Further, just like almost every macro and microeconomic parameters, all selected countries' production indexes had been observed to rise after 2009.

The change in the manufacturing industry production, shown in the second part of the figure, did not differ from the total production. However, it can be understood from the figure that the decline in manufacturing industry production was higher than the decline in total production. For instance, Turkey's industrial production fell by 9% in 2009 with respect to the previous year, but the decline in total industrial production was found to be 11%.

As it can be seen from the above, the 2008 crisis had serious effects both on the financial markets and on the real sector. The crisis started in America and influenced all developed, developing and underdeveloped countries (Griffith-Jones & Ocampo,

2009; Rose & Spiegel, 2010). In this period, governments and central banks had taken various measures by using monetary and fiscal policies to reduce the effects of the crisis. In general, it was observed that countries started to overcome the effects of the crisis since 2010, but this was not the case for all countries.

Looking at the aforementioned macro and microeconomic basic parameters, it might be said that Turkish economy was also affected from the crisis as well. In the following sections, it was investigated that how the crisis affected to Turkish economy, which sectors were affected mostly and since when the sectors overcame the crisis effects.

CHAPTER II

RELATED LITERATURE AND DEVELOPMENT OF THE TURKISH MANUFACTURING INDUSTRY

This chapter is divided into two main sections. First section reviews the literature that analyzed the manufacturing industries in Turkey, the US, Europe and some aggregated country groups during the 2008 global economic crisis period. Second section focuses on the historical development and transformation process in the Turkish manufacturing industry.

2.1. RELATED LITERATURE

This section reviews the studies analyzing the effects of the 2008 global economic crisis on the manufacturing sector. The literature on forecasting analysis and differences in differences analysis, which are the methods of the current study, were mentioned in the method part of the study. This section mainly focuses on the econometric models, the choice of dependent & independent variables and results which are aiming to explain the impact of the 2008 crisis on manufacturing sectors on a global level. This section also included studies to identify variables and sectors that give early warning for the 2008 crisis.

Briconge et al. (2012) analyzed the effects of 2008 crisis on firm performance in France by using export data and calculating trade margins, they showed that firm size is a fundamental factor in terms of reflecting crisis permeability. Further, their results indicate that industry based differences should be expected while examining the effects of crisis on firm performance. In this context, they found that sub-sectors

such as production of lead, copper, ores, railway & tramway vehicles, iron and steel, carpets and other textiles were the most affected by the crisis.

Carini and Carpita (2014) analyzed the firm performance in Italy between 2008 and 2010. They analyzed about 25000 firms and found that the co-operative companies were the most affected from the 2008 crisis. However, among the co-operatives, impact of the crisis was mostly seen in manufacturing after the mining sector. Also, they showed that food sector was found to be the most affected sub-sector among the manufacturing. Similarly, Cerrato and Alessandri and Depperu (2016) also analyzed Italian firms, using the OLS and logit estimation methods for the 2007-2010 period and found that firms preferred more internal market rather than buying from foreign markets. This can be interpreted as companies see the internal market safely and avoid any risky behavior. Another study on Italian manufacturing industry was done by Sangalli (2013). They tried to determine the dimension of the inventory investments during financial squeeze times in terms of their firm sales, leverage and debt about 120000 firms using the generalized method of moment method (GMM). As a result, they showed that small size firms invest less in crisis periods than other firms.

2008 crisis had an impact not only on the firms' investment decisions but also their innovation processes. For instance, Zouaghi and Sanchez (2016) analyzed the innovation activities of the Spanish firms', collected into three groups (agricultural, food beverage & tobacco and other), between 2008 and 2012 using the logit and tobit methods. The dependent variable of the study was the presence or absence of any innovation activities in the last 2 years. As a result of the study, it was found that all sectors' innovation activities were influenced by the crisis. However, it was also stated that agriculture and food sectors were less affected from the crisis with respect to sales and employment. In another study, Zouaghi, Sanchez and Martinez (2018) analyzed the innovative activities of the Spanish firms during the crisis by dividing the firms into two groups as high and low-tech and using the same models. As a result, they stated that low tech firms were more affected by the crisis. Arellano,

Bai and Mihalache (2017) analyzed the determinants of the output level of Spanish manufacturers between 2000-2014, and found that 2008 crisis affected firms that had low trading volumes than the others with respect to output levels. According to the literature, the crisis affected not only innovation activities or output levels of Spanish firms but also endangered their existences. For instance, Martinez, Zouaghi, Marco and Robinson (2018) analyzed 13000 Spanish Firms operating in the manufacturing and service sectors between 2009 and 2015 using survival analysis technique. Their results indicated that 2008 crisis increased the probability of bankruptcy and manufacturing firms that cooperate with the other firms have survived the crisis more quickly.

The 2008 crisis has dramatically affected manufacturing industries of developing countries. Within this scope, numerous studies have been done on the basis of both sectoral and manufacturing industry sub-sectors. With these studies it was aimed to determine how the various parameters of the companies such as profit, value-added, employment, production and effectiveness were affected by the crisis. For instance, Proença, Laureano and Laureano (2014) analyzed the financial indebtedness and capital structure of approximately 13000 SMEs operating in Portugal between 2007 and 2010 using the OLS method. As a result of the study, it was found that short terms loans had a higher impact on profitability than the long term loans and uni-directional relationship was observed between debt ratio and profit values during the crisis period. Similarly, Lacina and Vavrina (2014) analyzed the profitability of approximately 3,500 firms operating in Greece and Ireland between 2008 and 2010 using cluster and correspondence analysis methods. As a result, it was determined that these two countries were affected by the crisis but that the most affected were SMEs compared to large corporations. On a sectoral basis, the profitability of Greek firms which were operating in wholesale and retail trade sub-sectors were found to be the most affected by the crisis. In Ireland, the mining and quarrying sector (for the small companies) and water supply sector (for the large companies) were the most affected from the crisis in terms of their profitability level. There was another study

in the literature that analyzed the Greek manufacturing industry during the crisis years. Notta and Vlachvei (2014) also analyzed the profitability of firms operating in the dairy sector in Greece before and after the crisis. In the study, panel random effects analysis was conducted on the firms' market shares, sales, liquidity ratios and leverage ratios between 2006 and 2011. The analysis was divided into pre-crisis and crisis years. As a result of the analysis, it was seen that only the market share had a significant and positive effect on profitability in the pre-crisis period whereas the profitability was affected significantly by market share, liquidity (positively) and leverage (negatively) in the crisis years. Herman (2016) analyzed the sectoral performances and impacts of 2008 crisis on Romanian economy. In the study, it was found that the manufacturing industry was one of the most important components for the Romanian economy. Within the manufacturing industry, the most important sub-sectors in respect of value added and employment were found food & beverage, motor vehicles, and basic metals sub-sectors. Further, it was also pointed out that the value added and the employment values of the manufacturing industry experienced a serious decline in 2008 and the following 5-year period. Nikolic, Rubil and Tomic (2017) analyzed the public and private sectors in Croatia and Serbia using the Oaxaca blinder method. In the study, it was analyzed the private and public sector employees in terms of age, marital status, educational status and work experience. In order to determine the crisis effects, analysis was conducted separately for the years of 2008 and 2012. The study showed that wage differences was higher in Serbia than in Croatia and individuals working in the public and private sectors were affected from the crisis at different dimensions. Vokoun, Polanecky and Stellner (2015) analyzed the food, beverage and tobacco firms in Czechia and Slovakia between 2007 and 2010. In the study, panel fixed effect analysis and data envelopment analysis were conducted. They found that labor productivity fell only in 2007 and 2008 for both countries but recovery in productivity was observed faster in Czechia. Further, as a result of the data envelopment analysis, they stated that large firms were more effective than small firms in terms of costs.

The effects of 2008 crisis on the US economy had been discussed in earlier sections of the current study within the context of growth, unemployment and selected industrial parameters. Moreover, when the research was specifically focused on the manufacturing industry, the effects of the crisis were seen to be quite destructive. For instance, Zhang (2018) analyzed the US sectoral performance in terms of volatility and income. They found that performance of all sectors decreased in 2008 crisis. Furthermore, their study showed that manufacturing and public sector were more affected from the crisis and by 2015 only the performance of the services and agriculture sector, which have relatively small share in the economy, was reached pre-crisis levels. In addition, Haerer and Pratson (2015) tried to determine how the energy sector, which is directly related to the manufacturing industry, was affected from the crisis by the using input-output life cycle assessment model. They stated that unemployment increased considerably during the crisis years, especially in the coal sector, 50,000 people and in the green energy sector 175,000 people lost their jobs.

The crisis was also effective in manufacturing sectors of BRICS, which have an importance and significant share among the developing economies. Borghi (2017) analyzed the effectiveness of the prevention policies against economic crisis in Brazil with the input-output analysis. It was focused on the 56 sector and industry was found to be most affected sector from the crisis among others. Besides, it was stated that Brazilian economy was entered the recovery period in 2010 after the applied economic policies and incentives. Plotnikov and Vertakova (2014) analyzed the Russian manufacturing companies, and it was found that the number of people working in manufacturing industry has decreased since 2008. In addition, it was determined that the production capacity of approximately 75% of firms cannot come to pre-crisis levels until 2011. Dhasmana (2015) analyzed about 1500 manufacturers operating in India between 2002 and 2014 using the GMM method and calculating the concentration index. It was argued that there is a positive linkage between market concentration rate and profitability and found that tobacco was the most

concentrated and food & beverage was the least concentrated sectors. The results of the GMM analysis indicated that firms' sales and earnings growth values decreased dramatically after the 2008 crisis and growth was statistically and significantly affected from the real effective exchange rate. There were other papers in the literature that analyzed the Indian manufacturers during the crisis period. For instance, Rath (2018) analyzed the firms' productivity operating in the manufacturing and service sectors in India between 2008 and 2014 choosing sales, employment, growth and wage data by using the data envelopment method and GLS analysis. As a result of the study, it was found that manufacturing was more affected than service sector from the 2008 crisis. Xie, Zang and Qi (2016) analyzed the environmental productivity of the Chinese manufacturing industry between 2001 and 2010. In this context, approximately 30 manufacturing sub-sectors were analyzed using data envelopment and clustering methods. According to the study, the efficiency coefficient of environmental management decreased in 2010. The reason was the 2008 crisis; because, in the crisis period, the growth rate of the manufacturing companies slowed down, the production levels decreased and therefore, the companies did not care about to environmental management. Moreover, it was observed that the textile sector companies were the most concessions from environmental management during the crisis period.

The impacts of 2008 crisis were also seen in Japanese manufacturing sector which is a member of the G7 countries and one of the most important developed countries. For instance, Miyakoshi, Takahashi, Shimada and Tsukuda (2014) analyzed the risk premiums of firms which were in manufacturing and service sector between 2006 and 2010 using EGARCH method. Their study showed that manufacturing industries' risk premiums were increased during the crisis period and spread towards to finance sector. The results of this study are quite interesting since the 2008 crisis began in the US mortgage sector and the financial sector that directly interacted with it.

The impacts of the 2008 crisis have also been examined in the literature on specific country groups. For instance, Didier, Hevia and Schmukler (2012) analyzed the effects of 2008 crisis in emerging and developed countries using annual GDP growth rate and monthly industrial production index. They showed that emerging and developed countries' growth were affected by the crisis at almost the same margin. Further, their results indicated that emerging countries get over the effects of the crisis faster than developed countries. Moreover, they determined that industrial production of the emerging countries was less affected than developed countries. There was another study in the literature that analyzed the developed countries. Schwab and Werker (2018) analyzed the profitability of the firms in 160 countries (divided into two groups as a developed and less developed) during the crisis period. Their study indicated that less developed countries needed external financing to increase their profitability. Paunov (2012) analyzed approximately 1300 manufacturers operating in eight Latin American countries. It was tried to determine whether these firms could continue innovative projects in the crisis years using probit model. Their study showed that, in the crisis years, the likelihood of older firms to maintain their projects was higher than with new firms but firm size was not affect innovative projects significantly. Furthermore, they observed that firms which received public support and exporter firms were more likely to be able to run their projects than the others. Coulibaly, Sapriza and Zlate (2013) analyzed about 6000 manufacturing companies operating in 6 developing countries in Asia conducted with panel method. They found that sales were effected from the 2008 crisis and exporters were found more unsecure rather than non-exporters since they had fewer credits during the crisis. Moreover, they showed that sales of firms which are operating in China, Thailand and Malaysia were more dependent on external demand. Hasan and Salim (2015) analyzed seven Asian countries which were China, Japan, South Korea, India, Indonesia, Malaysia and Hong Kong to determine the effects of the 2008 crisis. In this context, de-trended fluctuation analysis was conducted and found that Chinese and Indian firms were less affected from the crisis than other countries. Eaton et al. (2016) analyzed the manufacturing companies in

21 countries between 2000 and 2012 using dynamic multicountry model. In the study, fluctuation of the investment, growth, international trade and production values were analyzed of these companies during and after the crisis. As a result, it was determined that the trade values of the mentioned manufacturing companies were reduced by about 30 percent. In terms of consumer durables, it was found that, China was the least affected country from the crisis, while Romania and Spain were the most affected. Aghion, Bloom, Lucking, Sadun and Van Reenen (2017) tried to determine firm performance in OECD countries during the crisis period and they found that sales volumes and profits of companies which were operating in multiple locations and/or countries fell less than firms which operating in a single center. Kapelko and Lansink (2017) analyzed the efficiency of the dairy products companies in 23 countries and in the three regions of Europe (east, west and south) between 2005 and 2012 using the multi directional inefficiency method. In the study, material, labor and investment efficiencies of companies were measured with data envelopment model. As a result of the analysis, efficiencies were found to be quite different in pre and post-crisis periods. It was also observed that efficiency for the western firms were found to be more steady in the crisis years compared to the others. It was determined that the most inefficient companies in terms of the labor force and investments in the crisis years were northern European companies. However, the least efficient companies in terms of material use were found as eastern European companies.

The above mentioned studies had shown that the 2008 global economic crisis affected the manufacturing industries of the countries which had a small and/or large scale. In this context, profitability and efficiency of firms decreased, job cuts increased, innovation and investment activities decreased. The losses caused by the crisis to the companies were not limited to these parameters. Aforementioned cases were just exemplified the deterioration. The effects of the 2008 crisis on Turkish manufacturing industry had also been substantial as in other countries. In the literature, limited number of studies have been done to determine crisis effects

on Turkish manufacturing industry. For instance, Lo Turco and Maggioni (2014) analyzed productivity, trade and sales of medium and large scale companies that operating in Turkish manufacturing sector conducted by the decomposition analysis between 2007 and 2009. As a result of the study, it was found that economic crisis more affected small scale companies than large scales companies. Moreover, it was stated that due to the decrease demand in the foreign markets, intermediaters were more affected by the crisis than other exporters. Baycan and Yıldırım (2017) investigated the efficiency of the manufacturing industry during the crisis period, using monthly production values of sub-sectors by the markow switching method. Their study showed that the volatility of the manufacturing productivity was higher when the country's economy grew slightly. Kaya Bahçe and Memiş (2013) analyzed the determinants of the Turkish working life in terms of such as sex, age, educational level, working place and area during the crisis years. For this purpose, logit and tobit models were conducted to selected three sectors (agricultural, manufacturing and service). In the study, employment status was a dependent variable which measured within the context of people who have a job or not. As a result of the study it was found that unemployment was highly associated with the education level, sex, age and area. Additionally, it was stated that elderly women had higher unemployment risk than other sex and age groups. According to the study, when the analyses focused on the gender differences, it was stated that economic crisis caused the inequalities in terms of the working time. Toraganlı and Yazgan (2016) analyzed the Turkish manufacturing firms' durableness during the crisis period using panel estimation technique and probit model. For this purpose, more than 600 firms were analyzed in terms of their age, labor status and external term of trade. The dependent variable of the study was whether the companies can continue the operations during the crisis period or not. The study showed that while the volatility on the exchange rate negatively affected firms' survival capabilities, labor performance affected positively. Kesimli and Günay (2011) analyzed the effects of the crisis on capital performances of the firms which quoted in the stock exchange. Their results showed that 45 firms' capitals were affected from the crisis. Özçelik

(2017) also analyzed the effects of crisis on publicly-traded manufacturing firms using panel data method and found that firms' profit values were negatively affected from the crisis. Furthermore, Karahan (2012) analyzed the performances of the firms during the crisis period and found that manufacturing firms were faced with a large number of orders cancellation in the crisis period, their domestic sales fell but the exports were not affected by the crisis. Moreover, Terzi (2010) found that manufacturers' net sales and incomes decreased, debts and loans increased during the crisis period.

There are also studies in the existing literature focusing on the crisis priority. In this context, these studies aimed to determine which parameters provide the early signals of the crisis. When looking at the studies examining the early signals about the 2008 crisis, it was determined that many parameters showed the early signals of the crisis. For example, Frankel and Saravelos (2012) analyzed various parameters, including the industrial production index, to show which are provide early signal for the 2008 crisis and found that variables that gave the strongest warning were international reserves and exchange rate. However, Davis and Karim stated that banks CDS and LIBOR rates could be considered as early predictors of the 2008 crisis for developed economies. In addition, to detect crisis earlier, Eichengreen (2009) reported that huge account deficits, growth and interest rates are important whereas Lane and Milesi-Ferretti (2011) argued that private credits, debts and trade deficits should be followed. Moreover, Nguyen and Nguyen (2008) tried to determine significant early warning parameters for Vietnam economy. Their study showed that public debts could signal for the crisis.

