

**REPUBLIC OF TURKEY
YILDIZ TECHNICAL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
PhD PROGRAM IN ECONOMICS**

PhD DISSERTATION

**THREE ESSAYS ON
FINANCIALIZATION AND (DE)REGULATION**

**SERKAN SENGUL
14729014**

**ADVISOR
PROF. DR. ENSAR YILMAZ**

**ISTANBUL
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ÖZ

FİNANSALLAŞMA VE DEREGÜLASYON ÜZERİNE ÜÇ MAKALE

Serkan Şengül

Ağustos, 2020

Bu tezin amacı finansallaşmayı ve regülasyonları üç farklı bakış açısıyla incelemektir. İlk makale, regülasyonların 2008 finansal krizi sırasında risk üzerindeki etkilerini incelemektedir. ABD, Avrupa ve uluslararası finansal mimarinin temelini oluşturan diğer büyük ekonomiler, krizin etkileriyle baş edebilmek için, hızla önlem almaya başladı. Öncelik, krizin finansal piyasalar üzerindeki etkilerini gidermeye verilmiş, yeni ve güçlü bir finansal mimarinin oluşturulması ve finansal istikrarın yeniden kazanılması için önlemler alınmıştır. İkinci makale, koşullu risk değeri (CoVaR) ve marjinal beklenen kayıp (MES) gibi literatürde önerilen iki ana sistemik risk ölçüsünü kullanarak, Türkiye bankacılık sektöründeki sistemik riskleri ölçmeye odaklanmaktadır. Sistemik risklere bankacılık sektörünün katkısını hesaplamak için, 2000–2016 döneminde Borsa İstanbul'da (BIST) listelenen altı Türk bankasının MES ve ΔCoVaR ölçüleri, Engle'in dinamik koşullu korelasyon modeli ile analiz edilmektedir. Banka özellikleriyle ilişkili bazı değişkenler (örneğin VaR-risk değeri-, boyut ve kaldıraç oranı vb. gibi) ile bankaların sistemik riske katkıları arasındaki ilişkinin tespit edilmesi için, her iki sistemik risk ölçümü (MES ve CoVaR), basit panel veri regresyon yöntemleri yoluyla analiz edilmektedir. Üçüncü makale, finansal olmayan şirketlerin yatırım kararları ve finansallaşma arasındaki ilişkiyi ve bu değişikliklerin yatırım davranışlarındaki etkilerini, Türk imalat firmaları için firma düzeyinde ekonometrik verileri kullanarak incelemektedir. Örneklem, 107 ve 56 adet halka açık Türk imalatçı firma için farklı zaman dilimlerini içeren düzensiz bir panelden oluşmaktadır. Türk imalat sanayinde herhangi bir finansallaşma göstergesinin olup olmadığını ortaya koymak için Arellano-Bond metodolojisi kullanılmaktadır.

Anahtar Kelimeler: Finansallaşma, Finansal Kriz, Sistemik Risk, Regülasyonlar

ABSTRACT

THREE ESSAYS ON FINANCIALIZATION AND (DE)REGULATION

Serkan Sengul

August, 2020

The purpose of this thesis is to investigate the financialization and regulations in three different views. The first essay examines the effects of regulations on the risk during the 2008 financial crisis. In order to cope with the effects of the crisis, the United States, Europe and other major economies, which constitute the basis of international financial architecture, have started to take measures rapidly. Priority has been given to eliminating the effects of the crisis on financial markets, and measures have been taken to create a new and strong financial architecture and restore financial stability. The second essay focused on measuring the systemic risks in Turkey's banking sector by using two major measures of systemic risk that have been proposed in the literature: conditional value at risk (CoVaR) and marginal expected shortfall (MES). In order to compute the contribution of banking sector to systemic risks, the MES and ΔCoVaR measures are estimated for the six Turkish banks which are listed on the Borsa Istanbul (BIST) during 2000–2016 period by using Engle's dynamic conditional correlation model. Both systemic risk measures (MES and ΔCoVaR) are analyzed to determine the relationships between some variables associated with bank characteristics (e.g., VaR (value at risk), size and leverage ratio) and banks' systemic risk contributions, via simple panel data regression methods. The third essay examines the relationship between financialization and investment decisions of non-financial corporations and the implications of these changes in their investment behaviour by using firm-level econometric data for Turkish manufacturing firms. The sample is composed of an unbalanced panel that is conducted with 107 and 56 publicly traded Turkish manufacturing firms for different time periods. The Arellano-Bond methodology is used in order to show whether there is any financialization indicator in Turkish manufacturing industry.