There are also some studies showing that some parameters of the manufacturing industry can be accepted as the early signal of the crisis. For instance, Saracco, Di Clemente, Gabrielli and Squartini (2016) examined some selected macro sectors and sub-sectors of the manufacturing. Their study indicated that the deteriorations in the wood and basic metal sectors were early signals of the crisis. Besides, Qian, Zhang and Cheng (2008) analyzed the Chinese manufacturers between 2002 and

2006. Their findings indicated that firms' cash flows could show the signals of the crisis.

Studies also conducted to determine which variables are able to consider as early signal of the crisis for Turkish economy. For instance, Koyuncugil and Özgülbaş (2012) stated that the profit before taxes can be used to detect financial deterioration of SMEs earlier. However, Çeşmeci and Önder (2014) argued that real-sector confidence and money market pressure indexes were the leading parameters to predict 1994 and 2001 crisis of the Turkish economy but Sevim et al. (2014) stated that export to import ratio provided early warning for these crises.

As mentioned above, the impacts of the crisis have been observed in manufacturing industries of almost all countries and/or country groups. Besides, the literature review showed that studies mostly concentrated on the effects of the 2008 crisis on manufacturing industry. Furthermore, some other studies focused on detecting early signals for 2008 crisis. It was observed that some of them analyzed financial or selected macroeconomic parameters whereas others specifically concentrated on the manufacturing and/or selected sectors to detect early signals. Moreover, it was observed that none of these studies did not seek the answers to the question that what would be happen if the 2008 crisis would not occur.

Taking into consideration all these, in the current study, first, it was tried to determine impact of the crisis on Turkish economy and manufacturing sector. Second, to predict early signals, all sectors were analyzed operating in Turkey. And third, it was tried to answer the question of how the manufacturing industry would proceed if the crisis did not exist.

2.2. TURKISH MANUFACTURING SECTOR

To understand the development of the Turkish manufacturing industry over the years, it is necessary to begin to analyze from the period of the Ottoman Empire. Especially, trade agreements which were made in the 19th century caused increases in the foreign trade of the Ottoman Empire. These treaties provided international integration of the Ottoman Empire, but they also caused foreign trade deficits. This was due to the import incentive structure of the trade agreements and capitulations that given in the prior times (Acartürk & Kılıç, 2011; Anbar, 2009; Eğılmez, 2018; Kazgan, 2013b; Yerasimos, 1980). For example, according to the trade agreement with Britain in 1838, the tax on exports from Britain to Ottoman empire was 5% and the tax on exports from Ottoman empire to Britain was 11% (Tokgöz, 2013). Besides, with this agreement, the tax on domestic trade was abolished for British traders, but it was decided that tax would continue to be levied on domestic traders (Kurtoğlu, 2017). During this period, the concessions enabled the foreign traders to trade freely in the Ottoman territories, which prevented the development of domestic industry and trade (Eğılmez, 2018). In this period, the foreign trade deficit occurred because the foreign exchange inflow was almost not. The foreign trade deficit caused by the budget deficit, and, therefore, the borrowing became obligatory. In the Ottoman Empire, foreign debt was taken in order to finance the rising budget deficit. First and last foreign debt was taken in 1854 and 1914, respectively. Although some of the foreign debts were taken for projects such as railway construction, but much of the debts were used to finance wars, budget deficits and to renew previous debts.

In 1875 Ottoman empire proclaimed the moratorium (fail to pay off debts) because of the rising foreign debts, receiving credits which were used to finance debts (financing could not be used in production and industry) and unavailability of new external debt in consequence of the financial panic on the Wien stock exchange and the whole Europe (Kazgan, 2013b). After this step, Düyun-u Umumiye was established in 1881, which controlled the income and customs of the ottoman state by the foreigners and to be used for the payment of the collected taxes (Eğılmez,

2018). For instance, tax on tobacco products, one of the government's most important income items, had to be transferred to this institution (Kurtoğlu, 2017). In the early 20th century, the administration controlled and collected about 1/3 of the income of the Ottoman empire (Tokgöz, 2013). The administration consisted of 7 persons, including the delegates of Britain, Germany, Holland, France, Austria, the representative of privileged bond holders, and the Ottoman nationality. Thus, financial independence was lost along with this structure. (Eğilmez, 2018). The administration provided consolidation of the ottoman debt. They also carried out initiatives to increase the collected tax revenue. They put measures in place to reduce illegal trade and tax evasion. With these implementations, budget deficit was reduced and budget surpluses was given. Besides, there would be no budget deficit until the World War I (Kazgan, 2013b). During the independence war, the government of Ankara confiscated the incomes of Düyün-u Umumiye. With the Lausanne Treaty, this institution was closed down. The major part of the arrears from the Ottoman Empire accrued to the Republic of Turkey. Discharge of the remaining debts from the Ottoman Empire continued until 1954 (Eğilmez, 2018). As a result, it was seen to be 100 years between the first external debt taken by the Ottoman Empire in 1854 and the last debt paid by the Republic of Turkey in 1954.

When the structure of the corporations operating in Turkey are examined, it was seen that 44% and 32% of 352 corporations was launched between 1914 -1920 and 1908 -1913 respectively until 1920. In other words, 76% of these corporations were founded during the war period (Kazgan, 2013b). According to the Kurtoğlu (2017) in 1920s, Turkey's export revenues were composed of tobacco (%35), dried fruit (%32) and the rest consisted of a few agricultural raw materials.

When the sectoral distribution of the companies in Turkish economy was examined, it was stated that from 33058 companies, 20057 companies served at textile sector, 5347 at leather processing sector and 5273 at hardware sector in 1921 (Kurtoğlu, 2017).

According to the 1927 census, 200,000 people were employed in 65300 industrial enterprises. 89% of them consisted of only 3 or less employees. While those employing more than 10 workers were 3% of the total. 60% of the enterprises were in the weaving and food industry. Nevertheless, Turkey was importing various products such as sugar, textiles, cotton and yarn. In addition, intermediate goods and investment goods composed only 30 percent of total imports (Kazgan, 2013b)

1929 economic crisis effected Turkish economy seriously. Price of agricultural products which is the most important import products of Turkey were reduced by 30 percent from 1925 to 1932 (Kazgan, 2013a). In this period, bankruptcies also occurred in small manufacturing enterprises (Paksoy, Akbaş & Şentürk, 2010).

With the five-year development plan which prepared after the great depression, it was aimed to fabricate products such as cotton & wool fabric, food, sugar within the country. In addition, production of the advanced industrial products such as chemistry, paper-cellulose, mining, textile, ceramics and iron & steel were decided to be stimulated (Tokgöz, 2013).

In the 50's, significant developments were experienced in all sectors, especially in agriculture. In this context, incentive policies were implemented, credit facilities were increased, imports were limited, domestic industry was encouraged and invested in infrastructure (Eğilmez, 2018). In 1950, the share of agriculture sector in the Turkish economy was 85.7 percent, while the share of manufacturing sector was 7.4%. In 1960, the shares changed to 74.9 and 9.6, respectively 1921 (Kurtoğlu, 2017). Between 1968 and 1977, industry (production) was identified as the most important factor to providing economic growth within the 2nd five-year plan. In this period, policies such as import substitution and export incentives came to the forefront. (Eğilmez, 2018). However, during this period, the 1974 oil crisis occurred and it affected Turkish economy as well. As a result of the crisis, both energy prices and imported input prices increased, and production decreased dramatically (Öztürk & Saygın, 2017; Yılmaz & Kalkan, 2017). However, Kepenek (2012) stated, not only looking at the external factors but also necessary to examine the internal factors to

explain the impact of the crisis. According to the him, as a result of three different development plans implemented until the 1974 crisis, the main problems in the economy could not be eliminated. The fact that the manufactured products were not suitable for export in terms of quality and prices, but for production it was needed to imported products. Due to this, domestic industrial production decreased over the years.

In 80s, market transition and outward oriented economy process begun in Turkey. For this purpose, a series of implementation, also known as the January 24 decisions, was entered into force (Foreign capital framework decree numbered 8/168) (Güven, 2008; Öniş, 1994). With these decisions, increasing openness, narrowing the public sector (including state economic enterprises (SEEs)), incentive for private enterprises, increasingly free conditions of goods & services & capital movements were aimed (Kazgan, 2013a). In addition, export-led growth also became one of the important objectives (Esen, 2000). After this period, exports have increased significantly, and balance of payment deficits shrunk. Until 1988, the general level of prices were under control, the production capacity and economic growth increased with the elimination of energy shortage (Güloğlu, & Altınoğlu, 2002).

Table 3: Manufacturing industry employment figures (Thousand)

	1980	1985	1990	1992	1993	1994	1995
Total employment in the manufacturing industry	2150	2440	2741	3085	2766	3034	2942
Own-account worker	445	505	556	686	547	652	584
Number of employees	1705	1935	2185	2399	2219	2382	2358
Workplaces employing 10+	787	928	1024	980	975	933	972
<i>Public</i>	287	276	250	228	214	197	170
<i>Private</i>	500	652	774	752	761	736	802

Source: (Yeldan, 2013)

Table 3 shows the employment figures in the Turkish manufacturing sector over the years. Places where less than 10 workers and unregistered workforce figures were not included in the table. It can be clearly seen from Table 3 that the number of employees have increased over time. However, as mentioned above, the number of people working in the public sector gradually decreased every year. In the same period, it was observed that the number of employee in the private sector increased. By looking at the decrease in the number of employee in the public sector and the increase in the number of employee in the private sector, it might be said that the market transition and outward oriented economic policies which implemented after 80s were relatively successful.

Table 4: GDP and sectoral growth rates (%) in Turkey between 1981-1991

Years	GDP	Agriculture	Industry	Service
1981-1983	4.0	2.1	7.4	3.3
1984-1987	6.7	2.0	5.9	6.7
1989-1991	4.0	- 0.1	5.7	3.7
1987	9.3	1.1	8.9	9.4
1988	1.4	8.0	2.3	1.1
1989	2.3	- 7.6	4.0	2.6
1990	9.2	7.4	9.1	7.6
1991	0.4	- 0.2	3.3	0.5

Source: (Kurtoğlu, 2017)

When the Table 4 is examined it is seen that the Turkey has a positive growth trend between 1981-1991. The highest growth was in 1987 with 9.3%. This table also shows how the growth in agriculture has declined over time, even though, the growth of the industry was striking during the period of 81-91. Except for the period 1984-1987, the growth in the industry during the period 1981-1983 and 1989-1991 exceeded the growth of the Turkish economy. It can be stated that the industry-based growth strategy implemented after 1980 was succeeded based on the fact

that rising industry growth and falling agricultural growth. Further, while the share of manufacturing industry value added in GDP was 15 % in 1970, it increased to 17% and to 22% in 1980 and in the early nineties respectively (Kepenek, 2017). After 80s, it was determined that the share of sub-sectors which are other chemical products, transportation vehicles, electric machines, other plastic products, other metallic industrial products, metal industry and textile have increased both in terms of productivity and employment (Taymaz & Suiçmez 2005). Despite these positive indications, the economy tended to disruption period due to structural and financial imbalances. According to Kazgan (2013b), the best substantiation of this is the increase in the domestic debt stock / GDP from 15.3% to 21% between 1980-1983 and 1984-1987. Furthermore, in order to increase exports, real devaluations were made and TL depreciated about 40% from 1981 to 1988. Because the real wages were already fallen by about 23 percent in 1980-1988 due to the suppressed by the employers (Taymaz & Suiçmez 2005). In this period, inflation and external debt increased and wages were not lowered due to unionization activities. In addition, while fixed capital investments needed to tend the areas that would increase exports (such as agriculture, manufacturing industry), public and private sectors were turned towards infrastructural investments and housing investments respectively. Besides, goods which has an unknown cost and high subsidy were imported such as iron and steel, glassware, ceramics and porcelain from eastern Europe and the former USSR. Because of that, Turkish manufacturers were shut down or operated in idle capacity. Because of these main reasons, the economy entered into the stagflation process and the government announced new economic decisions known as the 1988 February 4th decisions (Kazgan, 2013b).

During the 1990s, Turkish economy has shown unstable growth performance, which can be described as "expansion-crisis spiral". The main reasons for this performance were 1980s neoliberal reforms that transformed the inward state-based economy of the country into a market economy for export and implemented under the support of the Bretton Woods institutions. One of the most important components of these

reforms was the liberalization of capital movements in 1989. After this date, the economic performance of the country has become dependent on unstable capital movements (Koyuncu & Şenses, 2004). One of the most important developments for the Turkish economy was experienced during this period. The process that began in 1963 with the Ankara Treaty, after the completion of the transition period, the Customs Union Agreement became valid completely between the EU and Turkey with the framework of the Association Council numbered 1/95 on 1 January 1996 (Mihçı & Wigley, 2003). Thus, taxes on manufacturing goods has ceased to exist between Turkey and the EU. After the Customs Union, the fastest developing of the export was observed in the manufacture of motor vehicles, trailers and semi-trailers sub-sector. Apart from this, export also increased in manufacture of basic metals, plastic & rubber products, radio, television & communication equipment, furniture, machinery and equipment sub-sectors. On the other hand, there was a decrease in the share of our traditional export products such as textile, clothing, food, beverages, and leather (Tonus, 2007). However, in the post-Customs Union period, it was determined that the profitability decreased due to the rising in imports and the competition which increased in limited margin (Güven & Yeni, 2013).

Increasing interest rates due to rising public deficits in the 1990s accelerated the short-term capital inflows further, which in turn led to a real appreciation of the TL and, consequently, imports increased rapidly and exports slowed down. As a result, foreign trade deficit and current account deficit reached very high levels. According to the financial circles, this deficit appeared to be unsustainable. In December 1993, Turkey's reserves dropped approximately \$ 1 billion and this situation caused the 1994 crisis. This phenomenon led to rapid increase in exchange rates and in January 1994, two international rating agencies (Moody's and Standard and Poor's) reduced Turkey's credit note from the "investment grade countries," level to "speculative country" level. Consequently, an economic crisis had been occurred in January 1994 (Boratav, 2016). At this period, real wages decreased by 27% within the one year as a result of the 1994 crisis and hyperinflation. How much the manufacturing industry

was effected by the economic uncertainty and shocks in the 1990s were also observed from the stagnation of labor productivity in this period. During the 1994 crisis, productivity had fallen considerably in all industries except for specialized industries. It was also determined that manufacturing industry capacity utilization rate dropped significantly in this period (Şenses & Taymaz, 2003).

Turkish economy was also effected from the 1997 Asia and 1998 Russia economic crises (Kazgan, 2013a, Eğılmez, 2018). Due to the economic crises, sales of the raw materials and intermediate goods which sold to these countries were decreased dramatically. In 1998, while agricultural industry and mining grew by 8.4% and 9.3%, manufacturing sectors grew just 1.2% (Kazgan, 2013a).

According to the Taymaz and Suiçmez (2005), the period from the 1994 crisis until 2000 was a negative period for the development of the manufacturing industry. Although exports had doubled in seven years from 1993, productivity growth has hardly ever occurred.

Turkish economy had experienced a very serious economic crisis at the beginning of the 2000s. These crises, which were called the 2000-2001 crisis, had caused severe disruption in the financial and banking sectors as well as recession in the manufacturing industry. In 2001, GDP decreased 4.5% in the 1st quarter and 11.8% in the 2nd quarter. At the same period, the capacity utilization rate in the manufacturing industry dropped by 70% and the production index decreased to 88.6 (1997=100). In the first 5 months of the year, the number of companies that were shut down was 15.000 according to the Ankara Chamber of Commerce (ATO) data and about 53.000 according to the Confederation of Turkish Tradesmen and Craftsmen (TESK) data. The decline in private consumption expenditures was determined about 3.3% in the first quarter and 11.5% in the second quarter. In this period, the demand for durable goods also seriously reduced. For example, in the first 8 months of the year, refrigerator and television sales fell by 12%, while sales of other durable goods fell by 83% (Kazgan, 2013a). Taymaz and Suiçmez (2005) analyzed the effects of the 2001 crisis on the manufacturing industry. As a result,

they found that due to the 2001 crisis, real labor productivity, real production and employment indices fell in the manufacturing industry sub-sectors which are manufacture of motor vehicle, chemical, rubber, plastic, yarn, leather, timber, wood products, furniture, manufacturing of electronic products and TV-radio transmitter & receiver production.

As mentioned above, Turkish economy and manufacturing industry were influenced by many economic crises in history. Some of these crises were occurred due to not only external factors but also some internal factors. As a result, it was observed that most important manufacturing parameters such as investments, employment, productivity and production levels decreased in the crisis periods.

In order to eliminate the effects of the crisis Turkish government applied a new economic program called "transition to the strong economy program" in May 2001. Along with this, not only serious adjustments had been made especially in the financial sector but also a number of measures had been taken for the real sector. In this context, the credit resources of Eximbank had been increased, the VAT payments on exports had been expedited and the bureaucratic transactions on exports had been reduced (Erdönmez, 2003). A positive growth trend was observed in the manufacturing industry between 2002-2005 after the program implemented. The manufacturing industry grew by 9.1% in 2002, 7.8% in 2002, 9.1% in 2003 and 6.4% in 2005 (Ay & Karaçor, 2006).

CHAPTER III

DATA, METHODOLOGY AND RESULTS

In this chapter, the method of the current study, the content of the data, where it is obtained from, what years it covers and results will be explained.

3.1. DATA

In the study, data covering the years 2006 - 2014 obtained from TURKSTAT (Turkish Statistical Institute) and GSB (Entrepreneur Information System) were used. Most of the data was taken from TURKSTAT Industry and Service Statistics and two-digit data were used in the study according to NACE Rev.2 classification. The NACE classification is a European standard classification of economic activities related to production. Each NACE code is a set of economic activities that relate to the unit of statistics carrying out economic activities (TURKSTAT, 2015). The use of the NACE classification is compulsory by the Member States of the European Union. In this way, the harmonization and consistency of the production statistics of the member countries are ensured. From the past, NACE has experienced many revisions. Technological developments, developments in economic structures and organizations can reveal new activities and products that take place in the existing activity or product. For this reason, the classification has been updated from time to time and new revisions have been created (TURKSTAT, 2015). In this study, NACE Rev.2 classification was used. The list of economic activities under the NACE Rev. 2 regulation is shown in table 5.

Table 5: Structure of NACE Revision 2

Section	Title
A	Agriculture, forestry and fishing
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage, waste management and remediation activities
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
K	Financial and insurance activities
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative and support service activities
O	Public administration and defense; compulsory social security
P	Education
Q	Human health and social work activities
R	Arts, entertainment and recreation
S	Other service activities
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	Activities of extraterritorial organizations and bodies

Source: Eurostat

The aim of this study is to determine whether Turkey's economy was affected from 2008 global economic crisis or not. For this reason, differences in differences and forecasting analysis was conducted. For the consistency of the study, some sectors which had a small share on the Turkish economy and are generally mentioned as a service sector were aggregated under the name of "other sectors". After the consolidation process, it was observed that the other sector's GDP share was 14% in 2006 and 15% in 2014. In this context, the aggregated sectors were *Accommodation and food service activities, Information and communication, Professional, scientific and technical activities, Administrative and support service activities, Education, Human health and social work activities, Arts, entertainment and recreation and Other service activities*. On the other hand, A. Agriculture, forestry and fishing, E. Water supply; sewerage, waste management and remediation activities, K. Financial and insurance activities, L. Real estate activities, O. Public administration and defense; compulsory social security and T. Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use sectors could not be used in the study due to the incomplete data, incomplete year or classification incompatibility. The sectors used in the study are given in Table 6.

Table 6: Sectors used in the study

Code	Title
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I,J,M,N,P,Q,R,S	Other Sectors

Using the above mentioned data set, this study aims to analyze whether Turkey's manufacturing industry was affected from the 2008 global economic crisis or not. In this context, forecasting analysis and differences in differences (DID) analysis were conducted. In manufacturing industry analysis, two-digit manufacturing industry sub-sectors were used according to NACE REV.2 classification. The NACE rev.2 classification organizes manufacturing industry into 24 sub-sectors. These are shown in the table 7 below.

Table 7: Manufacturing Industry Sub-Sectors by NACE Rev.2 Classification System

Code	Name
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and

	equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment

Source: Eurostat

As mentioned above, the variables used in the study were obtained from TURKSTAT and Entrepreneur Information System (GBS). Table 8 shows the variables used in the study and where they are obtained.

Table 8: Variables

Variable Name	Obtained From
Number of Enterprises	Turkstat
Number of Persons Employed	Turkstat
Number of Paid Employees	Turkstat
Number of Hours Work By Employees	Turkstat
Wages and Salaries	Turkstat
Total Purchases of Goods and Services	Turkstat
Turnover	Turkstat
Production Value	Turkstat
Value-Added At Factor Cost	Turkstat
Net Profit	Entrepreneur Information System (GBS)
Exports	Entrepreneur Information System (GBS)
Domestic Sales	Entrepreneur Information System (GBS)
Net Foreign Exchange Profit / Loss	Entrepreneur Information System (GBS)

3.2. METHODOLOGY

3.2.1. Forecasting Analysis

Forecasting analysis has a wide range literature and used in many areas. In economics, forecasting analyzes are made for both microeconomic and macroeconomic predictions. For instance, Baltagi (2007) compiled various methods of forecasting analysis in his study. In the study, it was also given some examples from several methods of forecasting about time series and panel data methods. (see Baltagi & Griffin, 1997; Hsiao & Tahmiscioglu, 1997 for pooled analysis; Baltagi, Bresson, Griffin & Pirotte, 2003; Maddala, Trost, Li & Joutz, 1997; Baltagi; Griffin & Xiong, 2000; Brucker & Siliverstovs, 2006 for homogeneous and heterogeneous estimations) More specifically, forecasting analysis have been used in some microeconomic and macroeconomic areas such as the energy studies (see for example; Baillie & Baltagi, 1994; Baltagi, Bresson & Pirotte, 2002; Bianco, Manca & Nardini, 2009; Ediger & Akar, 2007; Kumar & Jain, 2010; Suganthi & Samuel, 2012; Pao & Tsai, 2011), prediction of the growth rate (see for example; Kuosmanen & Vataja, 2017; Min & Zellner, 1993) and inflation (Forni, Hallin, Lippi & Reichlin, 2003; Hubrich, 2005; Stock & Watson, 1999). However, this method is also employed in the determination of the economic and financial crisis. For example, Lozza, Bonanomi, Castiglioni and Bosio (2016) analyzed the real index data related to consumer behavior in Italy and fitted values obtained from forecasting method. As a result of the study, no significant relationship was found between real and fitted index values for crisis years. Similarly, ARIMA method was used by Chung, Ip and Chan (2009). They analyzed whether the Chinese manufacturing industry was affected by the crisis or not. As a result, towards the end of 2008, a significant decrease in the manufacturing industry production values was found. A similar study was conducted by Hu (2012). This study also analyzed the Chinese manufacturing industry using the ARMA method and found that the decreasing trend in the manufacturing industry growth was due to the 2008 crisis.

There are also studies in the literature that analyze not only the 2008 crisis but also other crises by using the forecasting technique. For example, Kaminsky, Lizondo and Reinhart (1998) argued that it is more important to focus on fluctuations in interest rates to detect currency crises since they found that the early warning system of interest rates was more effective than the other parameters. On the other hand, Kumar, Moorthy, and Perraudin (2003) found that logistic forecasting models were the most effective method to detection of the currency crisis.

There are also several studies in the literature about how forecasting analyzes will be successful. For example, Arkadievich Kholodilin, Siliverstovs and Kooths (2008) stated that spatial effects should be taken into account if a long-term forecasting analysis is implemented. They also found that pooled analyzes are the best forecasting models for the long term analyzes. However, Van den Berg, Candelon and Urbain (2008) argued that pooled analyzes should not be done because that kind of analyzes have removed the predictability. But, if the pooled analysis is still to be done, they stated that the clustering should be carried out correctly.

The multiple linear regression model is as follows

$$y_{it} = \alpha + \beta'X_{it} + \mu_{it}$$

Where $i = 1, \dots, N$ is the individual and observed time period $t = 1, \dots, N$

α is a scalar,

β' ($1 \times K$) is fixed however includes unknown parameters,

X_{it} is the i^{th} observation on K independent variables and

μ_{it} is a random disturbance term.

When individual specific effects are considered in the static panel analysis, the panel analysis has classified as fixed and random effects. These are explained below.

3.2.1.1. Fixed Effects Model

$$y_{it} = \beta' X_{it} + \alpha_i + \mu_{it}$$

In the fixed effects model, the constant term of each individual does not change over time. It is also assumed that the (slope) coefficients of the independent variables do not change over both individuals and time (Gujarati, 2003). Moreover, μ_{it} is described as independent identically distributed (*i.i.d*) random variable with zero mean and fixed variance. Further, all X_{it} are supposed to be independent of the μ_{it} for all i and t (Ren & Choi, 2016). The OLS estimator is the BLUE and it is consistent under the fixed effect hypothesis when T goes to infinity (Hsiao, 2003; Baltagi, 2008, Ren & Choi, 2016). This is represented below.

The OLS estimation of α_i and β are derived by minimizing:

$$S = \sum_{i=1}^N U_i' U_i = \sum_{i=1}^N (y_i - e\alpha_i - X_i\beta)' - (y_i - e\alpha_i - X_i\beta)$$

Taking partial derivatives of S with respect to α_i and setting them equal to 0, we have:

$$\hat{\alpha}_i = \bar{y}_i - \beta' \bar{X}_i, \quad i = 1, \dots, N$$

Where;

$$\bar{y}_i = \frac{1}{T} \sum_{t=1}^T y_{it}, \quad \bar{X}_i = \frac{1}{T} \sum_{t=1}^T X_{it}$$

Then, we can get the $\hat{\beta}$ as follows;

$$\hat{\beta}_{CV} = \left[\sum_{i=1}^N \sum_{t=1}^T (X_{it} - \hat{X}_i)(X_{it} - \hat{X}_i)' \right]^{-1} \left[\sum_{i=1}^N \sum_{t=1}^T (X_{it} - \hat{X}_i)(y_{it} - \hat{y}_i) \right]$$

3.2.1.2. Random Effects Model

$$y_{it} = \beta' X_{it} + \alpha_i + \lambda_t + \mu_{it}$$

Where λ_t is the unobservable time effect and μ_{it} is the reminder stochastic disturbance term.

While for the random case,

$$\alpha_i \sim i.i.d(0, \sigma_\alpha^2) \text{ and } \lambda_t \sim i.i.d(0, \sigma_\lambda^2)$$

X_{it} is independent of α_i , λ_t and μ_{it} and they are independent from each other.

Thus, $E\alpha_i = E\lambda_t = E\mu_{it} = 0$,

$$E\alpha_i \lambda_t = E\alpha_i \mu_{it} = E\lambda_t \mu_{it} = 0,$$

$$E\alpha_i \alpha_j = \sigma_\alpha^2 \text{ if } i=j \text{ or } 0 \text{ otherwise,}$$

$$E\lambda_t \lambda_s = \sigma_\lambda^2 \text{ if } t=s \text{ or } 0 \text{ otherwise,}$$

$$E\mu_{it} \mu_{js} = \sigma_\mu^2 \text{ if } i=j, t=s \text{ or } 0 \text{ otherwise,}$$

$$\text{Variance } y_{it} = \sigma_\alpha^2 + \sigma_\lambda^2 + \sigma_\mu^2$$

In random effects model, changes to units or units and time are included in the model as a component of the error term. The reason is that the loss of degrees of freedom in fixed-acting models is aimed to be prevented. Further, it also not only considering the differences in cross sections, units and time in a sample, but also out of sample (Gujarati, 2003).

The OLS estimator is BLUE in fixed effects model but not in the random effects model. In the random effects model, the OLS estimator is consistent and unbiased, but not efficient. In order to solve this problem, Baltagi (2008) used GLS estimator and showed that it is BLUE. For this reason, it can be possible to obtain the estimation of β and μ_{it} by using the GLS estimation.

$$\hat{\beta}_{GLS} = \left[\frac{1}{T} \sum_{i=1}^N X_i' Q X_i + \varphi + \sum_{i=1}^N (\bar{X}_i - \bar{X}) (\bar{X}_i - \bar{X})' \right]^{-1} \left[\frac{1}{T} \sum_{i=1}^N X_i' Q y_i + \varphi + \sum_{i=1}^N (\bar{X}_i - \bar{X}) (\bar{y}_i - \bar{y})' \right]$$

$$= \Delta \hat{\beta}_b + (I_K - \Delta) \hat{\beta}_{CV}$$

$$\hat{\mu}_{GLS} = \bar{y} - \hat{\beta}'_{GLS} \bar{X}$$

Where;

$$\Delta = \varphi T \left[\sum_{i=1}^N X_i' Q X_i + \varphi T + \sum_{i=1}^N (\bar{X}_i - \bar{X}) (\bar{X}_i - \bar{X})' \right]^{-1} \times \left[\sum_{i=1}^N (\bar{X}_i - \bar{X}) (\bar{X}_i - \bar{X})' \right],$$

$$\hat{\beta}_b = \left[\sum_{i=1}^N (\bar{X}_i - \bar{X}) (\bar{X}_i - \bar{X})' \right]^{-1} \left[\sum_{i=1}^N (\bar{X}_i - \bar{X}) (\bar{y}_i - \bar{y}) \right], \text{ and}$$

$$\varphi = \frac{\sigma_{\mu}^2}{\sigma_{\mu}^2 + T \sigma_{\epsilon}^2}$$

There are many arguments in the literature about which of the two models described above should be used. Basically, the relationship between the individual error term and independent variable is examined. In this context, assuming that there is no relationship between error terms and independent variables, the random effects can be preferred but the fixed effects model may be preferred under the assumption that this relationship exists (Gujarati, 2003). In addition, the Hausman's specification test can be conducted to determine which method is appropriate. The most important assumption in the error component regression model is $E(\mu_{it} / X_{it})$. If the relationship exists $\hat{\beta}_{GLS}$ estimator is biased and inconsistent for β . However, under the within transformation assumption $\tilde{\beta}_{within}$ is unbiased and consistent because it pass over the μ_i . The test compares the $\hat{\beta}_{GLS}$ & $\tilde{\beta}_{within}$ and tests which one is the consistent

under the $H_0 : E(\mu_{it} / X_{it})$. As a result of the test, if H_0 hypothesis is true, $\hat{\beta}_{GLS}$ is BLUE and random effects model is appropriate (Baltagi, 2001).

For this reason, Hausman test was conducted to determine which model is appropriate for the manufacturing sub-sector analysis. As a result of the test, random effects model was chosen and $\hat{\beta}_{GLS}$ estimator was found to be appropriate for our model.

In the light of the random effect model described above, the panel random effects form of the both six main and one aggregated sector operating in Turkish economy and two-digit manufacturing industry analyzes are as follows.

$$profit_{it} = \alpha + \beta_1 lnvad_{it} + \beta_2 lnexp_{it} + \beta_3 lnyis_{it} + \beta_4 lnnem_{it} + \beta_5 lnvas_{it} + \beta_6 lntgs_{it} + \beta_7 lntur_{it} + \beta_8 netexc_{it} + u_{it}$$

Where *profit* is the actual profit values, *Invas* is value-added at factor cost, *Inexp* is export domestic sales, *Innem* is number of paid employees, *Invas* is wages and salaries, *Intgs* is total purchases good and services, *Intur* is turnover and *netexc* is net foreign exchange profit / loss.

As it is seen, logarithms were taken of all applicable variables. Moreover, *Innen* (number of enterprises), *Innpe* (number of persons employed), *Innhw* (number of house work by employees), *Inprv* (production value) and *years* were determined as exogenous variables for the forecasting analysis.

3.2.2 Difference in Difference Estimation (DID)

Net profit is used as the dependent variable in this study in order to assess the effect of 2008 crisis on manufacturing sector profit levels. For this purpose, the differences-in-differences (DID) estimation methodology is employed. DID is widely used in

micro-econometrics to measure the impact of policy changes which essentially evaluates the effect of a group level shock. With the work of Ashenfelter and Card (1985) the DID methodology became widely used in the literature. The DID set up requires two different groups to be observed over two different periods, namely treatment and control groups. The control group is not subject to any policy changes or in this case, any shocks in either period. The treatment group on the other hand is not subject to a shock in the first period but is in the second. The differences-in-differences method therefore allow us to estimate the differences among time and groups due to the group level shock.

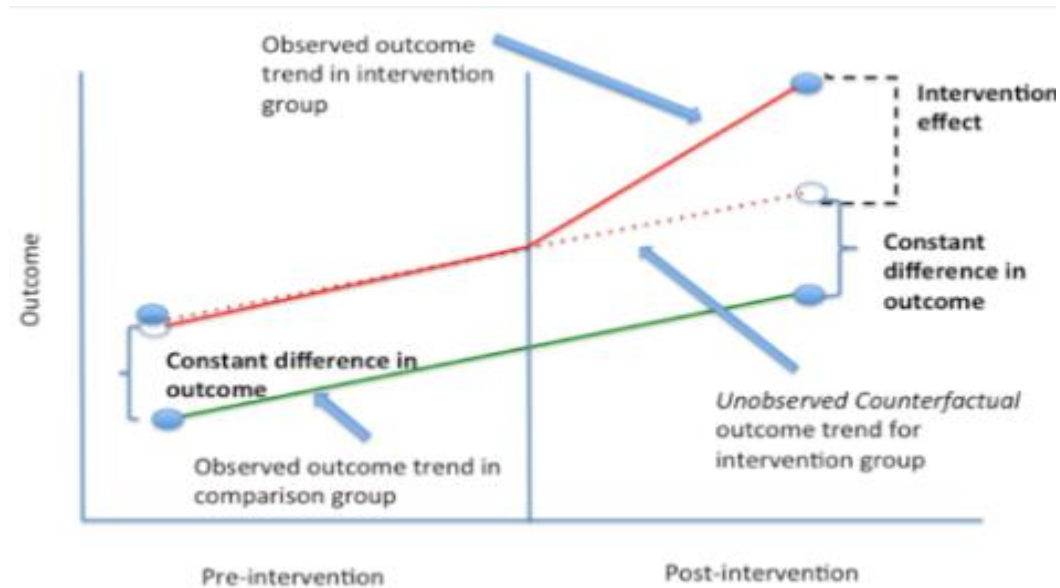
$$y = \beta_0 + \beta_1 dB + \delta_0 d2 + \delta_1 d2 \cdot dB + u$$

Where y is profit outcome, $d2$ is a post policy change period. The dB dummy variable identifies the differences between experiment and control groups before the policy change. δ_1 coefficient, multiplies the interaction term, $d2 \cdot dB$, which is the same as a dummy variable equal to one for those observations in the treatment group in the second period. Thus, the difference in difference equation is written as follows.

$$\hat{\delta}_1 = (\bar{y}_{B,2} - \bar{y}_{B,1}) - (\bar{y}_{A,2} - \bar{y}_{A,1})$$

Figure 6 shows, design and fundamental principles of the differences and differences (DID) analysis.

Figure 6: Illustration of the differences and differences (DID) analysis



Source: Columbia University, Educational Platform for Innovative Population Health Methods

3.3. RESULTS

In this section, sectoral results will be discussed first and then results regarding Turkish manufacturing industry will be provided. All analyzes in the study were carried out by using the STATA 14 statistical software program.

3.3.1. Sectoral Results of the Turkish Economy

As mentioned above, sectoral analysis was carried out to determine whether Turkey's economy affected from 2008 global economic crisis or not. Within this framework, forecasting analysis was conducted for six main sectors and one aggregated sector which were described in Table 6. Hence, by using this analysis, it was tried to answer the question that if the 2008 global economic crisis did not

exist how the profit pattern would be developed. Panel random effect GLS analysis was conducted for the variables given in Table 8 of aforementioned sectors due to the content of forecasting analysis. Panel Random Effect GLS results are shown in Table 9. In forecasting analysis, number of enterprises (Innen), Number of Persons Employed (Innpe), Number of Hours Work by Employees (Innhw), Production Value (Inprv) and years are defined as exogenous variables.

Table 9: Random Effect GLS Estimation Results

VARIABLES	(1) profit
Invad	8.168e+09* (4.210e+09)
Inexp	2.131e+09*** (7.200e+08)
Inyis	1.683e+10*** (6.063e+09)
Innem	4.012e+08 (1.401e+09)
Inwas	-4.264e+09 (2.985e+09)
Intgs	-5.085e+08 (9.368e+09)
Intur	-1.671e+10 (1.519e+10)
netexc	1.359*** (0.328)
Constant	-1.333e+11*** (2.401e+10)

Observations	63
Number of code	7
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

The random effect GLS results indicate that value added, export, domestic sales and net foreign exchange profit have positive and statistically significant effects on profit levels. Number of Paid Employees (Innem), wages and salaries (Inwas), total goods and services (Intgs) and turnover (Intur), are found to have no statistically significant effect on profitability.

Figure 7: Forecasting Analysis Results (Sector 1-3)

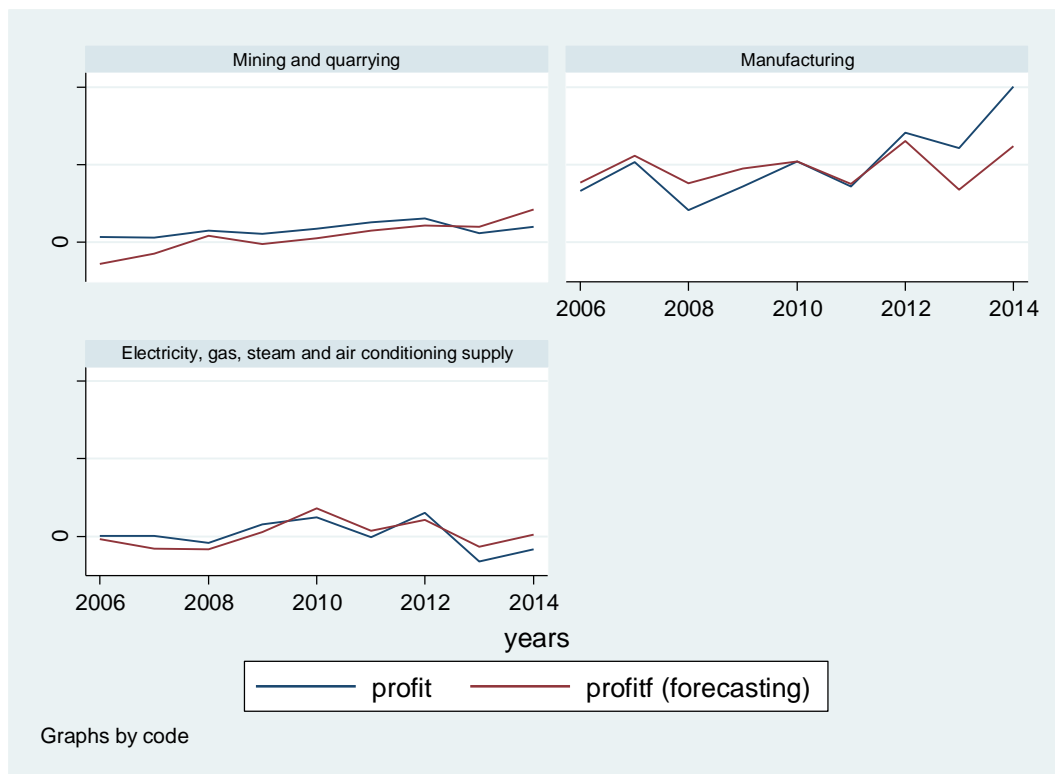


Figure 7 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for mining & quarrying, manufacturing and electricity, gas, steam & air conditioning supply sectors between

2006 and 2014. Figure 7 indicates a good match between forecasted and actual profit values prior to 2008, indicating a goodness of fit for the forecasting estimation. It is very important to determine matching closely between actual and estimated profit values for not only give accurate results of the analysis but also to find right answer if the 2008 global economic crisis did not exist how the Turkish economy would have been developed. Results of the forecasting analysis indicate that actual and estimated profit values for the mining and quarrying sector have followed the same patterns of between 2006 and 2014. In the manufacturing sector, it was observed that profit values started to fall from 2007 and reached the bottom in 2008. Especially in 2008, the estimated profit values did not depreciate as much as the actual profit values. Since 2009, the sector's profitability was started to show an increasing trend. Actual profit values stretched above the estimated profits after 2011. Actual and estimated profit values have the same pattern in electricity, gas, steam & air conditioning supply sector like in the mining & quarrying sector.

Figure 8: Forecasting Analysis Results (Sector 4-7)

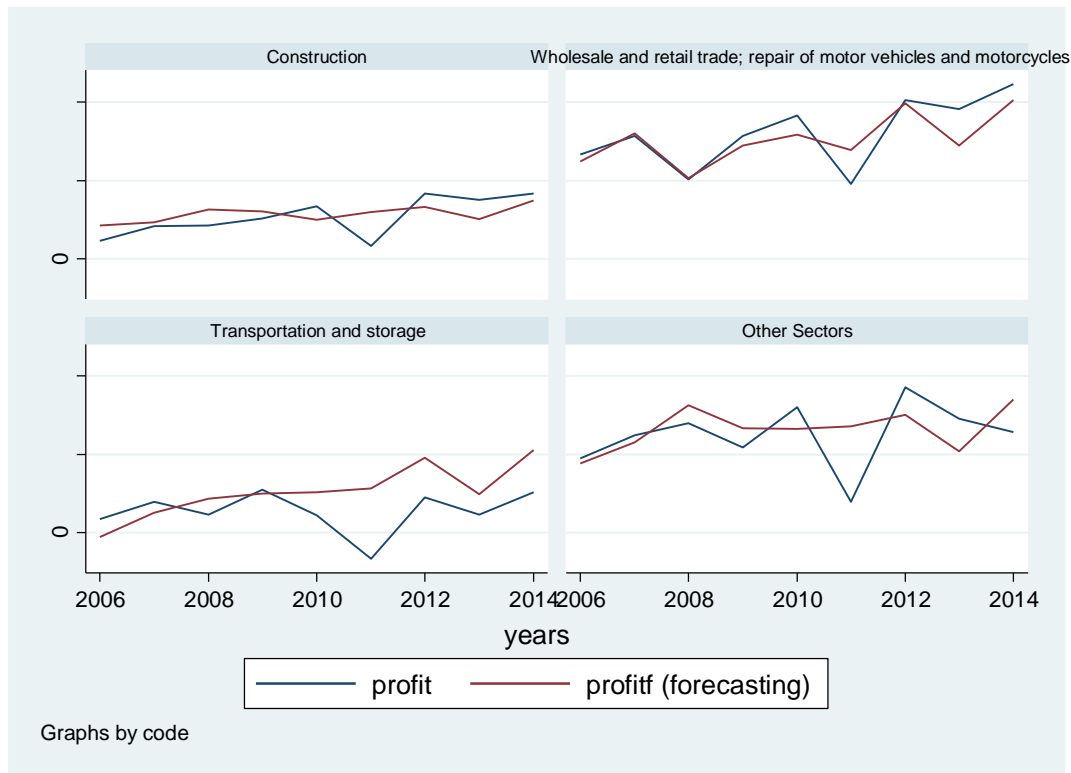


Figure 8 shows the actual profit values (*profit*) and estimated profit values (*profit-forecasting*) obtained by the forecasting analysis for Wholesale & retail trade; repair of motor vehicles & motorcycles, Transportation & storage and aggregated Other Sectors between 2006 and 2014. Actual and estimated profit values were found to be close to each other before 2008. The estimated profit levels were higher than the actual levels in the construction sector. In particular, the profit values in the construction sector were the lowest in 2011 and the difference between actual and estimated profit was the highest. Similar pattern was observed for Wholesale & retail trade sectors. After 2011, profitability in aforementioned sectors tended to recover, and by 2012, actual profit values exceeded the estimated profit values. Besides, transportation and storage sector's real profit values were below the estimated profit values in 2008, especially the difference between actual and fitted profit values in 2011 was found to be the highest. Although there was a recovery tendency in real

profit values since 2011, unlike the two sectors mentioned above, the actual profit values did not exceed the estimated values over the period studied. When the aggregated "other sectors" results are examined, it was seen that actual profit values decreased and estimated profit values exceeded these values for 2008 and 2009. As in other sectors, the lowest profitability was observed in 2011 in this sector either. After 2011, profitability tended to recover. In addition, in 2012 and 2013, the actual profit values were found to be above the estimated profit values.

3.3.2. Manufacturing Industry Analysis Results

According to the main results of the sectoral forecasting analysis, the biggest differences between actual and estimated profit values was observed in the manufacturing sector between the years of 2008 and 2009 which are the initial years of the crisis. In this context, it is possible to mention that, especially at the beginning of the global economic crisis period, the manufacturing is the most affected sector from the 2008 crisis. In the light of such information, it is also necessary to determine the dynamics of manufacturing industry in detail and the effects of the 2008 global economic crisis on this sector between 2006 and 2014. For this reason, random effects and forecasting analysis were performed on 33 sub-sectors of the manufacturing industry (according to the NACE Rev.2 classification system). Then, Differences in Differences (DID) analysis was conducted to determine whether the difference between the actual profit values and the estimated profit values was significant, whether the manufacturing industry was affected by the crisis and what would happen if the crisis did not exist.

3.3.2.1. Random Effect Analysis Results

Random effect estimation has been run to be the basis for forecasting analysis. The results of the random effect GLS estimation analysis are shown in table 10.

Table 10: Random Effect GLS Estimation Results for Manufacturing Industry

VARIABLES	(1) profit
Invad	2.207e+09*** (3.400e+08)
Inexp	-1.403e+08 (1.140e+08)
Inyis	1.412e+08 (1.833e+08)
Innem	-1.733e+08 (1.170e+08)
Inwas	-5.449e+08** (2.477e+08)
Intgs	1.375e+09 (9.845e+08)
Intur	-1.985e+09 (1.233e+09)
netexc	1.010*** (0.149)
Constant	-1.979e+10*** (1.784e+09)
Observations	216
Number of code	24

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

When the analysis results were examined, it was seen that value added-at-factor cost (Invad) and net foreign exchange profit / loss (netexc) affected the profit values significantly and positively, wage and salaries (Inwas) affected the profitability significant and negatively at 5% significance level.

3.3.2.2 Forecasting Analysis Results

When the forecasting analysis was performed, the number of enterprises (Innen), number of persons employed (Innpe), the number of hours work by employees (Innhw), production value (Inprv) and years were defined as exogenous variables in addition to the independent variables as well as in the sectoral analysis of Turkish economy. With the forecasting analysis, estimated profit values were obtained besides the actual profit values for each sub-sector. These aforementioned sub-sectors were separated into three groups and shown between figure 9 and 16 below.

Figure 9: Forecasting Analysis Results (Sub-Sector 10-12)

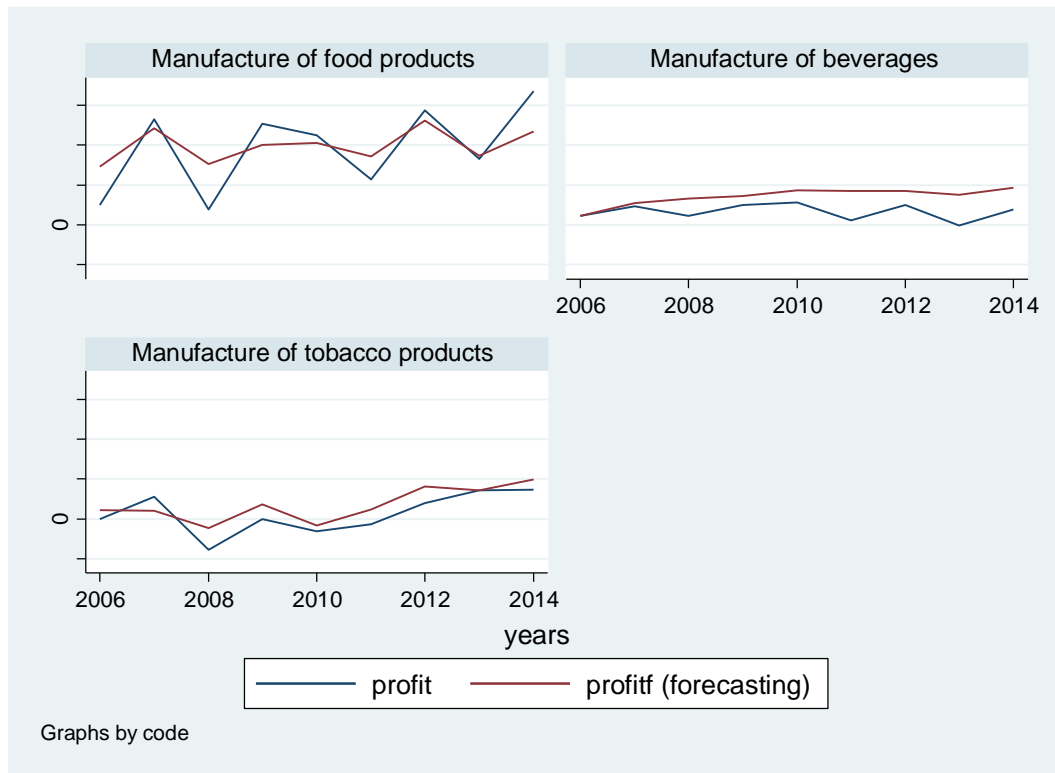


Figure 9 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for 10 coded Manufacture of food products, 11 coded Manufacture of beverages and 12 coded Manufacture of tobacco products between 2006 and 2014. Figure 9 also indicates a good match between forecasted and actual profit values prior to 2008, indicating a goodness of fit for the forecasting estimation. In these 3 sub-sectors, the profitability decreased in 2008 and the most dramatic decline was determined in food products. According to the figure 9, it was determined that the difference between the actual profit and the estimated profit values is the highest in 2008-2009. While the volatility of profit in food products over time was noteworthy, the decline in profitability after the volatility was never fall back to 2008 levels. Between 2008 and 2012, the actual profit values of tobacco products were found to be below the estimated profit. After 2013, the

actual profit for both food products and tobacco products were began to surpass the expected profitability.

Figure 10: Forecasting Analysis Results (Sub-Sector 13-15)

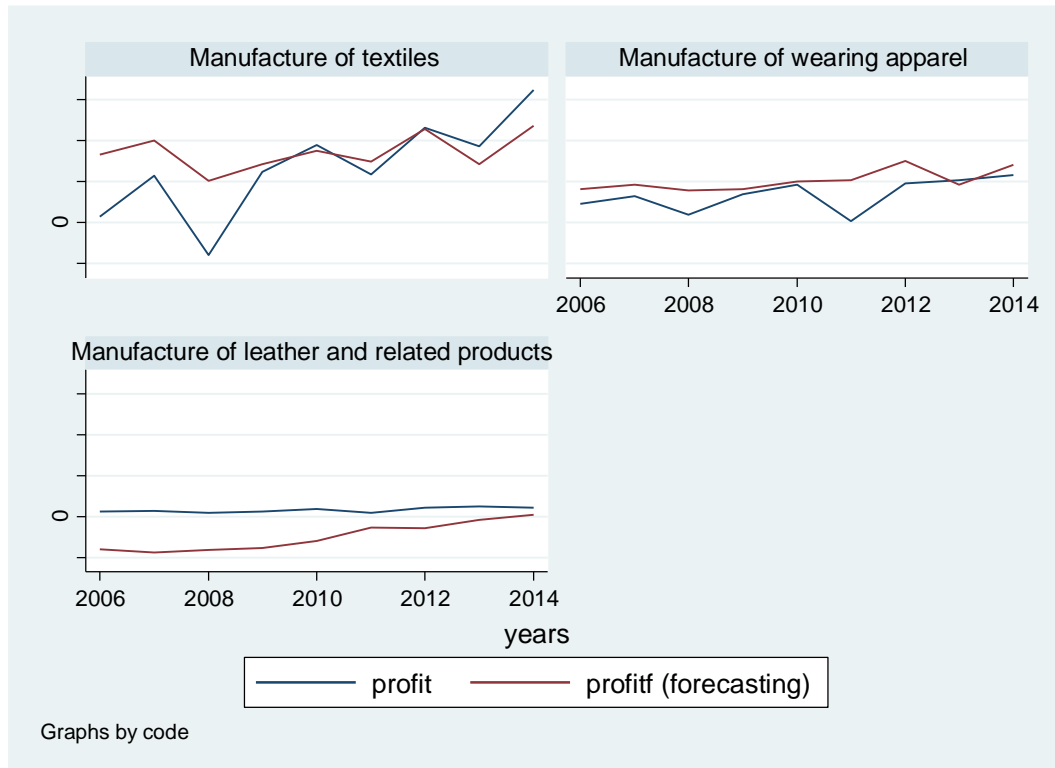


Figure 10 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for 13 coded Manufacture of textiles, 14 coded Manufacture of wearing apparel and 15 coded Manufacture of leather and related products between 2006 and 2014. When the results are examined, the most noteworthy outcome is that the actual profit values of the textile production were falling dramatically in 2008. The profitability of wearing apparel production also decreased in 2008. The maximum difference between actual and estimated profit values was determined in 2008 for textile production and in 2011 for wearing apparel production. However, the profitability of these two sectors were started to increase after 2008. From 2013 onwards, it was determined that actual profits start to exceed the estimated profit.

Figure 11: Forecasting Analysis Results (Sub-Sector 16-18)

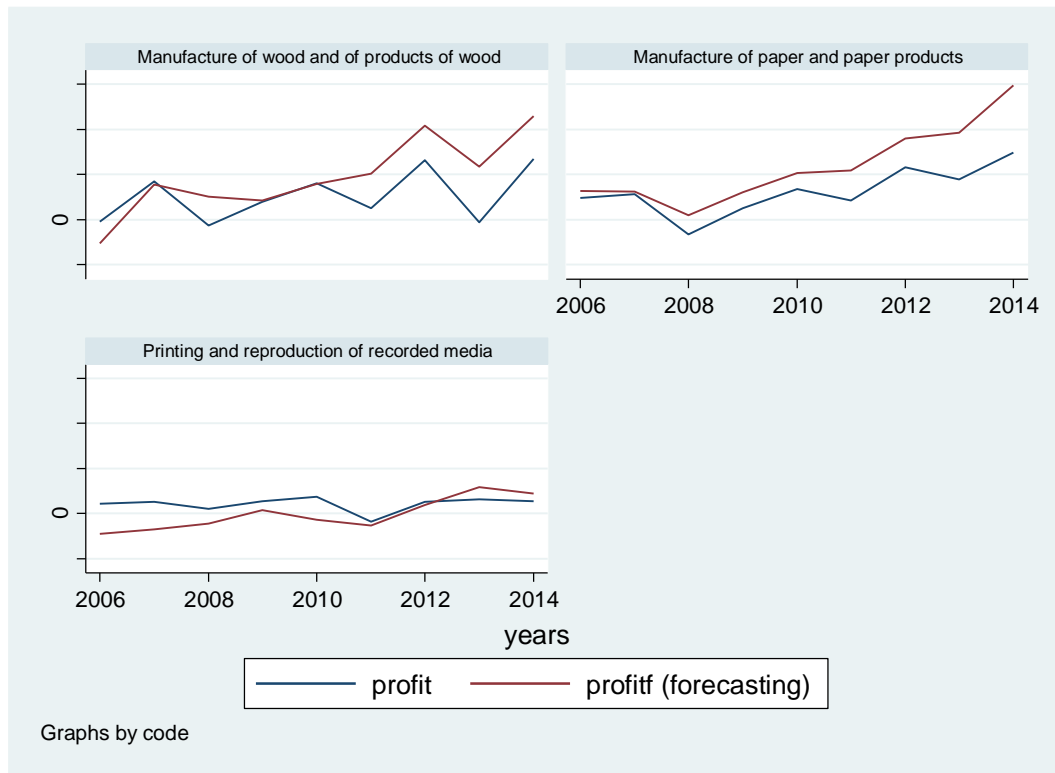


Figure 11 shows the actual profit values (*profit*) and estimated profit values (*profit-forecasting*) obtained by the forecasting analysis for 16 coded Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials, 17 coded manufacture of paper and paper products and 18 coded Printing and reproduction of recorded media between 2006 and 2014. It can be clearly seen that actual and estimated profits are close to each other before the crisis period. Particularly, the profitability of paper products and wood products was observed to drop significantly in 2008. After 2008, profitability values of these sectors were begun to rise and did not fall again to the level of 2008 profitability values. For the manufacture of wood products, years of 2009-2010 were defined as years when actual and estimated profit values were nearly equal. After 2010, the profitability of wood products showed a serious fluctuation, and also determined that the difference between the actual profit and the estimated profit was the highest in 2013. In addition

to this, it was seen that profitability in 17 coded paper and paper products was never able to exceed the estimated profitability between 2008 and 2014.

Figure 12: Forecasting Analysis Results (Sub-Sector 19-21)

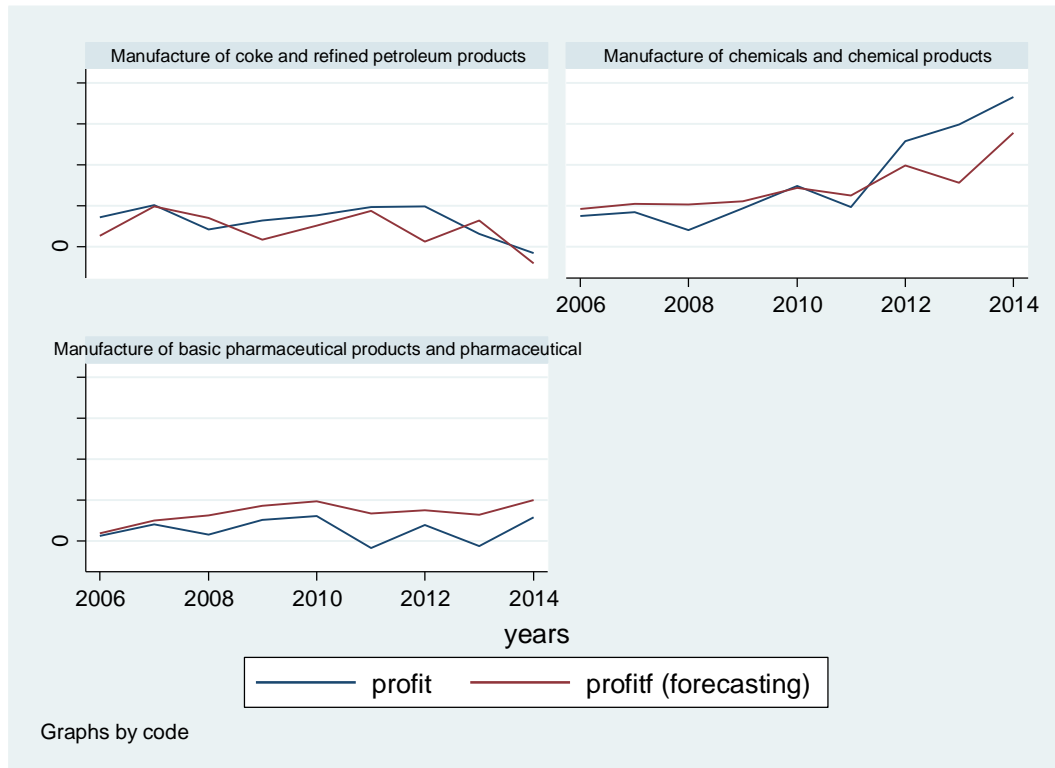


Figure 12 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for 19 coded Manufacture of coke and refined petroleum products, 20 coded Manufacture of chemicals and chemical products and 21 coded Manufacture of basic pharmaceutical products and pharmaceutical between 2006 and 2014. It was observed that the actual and estimated values in the initial years of the study were very close to each other. It was seen that the profitability of the aforementioned 3 sectors also fell in 2008 but after 2008, the profitability of this sectors began to increase trend. This uptrend was continued for the sub-sectors 20 coded and 21 coded until 2010, after this period, profitability values began to fluctuate again. It was seen that the actual profit values of the 19 coded manufacture of coke and petroleum products sub-sector was above

the estimated profit during 2009-2013. However, after 2013 these two values were determined as very close to each other.

Figure 13: Forecasting Analysis Results (Sub-Sector 22-24)

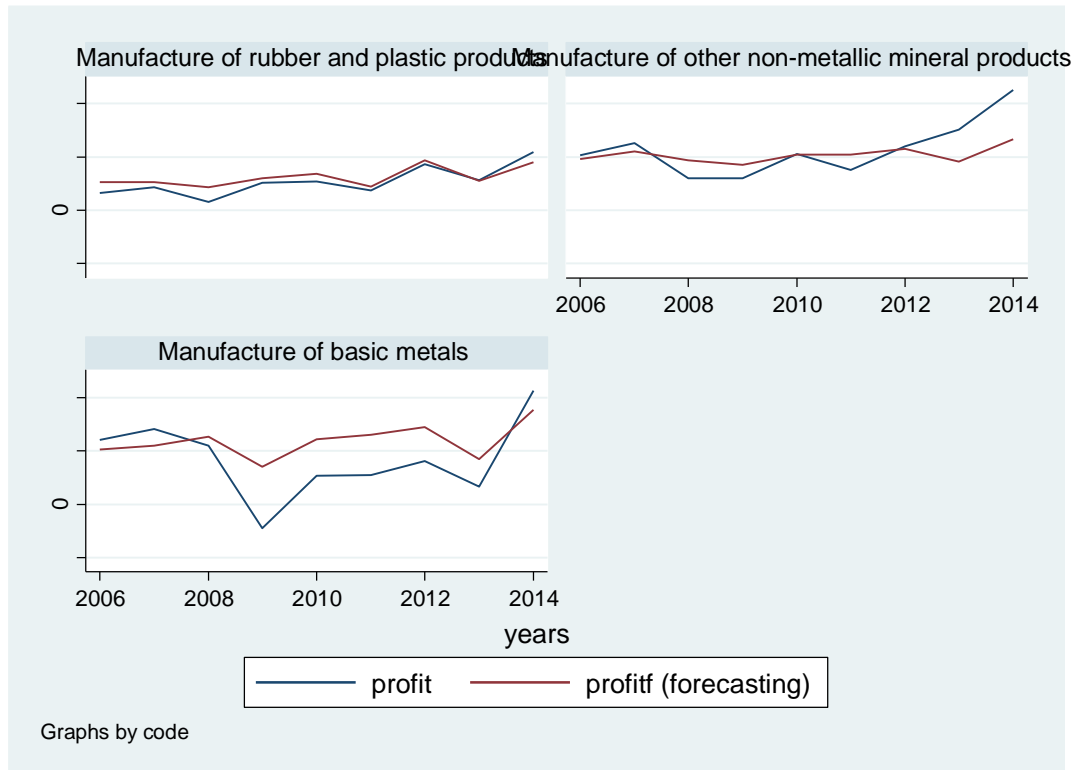


Figure 13 shows the actual profit values (*profit*) and estimated profit values (*profit-forecasting*) obtained by the forecasting analysis for 22 coded Manufacture of rubber and plastic products, 23 coded Manufacture of other non-metallic mineral products and 24 coded Manufacture of basic metals between 2006 and 2014. It was seen that actual and estimated profit values are close to each other before the crisis period according to the figure 13. In 2008, actual profit values in all sub-sectors were observed to fall. The sharpest decline in profitability was occurred in the 24 coded basic metals sub-sector. In addition, for the basic metal sector, the highest difference was detected between actual and estimated profit levels in this period. Although the profitability of the basic metal sub-sector had been on a rising trend

since 2009, though the difference between actual and selected profit values was seen still high. Again in this sub-sector, a balanced profitability trend was observed between 2010-2012. Notably, the actual and fitted profitability values in the 22-code sub-sector was observed to be very close to each other over the years. For the 23-coded sub-sector, it was determined that the period in which actual and estimated profit values are the most distant from each other was in 2008-2009, and the closest to each other was in 2012.

Figure 14: Forecasting Analysis Results (Sub-Sector 25-27)

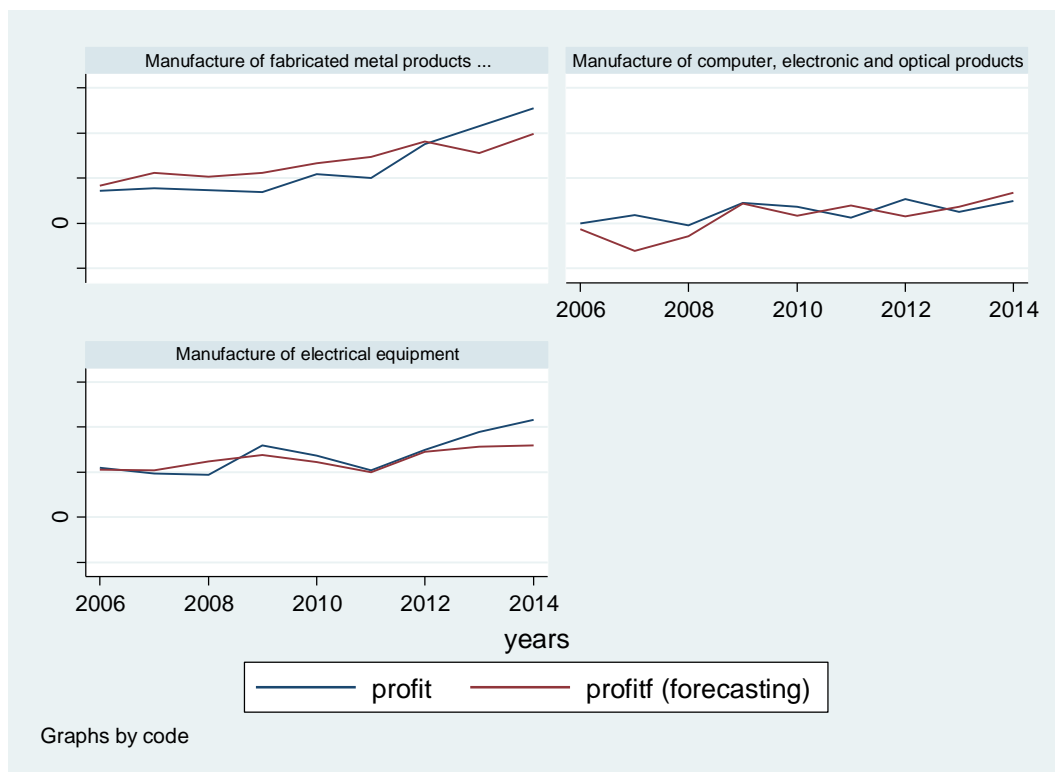


Figure 14 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for 25 coded Manufacture of fabricated metal products, except machinery and equipment, 26 coded Manufacture of computer, electronic and optical products and 27 coded Manufacture of electrical equipment between 2006 and 2014. It was found that the actual and estimated values in the initial years of the study were very close to each other. For these

aforementioned 3 sub-sectors, it can be said that actual and estimated profit values were proceeded very close to each other during the years of study. Further, actual profit values in the sub-sectors 25 and 27 were observed to exceed the estimated profit values especially after 2012.

Figure 15: Forecasting Analysis Results (Sub-Sector 28-30)

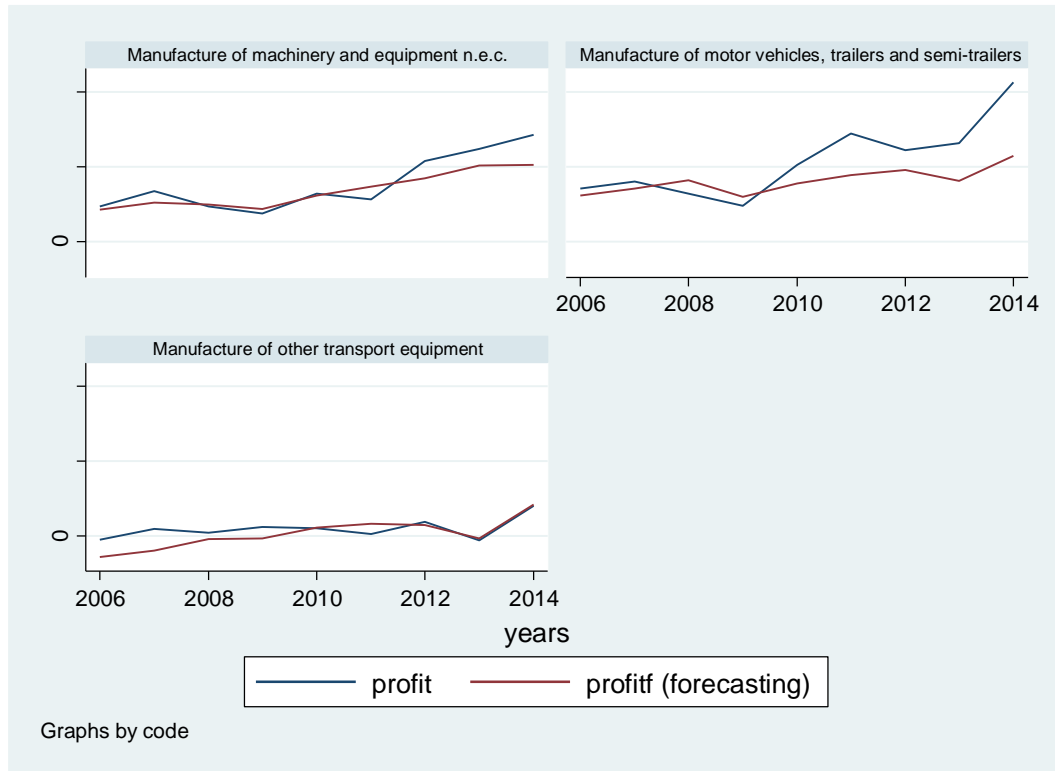


Figure 15 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for 28 coded Manufacture of machinery and equipment n.e.c., 29 coded Manufacture of motor vehicles, trailers and semi-trailers and 30 coded Manufacture of other transport equipment between 2006 and 2014. According to the result of the analysis, actual and estimated profits were found to be very close to each other during the initial years of the study as in the results of the analysis previous sub-sectors. The profitability in the sub-sectors with codes 28 and 29 was seen to fall after 2007. For these two sectors, the lowest profitability values were observed in 2009. After 2011, actual profit values were

started to accelerate positively and moved above the estimated profits. Especially in 29 coded manufacture of motor vehicles, trailers and semi-trailers sector, important difference was detected between actual and estimated profit values after 2009. When the analysis results of the 30 coded sub-sector were examined, it was determined that actual profit values and estimated profit values were close to each other between 2006 and 2014.

Figure 16: Forecasting Analysis Results (Sub-Sector 31-33)

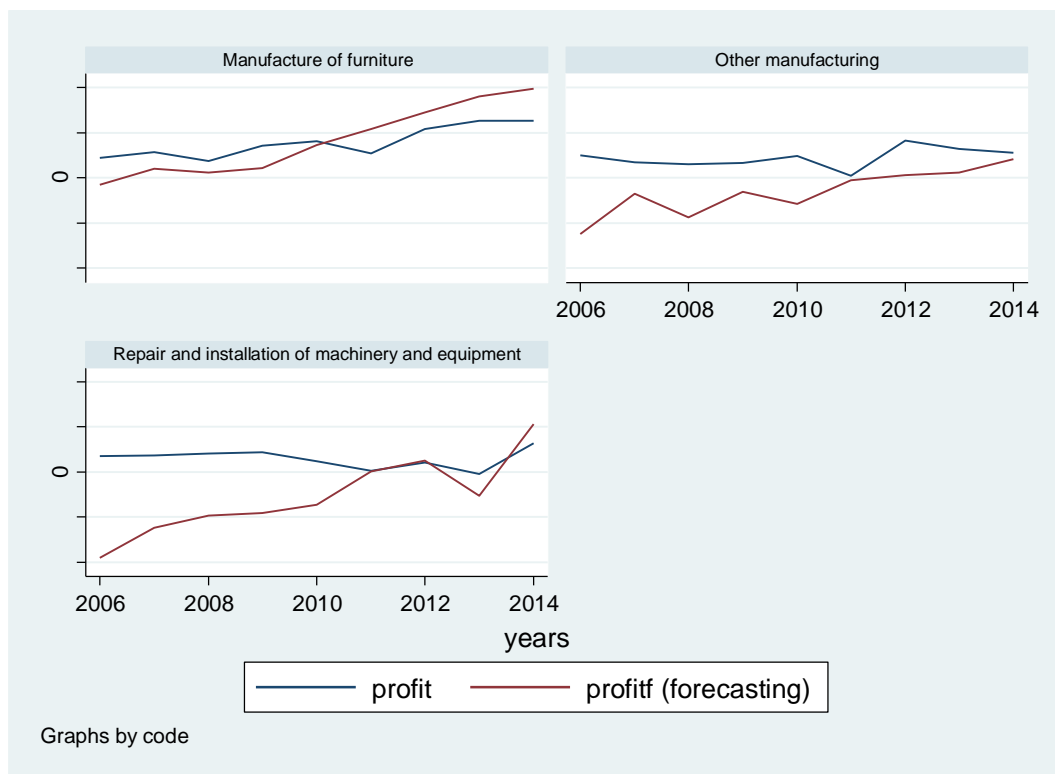


Figure 16 shows the actual profit values (*profit*) and estimated profit values (*profitf-forecasting*) obtained by the forecasting analysis for 31 coded Manufacture of furniture, 32 coded Other manufacturing and 33 coded Repair and installation of machinery and equipment between 2006 and 2014. When the results of the first years of the study are examined, although actual and estimated profit values in the manufacture of furniture sub-sector were found to be close to each other, this convergence does not valid for other two sub-sectors.

3.3.2.3. Differences in Difference Estimation Results

As a result of the forecasting analysis, differences in differences (DID) analysis were performed to determine whether the difference between the actual and estimated profit values for each sub-sector was significant or not. With this analysis, it can be determined whether the manufacturing industry sub-sectors are affected by the crisis. Before the DID analysis, the share of each sub-sectors profit values into the manufacturing sector was examined. The purpose of this is to prevent any deviation that may occur when all sectors with large shares and small shares are analyzed together. In this context, table 11 represents the profitability ratios of the manufacturing sub-sectors over the years.

Table 11: Percentage and Order of Sub-Sectors

Code	Sub-Sector Name	percentage of profitability in total profitability	rank
10	Manufacture of food products	9,404959115	3
11	Manufacture of beverages	1,593704692	14
12	Manufacture of tobacco products	0,633319102	23
13	Manufacture of textiles	6,638381255	8
14	Manufacture of wearing apparel	3,31886528	11
15	Manufacture of leather and related products	0,783180889	21
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1,29025703	17
17	Manufacture of paper and paper products	1,519563928	15

18	Printing and reproduction of recorded media	0,521336943	24
19	Manufacture of coke and refined petroleum products	3,115048333	12
20	Manufacture of chemicals and chemical products	7,971293463	5
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1,363145568	16
22	Manufacture of rubber and plastic products	5,268554096	10
23	Manufacture of other non-metallic mineral products	11,16176643	1
24	Manufacture of basic metals	8,278002536	4
25	Manufacture of fabricated metal products, except machinery and equipment	6,236507838	9
26	Manufacture of computer, electronic and optical products	1,273404758	18
27	Manufacture of electrical equipment	6,818028717	7
28	Manufacture of machinery and equipment n.e.c.	7,548042148	6
29	Manufacture of motor vehicles, trailers and semi-trailers	10,61297041	2
30	Manufacture of other transport equipment	0,918701848	20
31	Manufacture of furniture	1,920506157	13
32	Other manufacturing	1,09677812	19
33	Repair and installation of machinery and equipment	0,713681344	22
	Mean	4,16	

As it can be seen from Table 11, the largest share of profit among the manufacturing sub-sectors was 23 coded other non-metallic mineral products with approximately 11.12% between 2006-2014. The second was 29 coded motor vehicles with 10.61%. 10 coded Manufacture of food products is in the third place in terms of overall profitability share with approximately 9.41%. It was determined that the sum of these

three sub-sectors' profit ratios is nearly one third of the total profit of the manufacturing sector. The three sectors with the lowest share in total profitability was detected as 33 coded Repair and installation of machinery and equipment, 12 coded Manufacture of tobacco products and 18 coded Printing and reproduction of recorded media. These aforementioned sub-sectors' total profits were calculated less than 2%. For this reason, it would not be correct to run DID analysis for have a large share and small share in total profit together. Therefore, the DID analysis was conducted to actual and estimated profitability values of the sub-sectors by dividing two groups: large share in total profit and small share in total profit. The means of share of sub-sectors in total manufacturing sector were calculated to determine these two groups. As shown in Table 11, the average profit share of sub-sectors was found as 4.16%. For this reason, the sub-sectors with a profit share greater than 4.16% were collected in one group, while those in the other were collected in another group. Tables 12 and 13 show which sub-sectors have large and small share of profitability respectively.

Table 12: Sub-sectors which have Large Share

Code	Sub-Sector Name
23	Manufacture of other non-metallic mineral products
29	Manufacture of motor vehicles, trailers and semi-trailers
10	Manufacture of food products
24	Manufacture of basic metals
20	Manufacture of chemicals and chemical products
28	Manufacture of machinery and equipment n.e.c.
27	Manufacture of electrical equipment
13	Manufacture of textiles
25	Manufacture of fabricated metal products, except machinery and equipment
22	Manufacture of rubber and plastic products

Table 13: Sub-sectors which have Small Share

Code	Sub-Sector Name
14	Manufacture of wearing apparel
19	Manufacture of coke and refined petroleum products
31	Manufacture of furniture
11	Manufacture of beverages
17	Manufacture of paper and paper products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
26	Manufacture of computer, electronic and optical products
32	Other manufacturing
30	Manufacture of other transport equipment
15	Manufacture of leather and related products
33	Repair and installation of machinery and equipment
12	Manufacture of tobacco products
18	Printing and reproduction of recorded media

As mentioned before in DID model, two groups are observed in two different times. The first group (treatment group) is effected by a policy change which was not in the first period but there is in the second period. The other group (control group) is not exposed by this policy change in both periods. Average value of control group is subtracted from average value of treatment group for each period and then the outcome scores is subtracted from each other. This calculation provides to remove bias which arise from constant differences between treatment and control groups in both periods. However, due to the data set of one country was used in this study there were not be a control group. For this reason, forecasting method was applied

to the data set; the data which was obtained by this simulation was assessed. Lastly, the differences between treatment and control group values were analyzed.

Table 14: Differences in Differences Analysis Results for Large Sample

VARIABLES	(1) model2
time	3.547e+08** (1.709e+08)
treated	-2.850e+08 (1.974e+08)
_diff	4.058e+08* (2.417e+08)
Constant	1.414e+09*** (1.396e+08)
Observations	180
R-squared	0.121
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

As a result of the DID analysis for the 10 sub-sector which have a big share in the total profit, the difference between actual and estimated profit values of these sectors was found to be statistically significant at 10% significance level between 2006 and 2014.

Table 15: Differences in Differences Analysis Results for Small Sample

(1)	
VARIABLES	model3
time	4.150e+08*** (7.801e+07)
treated	1.917e+08** (9.008e+07)
_diff	-2.721e+08** (1.103e+08)
Constant	6.281e+06 (6.369e+07)
Observations	252
R-squared	0.113
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

The findings of the DID analysis for the 14 sub-sector which have a small share in the total profit, the difference between actual and estimated profit values of these sectors was found to be statistically significant at 5% significance level between 2006 and 2014.

CHAPTER IV

DISCUSSION

The aim of this study to determine whether Turkey's economy but especially the Turkish manufacturing industry was affected from 2008 global economic crisis. On the other hand, this thesis aims to analyze how the Turkish economy and manufacturing industry would be developed if the 2008 global crises had not taken place. In this context, forecasting analysis was conducted for six main sectors and one aggregated sector, which are operating in Turkish economy, to obtain estimated profit values besides actual profits. As a result of the analysis, it was found that the manufacturing industry was more affected by the 2008 crisis than other sectors. Further, forecasting analysis was also applied to the manufacturing industry as well.

Profit was selected as a dependent variable to analyze the effects of the 2008 crisis on Turkish economy and manufacturing industry. The importance of profit and the reason for choosing as a dependent variable were described in detail in the introduction part with regards to the historical perspective, economic schools and 2008 crisis.

For the detection of 2008 global economic crisis on Turkey's economy; mining & quarrying, manufacturing, electricity, gas, steam & air conditioning supply, construction, wholesale & retail trade; repair of motor vehicles and motorcycles, transportation & storage and aggregated "other sectors" had been analyzed. With this aim, forecasting analysis was applied to these mentioned sectors. As a result of the random effect GLS estimation based on the content of the forecasting analysis, profitability was found to be positively and significantly affected by value added at factor cost, export, domestic sales and net foreign exchange profit / loss. When the forecasting analysis results were examined for the studied sectors, it was determined that profit values declined in 2008 and 2009. Besides, the most serious decline in

profit values were detected in the manufacturing, wholesale and transportation sectors (see figure 7 and 8). Since these aforementioned sectors shares were more than 30% in GDP, it can be clearly said that 2008 global economic crisis affected Turkish economy inevitably. The GDP shares of these three sectors for 2006-2014 were shown in table 16.

Table 16: GDP in Current Prices by Kind of Economic Activity

Sector Name	Years	Value (Thousand TL)	Shares in GDP (%)
C. Manufacturing	2006	129.329.767	17,1
	2007	140.683.428	16,7
	2008	152.515.665	16,0
	2009	143.638.685	15,1
	2010	170.754.552	15,5
	2011	209.165.367	16,1
	2012	219.640.682	15,5
	2013	240.199.914	15,3
	2014	276.548.906	15,8
G. Wholesale and retail trade	2006	94.089.737	12,4
	2007	102.295.729	12,1
	2008	115.357.253	12,1
	2009	102.616.268	10,8
	2010	119.892.628	10,9
	2011	154.648.322	11,9
	2012	168.295.981	11,9
	2013	188.389.859	12,0
	2014	208.696.024	11,9
H. Transportation and storage	2006	87.473.448	11,5
	2007	98.428.141	11,7
	2008	113.442.502	11,9
	2009	106.396.064	11,2
	2010	121.985.236	11,1
	2011	151.009.007	11,6
	2012	170.629.116	12,0
	2013	186.958.493	11,9
	2014	208.686.812	11,9

Source: Turkstat

Table 16 shows that the manufacturing had the highest share of GDP in the studied years. It also indicates that wholesale and transportation have second or third highest share over the years.

Relating to the forecasting analysis of the major sectors which are operating in the Turkish economy, it was determined that most of the sectors' actual profit values declined dramatically in 2011. Moreover, the sharpest fall was detected on the transportation & store sector and aggregated "other sector". It was also found that the difference between the actual and estimated profit values of the sectors (construction, wholesale & retail trade, transportation & storage and other sectors) indicated in the figure 8 was also quite large in 2011. The reason for this difference might be either the effect of the 2008 crisis or another trigger effect in 2011 or earlier. Therefore, it is not possible to attribute directly to 2008 global economic crisis for the declining profit values of these aforementioned sectors. However, this is not valid for the manufacturing industry. Contrary to other sectors, actual profit values in the manufacturing industry fell in 2011, the estimated profit values decreased at the same level as well. For the manufacturing industry, the highest difference between actual and estimated profit values was found at 2008. From this point of view, since the manufacturing sector had the highest share in Turkish economy and determined as a most affected sector from the 2008 crisis, manufacturing sector was also analyzed in this study.

When the GLS results was analyzed for the manufacturing sector, it was found that while ln_{vad} and $netexc$ was affected each sub sectors' profit values statistically significant and positive, ln_{was} was affected statistically significant and negative. In other words, it can be stated that for the manufacturing sector, profitability increases when the value added and net foreign exchange profit increases. It is possible to prove this hypothesis by looking at the literature. Many studies identified the direction of the relationship between wage & salaries and profitability for the manufacturing sector.

For example, Roemer (1988) and Sundkvist, Hedman and Halström (2012) found a significant and negative relationship between salaries and profit. In addition to this, there is a vast literature that examined the relationship and the direction of the relation between the profitability and wages of the manufacturing industries. For example, the studies which were conducted for Turkey (Yeldan, 2013), for the US (Aaronson, French, Sorkin, & To, 2018; Osterman, 2018; Puty; 2018), for the UK (Bell & Machin, 2018; Draca, Machin, & Von Reenen, 2011) and for China (Wang & Chanda, 2018) showed that the link between profit values and wage was negative and significant on manufacturing industry. Besides, some other studies which were done for New Zealand (Agarwal et al., 2013), for Australia (Caves, 1974) and for Mexico (Ibarra, 2015) stated that the relation between the aforementioned variables was significant and negative on manufacturing. Some of the above-mentioned countries are developed and some others are developing countries. As it can be seen, similar pattern of the relationship between wage and profit were observed in both country groups. The current study examined Turkish manufacturing industry and the findings were determined parallel with the literature.

Value added at factor cost (Invad) is the second variable which significantly affected the profit values in this study. Similar to the findings of this study, many studies in the literature found positive relationship between these variables. For instance, Roztocky & Needy's (1999) in Vietnam, Tran, Grafton & Kompas's (2009) in Indian, Altaf's (2016) and Chiu, Lin & Wang's (2017) studies in Taiwan examined small manufacturing firms and found that the relationship between profit and value added was significantly positive.

As a result of the random effects analysis, net foreign exchange has been determined as another variable which has statistically significant effect on profitability. When looking at the literature, it is possible to see many studies that found the relation as in the case with this study. Brown (2001) and Dhanani (2003) determined that foreign exchange risk and its translation affected profitability. Even in some cases, exchange rates might affect profitability more than the effect of sales

(Dhanani, 2003). Combas & Rivat (2008) have examined international companies and found that companies' profits increase when they optimized their foreign exchange risk. In addition, Neely (2008) found that significant variation in currency exchange rates have a direct impact on firms' profitability. Similarly, Ibarra (2015) analyzed Mexico's manufacturing sector and found positive linkage between exchange rate profit / loss and profitability.

It was clearly seen that value added and net exchange profit / loss, which were explicitly described above, not only effect the Turkish manufacturing sector, but also effect other sectors operating in the Turkish economy in studied years. This determination can be followed from Table 9. Other than value added and net exchange profit / loss, Inexp (export) and Inyis (domestic sales) have been identified as the other factors effecting the profitability of other sectors that operating in Turkey.

Export has been determined to be statistically insignificant on manufacturing sector's profitability. However, it was also determined that it effected whole sectors profitability operating in Turkish economy. The reason for this may be due to the fact that export is very important factor for the two largest sector which are wholesale & retail trade, transportation & storage sectors after the manufacturing sector. Because firms which are operating in wholesale and retail sectors are supposed to have a technology that can buy their goods domestically and sell them in international markets, and they can export more than one goods differently from the manufacturing firms (Akerman, 2016). Lu et al. (2011) analyzed 29 developing countries' firms in their study and they found the firms which were export unmediated to the international markets were more profitable compared to intermediaries. Besides, when the literature was examined, there were many studies that stating the companies in the wholesale sector play a fundamental role in international trade (Severn & Laurence, 1974; Bergsten, Horst & Moran, 1978; Daniels & Bracker, 1989; Ahn, Khandelwal & Wei, 2011; Fujii, Ono, & Saito, 2017)

Besides, many studies indicated the importance of exports in the transportation and storage sector. According to the Francois & Wooton (2010), the profitability of the

transportation companies increases due to the increase in the traded amount when the tariff is lowered. Furthermore, even minor changes in the prices of companies operating in the transportation sector might affect the profitability of sectors based on exports (Fink, 2002).

In this part of the discussion, it is necessary to examine the results of the forecasting analysis to determine whether Turkish economy (especially the Turkish manufacture industry) was affected from 2008 global economic crisis or not. In this context it would be beneficial to discuss the results of the forecasting analysis of the manufacturing industry's aforementioned sub-sectors in terms of their significance in the manufacturing industry (see Table 11 for sorting).

Table 11 also illustrates sub-sector profitability rankings calculated for the period of 2006-2014. This calculation is very important in terms of the consistency of the DID analysis which is explained subsequently. Sub-sector profitability rankings have changed over time. Many factors such as periodic achievements, sectoral incentives, technological developments, recessions, crises and implemented free market & outward-oriented policies after 1980 may have been effected this change. Specifically, the determination of the profitability rankings of the sub-sectors after 1980 and comparing this with the sub-sector profitability rankings calculated for the period 2006-2014 will be important for the monitoring of this change. In this context, profitability ratios and rankings of manufacturing industry sub-sectors in 1980 and 1997 are shown in Table 17.

Table 17: Profit margins and rankings of Turkish manufacturing industry sub-sectors in 1980 and 1997

Sector	Gross Profit Margin			
	1980	Rank	1997	Rank
Competitive Sectors				
311. Food	0.21	22	0.24	27
312. Food n.e.c	0.17	28	0.20	29
321. Textiles	0.31	13	0.33	21
322. Clothing and Apparel	0.21	22	0.32	22
323. Leather Products	0.14	29	0.28	25
331. Wood and Wood Products	0.29	16	0.32	22
352. Other Chemical Products	0.27	19	0.65	6
356. Other Plastic Products	0.28	17	0.36	18
369. Other Non-Metallic Mineral Products	0.44	7	0.74	3
381. Fabricated Metal Products	0.40	9	0.48	12
383. Electrical Machinery Products	0.36	12	0.46	13
Non-Competitive Sectors				
313. Beverages and Non-Alcoholic Beverages	1.17	1	0.55	8
314. Tobacco	0.28	17	0.25	26
324. Footwear	0.19	25	0.35	19
332. Furniture	0.31	13	0.58	7
341. Paper Industry	0.19	25	0.31	24
342. Printing and Publishing	0.19	25	0.41	17
351. Basic Industrial Chemicals	0.47	5	0.53	11
353. Petroleum Refineries	0.37	11	1.24	1
354. Other Petroleum Products	0.53	4	0.34	20
355. Rubber	0.40	9	0.67	5
361. Pottery	0.72	2	0.97	2
362. Glass Products	0.68	3	0.54	10
371. Iron and Steel	0.22	21	0.44	15
372. Nonferrous Metals	0.30	15	0.22	28
382. Machinery Industry	0.25	20	0.45	14
384. Transport Equipment	0.21	22	0.42	16
385. Professional and Scientific Equipment	0.42	8	0.71	4
390. Manufacturing n.e.c	0.45	6	0.55	8

Source: Yeldan, 2013

Yeldan (2013) calculated the sub-sectors' profit margins and rankings for 1980 and 1997. The sub-sectors were classified according to ISIC Rev2 classification system.

Table 17 indicates that the beverage sector, which ranked 1st in profitability in 1980, dropped to 8th place in 1997. Similarly, it can be seen that the glass products sector, which was 3rd in 1980, fell to 10th place in 1997 calculation. Besides, some sub-sectors which had very important profit rates in 1980 had not been able to maintain these shares in 1997 (like other petroleum products, industrial chemicals, textiles and wood). On the contrary, it can be observed that there was an increase on the profits and rankings of some sub-sectors which had lower profit rates and lower rankings in 1980 to 1997. For example, non-metallic mineral products sub-sector was 7th in 1980, it rose to 3rd place in 1997. Although Yeldan (2013) used the ISIC Rev2 system in her study, subcomponents of the 369 coded sub-sector and 23 coded non-metallic mineral product sub-sector (Nace REV2) which was the 1st in our calculation, were almost identical. Thus, this rising trend in the last five decades confirmed that calculated profitability rankings in the current study were consistent. Similarly, 384 transport equipment sector which was the 22nd in 1980 and 16th in 1997, was determined similar to 29 coded manufacture of motor vehicles sector, in terms of their subcomponents, which was the second in our study. This rising trend showed the importance of motor vehicle sector for Turkish economy. The same upward trend (in fact, more striking) was observed in the food sector. According to the table, the food sector (coded 311 and 312), which was at the end of the profitability ranking in 1980 - 1997, was determined in third in the current study. Since the 10 coded food sector and 311-312 coded food sectors were similar in terms of their contents, it can be seen how the food sector has become an important part of the Turkish economy and manufacturing industry over the years.

The 23 coded manufacture of other non-metallic mineral products sector, which ranks first in the manufacturing industry profitability ranking, is composed of subcomponents such as glass and glass products manufacturing, cement, mud, mortar and concrete manufacturing, construction materials manufacturing (such as bricks and tiles), ceramic household manufacturing and noise - heat insulation manufacturing. In terms of production values, concrete and concrete products

manufacturing, cement manufacturing and glass products manufacturing constitute approximately 70% of this sub-sector production (İstanbul Sanayi Odası [İSO] Report, 2014b). Most of these sub-sector products are used as inputs in the construction sector. For this reason, a considerable number of mineral products are also referred to as building or building materials. Therefore, there is a close relation between the development of the non-metallic mineral products industry and the construction industry. The level of housing, building and infrastructure investments in the construction sector are the most important determining factor for the non-metallic mineral industry (İSO Report, 2014a). In the ready mixed concrete manufacturing, Turkey has the 1st place among the European countries (Akakın, Kılınç, Işık & Zengin 2013), while at the fourth in the cement production among the G20 countries according to the Ariöz & Yıldırım (2012). Due to the actual and estimated forecasting values are found close each other in the first years of the study, the forecasting analysis for the 23-coded non-metallic sector is consistent. In particular, the close proximity of the sub-sector actual and estimated forecasting values, which have the highest share in the context of profitability as a dependent variable, is also an indication of the success of the study and analysis. As a result of the significant decline in actual profits in 2008 it is quite real that the non-metallic mineral sector is affected by the 2008 crisis. This is due to the narrowing of the production value and the declining profitability of the three most important components of the non-metallic mineral sector. For instance, the capacity utilization rate in the cement sector decreased from 61.4% to 58.6% between 2008 and 2009 (Çevik, 2016). Besides, it has been seen that the production of concrete and concrete products decreased by 21% (which is the highest share in the non-metallic sector's production) and the production of glass & glass products declined by 6.4% in the same period (İSO Report, 2014b). The profitability of the sub-sector has begun to recover after the 2008 crisis due to the effect of deferred demand in the construction sector (Çevik, 2016). However, the reasons for the decline in the sector's profitability in 2012 were the increase in energy costs due to the relatively higher exchange rates and the low demand in glass products markets particularly

(Türkiye Odalar ve Borsalar Birliği [TOBB] Report, 2013). In addition, dramatic increases in the sub-sector's profitability and a huge gap between actual and estimated profit values (in favor of the actual profit values) were stated after 2012.

The 29 coded manufacture of motor vehicles, trailers and semi-trailers sector, which is the second in the manufacturing industry profitability rank, is composed of subcomponents such as manufacture of motor vehicles (truck, van, car, minibus, bus, metrobus and special-purpose vehicles such as garbage trucks, road cleaning vehicles, fire trucks and ambulances), manufacture of motors of motor vehicles and manufacture of parts and accessories of motor vehicles. The motor vehicle industry is a major buyer of basic industries such as iron and steel, light metals, petrochemicals, rubber, plastics. All kinds of motor vehicles required by tourism, infrastructure and construction, transportation and agriculture sectors are provided by the motor vehicle sector products. For this reason, changes in the sector are closely related to the entire economy (Bilim, Sanayi ve Ticaret Bakanlığı Report, 2013). The largest share in the sub-sector belongs to the manufacture of motor vehicles with 67.3% while the second largest share belongs to manufacture of motor vehicles and their parts and accessories with 29% (Kafalı, 2012). When the sectoral production index was taken as 100 for 2005, the index was calculated as 126.6 in 2008. However due to the global economic crisis, index was recorded as 88 in 2009. The results of the forecasting analysis showed that there was a dramatic gap between the actual and estimated profit values after the 2008 crisis. The reason for this is the government's regulatory policies. With the aim of reducing the effects of the global economic crisis, the rates of special consumption tax (SCT) and value added tax (VAT) were reduced by the Council of Ministers decree numbered 2009/14802 and then the discount period was extended until the end of September with the decision of the Council of Ministers numbered 2009/15081 (Kafalı, 2012). This steady steady fluctuation in the estimated profit values from the incentives mentioned above. For this reason, it was determined that the dramatic increase in

the sector profitability exceeded the expected profitability values and effected positively of these incentives on the sector profitability.

The 10 coded manufacture of food products sector, which ranks third in the manufacturing industry profitability ranking, is composed of subcomponents such as manufacturing of cattle, sheep, goats, poultry, fish, marine animals and offal products, processing and storage of vegetables and fruit, production of plant and animal fats, manufacture of dairy products, manufacture of cereal products, starch and starch products, manufacture of bakery products, manufacture of sugar, cocoa, chocolate, spice, sauce, vinegar and convenience food production and manufacture of animal feeds (cat, dog food, etc.). When the sub-sector's structure was analyzed, it has been seen that 95% of the enterprises operating in the sector are SMEs. For this reason, SMEs are faced with some problems such as processing, production, capacity, technology, financing and cost. Moreover, due to the fact that the raw material of this sub-sector are non-durable goods, it is necessary to find buyers in the market in a short time and to destock of the goods from the factory or selling area (İzmir Atatürk Organize Sanayi Bölgesi [İAOSB] Report, 2012). Otherwise, as mentioned above, the profit of the manufacturer who is experiencing cost and financing problems will be reduced. It has been also detected, the impacts of the 2008 crisis are reflecting on the sub sector's profit values in the same year due to the necessity of selling the products in a short period and the declining domestic & foreign demand during the crisis period. Figure 9 shows that the 2008 global economic crisis severely affected the food products industry. The most difference between estimated and actual profit values was determined in 2008. After 2008, the upward tendency was observed in actual profit values. The reason might be that the government has made regulations to protect the producer / SMEs and boost the production. For example, SMEs which fulfil the conditions set out in the law of SMEs and also apply until the end of 2009 have been allowed to benefit from corporate tax exemption or up to 75% tax deduction (Karaca, 2014). In the following years, serious

fluctuations in the profit values of the sub-sector were observed, but it was also determined that after 2013 real profit values exceeded the estimated profit values.

The 24 coded manufacture of basic metals sector, which is the fourth in the manufacturing industry profitability rank, is composed of subcomponents such as production of precious metals such as gold, silver and platinum, production of aluminum, lead, zinc, tin and copper and processing of nuclear fuels. This section covers the activities of dissolving and / or separating ferrous and non-ferrous metals obtained from mines, iron mines and scrap using electro-metallurgical and other metallurgical techniques (Atil, Duman & Narin, 2013). Just as in almost all sub-sectors, estimated and actual profit values of the basic metal industry were found very close as a result of the forecasting analysis in the first years of the study (see figure 13). However, in 2009 when the effects of the crisis were observed, it was stated that the profitability of the base metal industry dropped dramatically. It was also seen that in 2009 the production index of the sector decreased by about 15.5% compared to the previous year (Turkstat). Actually, it was seen that the performance of the main metal industry in the pre-crisis years was quite successful. In the period of 2003-2008, increasing in the production value of the sub-sector was determined as 252.7%. Furthermore, the capacity utilization rate of the sub-sector averaged more than 80% between 2005 and 2008. However, with the impact of the 2008 global economic crisis, the capacity utilization rate in the sub-sector decreased by 3.6 points in 2008 and by 10.3 points in 2009. In 2010, capacity utilization rate increased by 5 points (Şahinkaya, 2012). As it can be seen from figure 13, this increase was reflected in the profitability of the sector. It was determined that the profitability ratios in the sub-sector were below the pre-crisis period until 2014, but reached to the pre-crisis period by 2014. In the same period estimated and actual profit values was determined as equal. For this reason, it can be said that the 24-code base metal industry has recovered from the effects of the crisis only after 2014.

The 20 coded manufacture of chemicals and chemical products sector, which is the 5th in the manufacturing industry profitability rank, is composed of subcomponents

such as manufacture of dyes, varnishes and printing materials, manufacture of industrial gases, enrichment of uranium and thorium ores, synthetic rubber production, manufacture of chemical fertilizers and nitrogen components, manufacture of pesticides and other agrochemical products, manufacture of soap, detergent, cleaning agents, perfume and cosmetics, manufacture of personal care products, manufacture of explosives and biodiesel and biofuel production. The forecasting analysis for this sub-sector is significant since actual and estimated forecasting values in the first years of the study are close to each other (see figure 12). In this sub-sector, manufacture of dyes, varnishes and printing materials, manufacture of soap, detergent, cleaning and polishing and manufacture of plastic raw materials are the order of 3 components, which have the highest share in terms of production values. The first two components which are mentioned above have also the highest value added (ISO Report, 2015). When the capacity utilization rates of this sub-sector were considered it was seen that the utilization ratio which was 72.4% in 2008 decreased to 68.9% in 2009. Additionally, when the industry's manufacturing index was considered and accepted as 2005 = 100, it was determined, the index, which was 112.7 in 2008, declined to 99.9 in 2009. It might be stated that the chemicals and chemical products sector was affected from the 2008 crisis in the light of these two important indices. Conducted forecasting analysis within the scope of the study support this finding. When the figure 12 are examined, it will be seen that the difference between actual profit values and estimated profit values was quite high in 2008. It will be also seen from Figure 12, after 2009, this sub-sector started to get over effects of the crisis and in 2010 real profit values and estimated profit values were determined equal. For this reason, it might be interpreted that the 20-coded chemicals and chemical products sector has recovered from the effects of the crisis at the end of the 2010. Dyes products which is the highest share component of the chemical industry is very closely related to construction, furniture and automotive sectors (ISO Report, 2015). Therefore, stagnation and/or decrease in demand in dyes products will affect above mentioned sectors vice versa. The chemical products sector was ranked 2nd in the overall

manufacturing industry as a result of the "total forward linkage" analysis conducted by the Ministry of Development (Sekmen, 2012), which shows how much the relevant sector is affected if the all sector products increase extra one unit. With this, it can be clearly seen that chemical and chemical products industry is very important for the manufacturing industry and national economy.

The 28 coded Manufacture of machinery and equipment n.e.c. sector, which is the 6th in the manufacturing industry profitability rank, is composed of subcomponents such as engine and turbine manufacturing (except aircraft, vehicle and cycle engines), manufacture of office machinery and equipment (except computers), manufacture of industrial coolers and freezers, manufacture of agricultural and forestry machinery, manufacture of metalworking machines, manufacture of bulldozers, graders and concrete pavement machines, manufacture of food, beverage and tobacco processing machinery, manufacture of machinery for textile, apparel and leather production, manufacture of machines for the production of paper, plastics and rubber. Forecasting analysis for the sub-sector is significant because the actual and estimated profit values have been determined close to each other in the first years of the study (see figure 15). According to the analysis, there was a difference between the estimated profit values of the sub-sector and actual profit values in 2009. For this reason, it was determined that the manufacture of machinery and equipment n.e.c sector was affected from the 2008 crisis. This finding was also supported by the industrial production index. When the data are analyzed, it was determined that the capacity utilization rate decreased by 22.8% in 2009 compared to the previous year. The sub-sector started to recover from the effects of the crisis by the end of 2009 and it was seen that capacity utilization rate increased by 32.5% in 2010 compared to the previous year. This increasing trend was also reflected in the profitability of the sub-sector and it was stated that actual profit values and estimated profit values reached equal levels in 2010.

The 27 coded manufacture of electrical equipment, which is the 7th in the manufacturing industry profitability rank, contains the manufacture of products that

generate, distribute and use electrical power. On the other hand, involved is the production of electrical lighting, signaling equipment and electric household appliances such as (heaters, vacuum cleaners, tea / coffee machines, toasters, iron, shaving machines) and white goods (refrigerator, washing machine, dishwasher, exhauster, oven, cooker, microwave oven, etc.) This sub-sector does not include the production of electronic products in section 26 (Eurostat, 2008). As in almost all analyzes, the result of the forecasting analysis is significant for this sub-sector because of the close proximity of actual and estimated profit values in the first years of the study (see figure 14). Figure 14 also shows, the profitability in electrical equipment sector declined in 2008. It has been determined that this decrease in profitability has ended as of 2009 and in the same year the actual profit values have exceeded the estimated profit values. The reason for this might be some incentives given by the government and some measures taken. The government remitted the 6.7% SCT from electronic goods and white goods with the decision of the Council of Ministers No. 2009/14802 published on 16 March 2009 in order to protect the producers and stimulate the demand in the market (Akgül Yılmaz, 2013). With this incentive applied at the beginning of 2009, it was determined that profit of the producer was increased, even exceeded the estimated profits. The mentioned incentive was reduced by the Decision of the Council of Ministers published on 16.06.2009 numbered 2009/15081. According to this regulation, the SCT on white goods was increased to 2% (Akgül Yılmaz, 2013). The effect of this regulation can be seen from figure 14. At the end of the 2009, there was a downward trend in the actual profit values and it was also seen that the estimated profit values and the actual profit values were reached equality in 2011.

13 coded manufacture of textiles and 12 coded wearing apparel sector are found in the 8th and 11th rankings respectively in the manufacturing sector's profitability ranking. Textiles manufacturing contains not only preparation and spinning of textile fibres but also textile weaving, finishing of textiles and manufacture of made-up textile articles, except apparel (e.g. household linen, blankets, rugs, cordage etc.).

In addition, the 14 coded wearing apparel sub-sector consists of subcomponents such as leather garment production, outerwear goods, garment goods by taking measurements, production of knitted wear, sports and training goods, manufacture of underwear goods, production of stage and show clothes. It was seen that the profitability decreased in both of the mentioned sectors in 2008 (see figure 10). Especially the considerable decline in the profitability of the 12-coded textile products was determined. Yarn production which has a highest share in the Europe and second highest share in the World, 184 of the 350 factories operating in yarn production in Turkey were shut down due to rising production costs, diminishing of the demand and rising energy cost particularly (Alüftekin et al., 2009). This contraction of the sub-sector can be also confirmed by looking at the production index and capacity utilization rates. Textile industry production index was calculated as 22.9 points in 2008 while it was 101 points in 2007 (2005=100). When the capacity utilization rates are taken into consideration, it was seen that the ratio decreased from 81.5% to 75.6 between 2007 and 2008. In the same period, industrial production index and capacity utilization rate in the wearing apparel sector decreased by 9.5% and 4% respectively (Turkstat). This contraction in production and capacity ratios reflected the profit values of both sectors. In particularly, the highest difference between the actual and estimated profit values in the textile sector was observed in 2008. It might be interpretation that if the 2008 global economic crisis did not exist, profitability of textiles industry would not decrease too much due to the above mentioned reason as well as the modest decreased of the estimated profit values in the same period. The textile sector also benefited from a series of regulations aimed at avoiding the effects of the 2008 crisis. In this context, VAT ratio was reduced from 18% to 8% on goods and services produced in the food, tourism and textile sectors by the decision of the ministerial council numbered 2007/12143 on 30 May 2007. Some of the reductions were put into practice on 1 June 2007 while others were postponed until 1 January 2008 due to the negative impact on the budget revenues. Though, VAT discounts on products in the textile and food sector were implemented since 1 June 2007 (Akgül Yılmaz, 2013). Even this

implementation shows the essence of aforementioned sub-sectors for the Turkish economy. The upward trend of the profitability in the textile sector, which started shortly after 2008, might be due to the mentioned incentives were become valid immediately. As a result of the forecasting analysis the estimated and actual profit values were found equal in both the textile sector and the wearing apparel sector in 2010. Therefore, it can be said that both textiles and wearing apparel sectors have survived the effects of the crisis as of the end of 2010.

25 coded Manufacture of fabricated metal products, except machinery and Equipment and 22 coded Manufacture of rubber and plastic products sector are found in the 9th and 10th respectively in the manufacturing sector's profitability ranking. 25 coded fabricated metal products sectors sub components such as manufacture of metal roof or skeleton for construction and /or its parts, manufacture of doors and windows from iron or steel, weapons and ammo products, processing and storage of metals and manufacture of tableware and kitchenware from iron, steel and aluminum. 22 coded Manufacture of rubber and plastic sector's sub components such as tire manufacturing, manufacture of plastic construction materials, manufacture of plastic tableware, kitchen, office and furniture products, manufacture of bathroom equipment and lighting equipment and other rubber products manufacturing. In the first studied years estimated and actual profit values were found very close as a result of the forecasting analysis for the both of these sectors (see figure 13 and 14). Especially in 2008-2009, the profitability of the rubber and plastic sector was relatively narrowed but it was not determined a significant decrease in metal products sector's profit values. Besides, the estimated and actual profit values were found as equal in 2010 for both sectors.

In pre and past crisis periods, the changes in sub-sectors' profit values were explained in the current study. In this context, the variation of the actual profit values and the estimated profit values obtained from the forecasting analysis were compared in the studied years. It was determined that actual profit values of these sectors was decreased considerably during the 2008 crisis. It was also seen that at

the same period had the greatest difference between estimated and actual profit values for the almost all aforementioned sub-sectors. The sub-sectors discussed above have the largest share in the manufacturing industry, as noted in table 12, and these sub-sectors have been called large samples in the study. In order to determine whether these sectors, which have a large share, were significantly affected by the crisis, differences in differences analysis was conducted on the actual and estimated profit values. As a result of the analysis, the difference between the actual and estimated profit values of the sub-sectors, which have a large share in the manufacturing profitability, was found to be statistically significant at 10% significance level. Thus, it was determined that the above-mentioned sectors were statistically and significantly affected by the 2008 crisis, and their profit values also statistically and significantly reduced in this period.

When the analyzed of the sub-sectors which has a small share in the profitability ranking of the manufacturing industry, it was not seen any differ from the large share sample. It was observed that the profitability of the sub-sectors, which have a small share, was declined in the crisis period (especially in the 16 coded manufacture of wood and products of wood and cork, 19 coded manufacture of chemicals and chemical products and 26 coded manufacture computer, electronic and optical products). Besides, the highest difference between the actual and estimated profit values were also determined in this period (see figures 11,12 and 14). A number of incentive packages that covering to also these sectors were imposed by the government in order to reduce the effects of the crisis, stimulate domestic demand, increase competitive power, create a sense of decline in prices, and positively impact consumption decisions. Between 31 March 2009 and 30 June 2009, VAT on the furniture and wood products, computers, informatics and office machines was reduced from 18% to 8% by the decision of the Council of Ministers numbered 2009/15081 (Göze Kaya & Durgun Kaygısız, 2015). Moreover, in the same period the SCT on cable, wireless and mobile internet service provision was reduced from 15% to 5% (Firat, 2013). After these adjustments, increasing tendency was observed

in the actual profit values. Although small share sub-sectors' profitability increased due to incentives, it might be said that these sectors were affected by the 2008 global economic crisis. DID analysis was conducted to determine whether these sectors were significantly affected by the 2008 global economic crisis. As a result of the DID analysis, the difference between estimated and actual profit values was found to be significant at 5% significance level. Because of these reasons it was found that the profitability of the small share sub-sector was significantly affected by the 2008 global economic crisis.

CONCLUSION

The main purpose of this study was to analyze the impact of the 2008 crisis on Turkish manufacturing sector. This paper also aimed to determine whether the 2008 crisis is a financial or an economic crisis. Although the concepts of financial crisis and economic crisis are used interchangeably in the literature, these two concepts are quite different from each other. While financial crises are arisen by a deterioration in financial parameters. The concept of economic crisis states a deterioration in the whole economic system whether it originates from financial markets or from the real sector. Having looked at the main macroeconomic and microeconomic parameters, it was observed that 2008 crisis is an economic crisis. Although the crisis began in the American mortgage sector and affected the financial markets at first, then it spreads to the real sector and turned into an economic crisis.

Another aims of the study were to determine whether the manufacturing sector show early signal for the crisis and to seek an answer of how the Turkish economy – particularly manufacturing sector - would have proceed if the crisis did not exist. Within this scope as a starting point, forecasting analysis was conducted on the profit values of the sectors which are operating in the Turkish economy between 2006 and 2014. Especially in 2008 and 2009, when the effects of the crisis were peak, the highest difference between the actual and estimated profit values obtained by the forecasting analysis was observed in the manufacturing industry. For this reason, it was argued that manufacturing was the most affected sector by the 2008 crisis. Especially the difference between the actual and estimated profit values in the pre-crisis term was higher in the manufacturing industry compared to other sectors and a dramatic decline of the sector's profit values was observed in 2007 and 2008. These facts led to the conclusion of early signaling capability of the manufacturing industry.

In order to determine the effects of 2008 crisis on the manufacturing industry in detail, two-digit sub-sectors of the manufacturing industry were analyzed. For this

reason, differences in differences analysis is decided to conduct. However, by the nature of this analysis, actual profit values are not enough to analysis the crisis effects on manufacturing sector. Therefore, forecasting analysis was conducted on the aforementioned sub-sectors' profit values firstly and obtained estimated profit values. In general, in most sub-sectors, it was seen that the actual profit values decreased dramatically in 2008-2009 and also significant differences was observed between estimated and actual profit values in the same period. However, recovery in sector profitability was observed to start as early as 2010 and the gap between actual and estimated profit values decreased correspondingly. Further, it was determined that profit values of manufacturing sector bounced back and even actual profits exceeded the estimated profits in the later years.

After this step, differences in differences analysis was conducted on sub-sector's profit values to determine whether the differences between actual and estimated profit values were significant and whether the manufacturing sector was affected statistically significantly by the 2008 crisis. This study differs from other studies in the literature due to the use of forecasting and micro econometric differences in differences methods together in determining the impacts of crisis. In this way, the impacts of crisis on the profits and thereby on the sector were able to understood statistically by creating experimental and control groups that can be formed.

Before the analysis was performed, sub-sectors were divided into two groups as have a large share and small share on total profits. The results of the differences in differences analysis for both groups were found to be statistically significant. Thus, it was determined that the manufacturing industry was significantly affected by the 2008 global economic crisis.

Another strength of the study was to include almost all sectors into the analysis while determining that manufacturing was the most affected sector and showed early signal for the crisis. In this way, the fluctuations in other sectors was controlled during crisis period.

However, there are some limitations to the study. As mentioned above, almost all sectors were included in the analysis, but some sectors could not be included in the study due to the lack of data of the relevant years. Likewise, the period which was analyzed could not be extended due to data unavailability.

By using these methods, other sectors operating in the economy might be examined with the sub-sectors dimension, the analysis can be repeated at the firm level, other countries can be included in the analysis and/or some other variables might be determined as a dependent variable in future studies.

Notwithstanding the limitations, the methods and results of this study of great importance to researchers and policy makers working in the relevant field.

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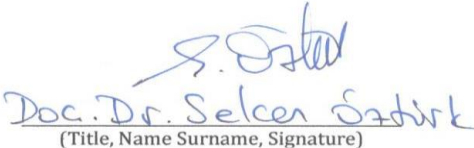
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Appendix 1. Originality Report

 <p>HACETTEPE UNIVERSITY GRADUATE SCHOOL OF SOCIAL SCIENCES Ph.D. DISSERTATION ORIGINALITY REPORT</p>												
<p>HACETTEPE UNIVERSITY GRADUATE SCHOOL OF SOCIAL SCIENCES ECONOMICS DEPARTMENT</p> <p style="text-align: right;">Date: 15/01/2019</p> <p>Thesis Title : The Analysis of 2008 Global Economic Crisis: The Case of Turkish Manufacturing Industry</p> <p>According to the originality report obtained by myself/my thesis advisor by using the Turnitin plagiarism detection software and by applying the filtering options checked below on 15/01/2019 for the total of 106 pages including the a) Title Page, b) Introduction, c) Main Chapters, and d) Conclusion sections of my thesis entitled as above, the similarity index of my thesis is %6.</p> <p>Filtering options applied:</p> <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Approval and Declaration sections excluded 2. <input checked="" type="checkbox"/> Bibliography/Works Cited excluded 3. <input checked="" type="checkbox"/> Quotes excluded 4. <input type="checkbox"/> Quotes included 5. <input checked="" type="checkbox"/> Match size up to 5 words excluded <p>I declare that I have carefully read Hacettepe University Graduate School of Social Sciences Guidelines for Obtaining and Using Thesis Originality Reports; that according to the maximum similarity index values specified in the Guidelines, my thesis does not include any form of plagiarism; that in any future detection of possible infringement of the regulations I accept all legal responsibility; and that all the information I have provided is correct to the best of my knowledge.</p> <p>I respectfully submit this for approval.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"></td> <td style="text-align: right;">Date and Signature</td> </tr> <tr> <td>Name Surname: İsmail Çakmak</td> <td style="text-align: right;">15.01.2019</td> </tr> <tr> <td>Student No: N12241006</td> <td style="text-align: right;"></td> </tr> <tr> <td>Department: Economics</td> <td></td> </tr> <tr> <td>Program: Economics</td> <td></td> </tr> <tr> <td>Status: <input checked="" type="checkbox"/> Ph.D. <input type="checkbox"/> Combined MA/ Ph.D.</td> <td></td> </tr> </table>		Date and Signature	Name Surname: İsmail Çakmak	15.01.2019	Student No: N12241006		Department: Economics		Program: Economics		Status: <input checked="" type="checkbox"/> Ph.D. <input type="checkbox"/> Combined MA/ Ph.D.	
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<p><u>ADVISOR APPROVAL</u></p> <p style="text-align: center;">APPROVED.</p> <p style="text-align: center;"><u>Doc. Dr. Selcen Öztürk</u> [Title, Name Surname, Signature]</p> <p style="text-align: center;"></p>												

Appendix 2. Ethics Board Waiver Form

 <p>HACETTEPE UNIVERSITY GRADUATE SCHOOL OF SOCIAL SCIENCES ETHICS COMMISSION FORM FOR THESIS</p>										
<p>HACETTEPE UNIVERSITY GRADUATE SCHOOL OF SOCIAL SCIENCES ECONOMICS DEPARTMENT</p> <p style="text-align: right;">Date: 15/01/2019</p> <p>Thesis Title: The Analysis of 2008 Global Economic Crisis: The Case of Turkish Manufacturing Industry</p> <p>My thesis work related to the title above:</p> <ol style="list-style-type: none"> 1. Does not perform experimentation on animals or people. 2. Does not necessitate the use of biological material (blood, urine, biological fluids and samples, etc.). 3. Does not involve any interference of the body's integrity. 4. Is not based on observational and descriptive research (survey, interview, measures/scales, data scanning, system-model development). <p>I declare, I have carefully read Hacettepe University's Ethics Regulations and the Commission's Guidelines, and in order to proceed with my thesis according to these regulations I do not have to get permission from the Ethics Board/Commission for anything; in any infringement of the regulations I accept all legal responsibility and I declare that all the information I have provided is true.</p> <p>I respectfully submit this for approval.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Name Surname: İsmail ÇAKMAK</td> <td style="width: 30%; text-align: right;">Date and Signature</td> </tr> <tr> <td>Student No: N12241006</td> <td style="text-align: right;">15.01.2019</td> </tr> <tr> <td>Department: Economics</td> <td style="text-align: right;"></td> </tr> <tr> <td>Program: Economics</td> <td></td> </tr> <tr> <td>Status: <input type="checkbox"/> MA <input checked="" type="checkbox"/> Ph.D. <input type="checkbox"/> Combined MA/ Ph.D.</td> <td></td> </tr> </table>	Name Surname: İsmail ÇAKMAK	Date and Signature	Student No: N12241006	15.01.2019	Department: Economics		Program: Economics		Status: <input type="checkbox"/> MA <input checked="" type="checkbox"/> Ph.D. <input type="checkbox"/> Combined MA/ Ph.D.	
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