Key Words: Financialization, Financial Crisis, Systemic Risk, Regulations

PREFACE

Many people have contributed to the successful completion of my challenging Ph.D. journey in the Department of Economics at Yıldız Technical University. First and foremost, I would like to express my endless gratitude to my invaluable supervisor Prof. Dr. Ensar YILMAZ for accepting me as his student and for his immense guidance and support throughout this period. I would like to extend my sincere thanks and respect to my examining committee members Assoc. Prof. Dr. Seçkin SUNAL and Assoc. Prof. Dr. Şeref BOZOKLU for their valuable contributions to the progress and completion of this study. I would also like to thank TÜBİTAK for its financial support during this process. Finally, I owe special thanks to my dear wife Esra ŞENGÜL who has fully supported me during the most challenging times of my Ph.D. study despite the doubling up of her responsibilities and to my beloved daughter Defne ŞENGÜL and my son Mert Ali ŞENGÜL for not letting me complete my Ph.D. journey earlier.

Istanbul; June, 2020

Serkan SENGUL

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ABBREVIATIONS

ABCP	: Asset-Backed Commercial Paper
AFI	: Association of Financial Institutions
ARMA	: Autoregressive Moving Average
AT	: Additional Tier
BBVA	: Banco Bilbao Vizcaya Argentaria
BCBS	: Basel Committee on Banking Supervision
BIS(T)	: Borsa Istanbul
BoE	: Bank of England
BRSA	: Banking Regulation and Supervision Authority
CAR	: Capital Adequacy Ratio
CBO	: Congressional Budget Office
CBRT	: Central Bank of the Republic of Turkey
CDS	: Credit Default Swap
CMB	: Capital Markets Board of Turkey
CoVaR	: Conditional Value at Risk
CRO	: Chief Risk Officer
DCC	: Dynamic Conditional Correlation
DFA	: Dodd Frank Act
CNAV	: Constant-Net-Asset-Value
CET	: Common Equity Tier
EU	: European Union
FSB	: Financial Stability Board
FSOC	: Financial Stability Oversight Council
FPC	: Financial Policy Committee
GARCH	: Generalized Autoregressive Conditional Heteroskedasticity
GDIISB	: General Directorate of Insurance and the Insurance Supervisory Board

GDP	: Gross Domestic Product
GMM	: Generalized Method of Moments
IMF	: International Monetary Fund
LCR	: Liquidity Coverage Ratio
LIBOR	: London Interbank Offered Rate
LR	: Leverage Ratio
MASAK	: Financial Crimes Investigation Board
MES	: Marginal Expected Shortfall
MFA	: Ministry of Foreign Affairs
MiFID	: Markets in Financial Instruments Directive
MMF	: Money Market Funds
MVA	: Manufacturing Value Added
NFC	: Non-financial Corporations
NIM	: Net Interest Margin
OBSE	: Off-Balance Sheet Entities
OECD	: Organisation for Economic Co-operation and Development
OFR	: Office of Financial Research
OTC	: Over the Counter
ROA	: Return on Assets
RWA	: Risk Weighted Assets
SDIF	: Savings Deposit Insurance Fund
SES	: Systemic Expected Shortfall
SIFI	: Systemically Important Financial Institution
SIV	: Structured Investment Vehicles
SRISK	: Systemic Risk Measure
TBTF	: Too-Big-To-Fail
TLAC	: Total Loss-Absorbing Capacity
UK	: United Kingdom
UNIDO	: United Nations Industrial Development Organization
US	: United States
USA	: United States of America
VAR	: Value at Risk

1. FINANCIAL REGULATIONS AND RISK IN THE CONTEXT OF THE GLOBAL RECESSION

1.1. Introduction

The 2008 financial crisis was a great experience for the banking sector globally. The sector has become more cautious by introducing models on important issues such as excessive risk taking, insufficient capital and liquidity buffers in industry (Cull, Martínez-Pería 2013). Regulators responded to the crisis with more capital, standardization in liquidity, stronger supervision and more specific solutions. Along with the changes in the globalization tendency of the real economy, due to the weak economic growth and low interest rates in most developed economies, the working area of the banks has changed significantly. Technology has found external powers, while banks' stakeholder scrutiny has increased. Thus, competitive pressure began to emerge in the market.

Costs of the financial crisis were huge. The International Monetary Fund (2009) states that covering the results of the global financial crisis has costed 11.9 trillions dollars in total (Merrouche, Nier, 2010, 4). Consequently, a relatively new research conducted by Atkinson et al. (2013) demonstrates a cost equivalent to 14 trillion dollars for the USA only after considering the amounts regarding the production, richness, the effects caused by national trauma and exceptional precautions taken by government (Choi, 2013, 362). Sanders explains that the Congressional Budget Office (CBO) made an estimation in January 2012, which shows the cumulative difference between the real GDP and presumed potential GDP after the crisis would cost \$5.7 trillion towards 2018 (Sanders, 2013, 16).

According to Cull and Martinez-Peria (2013) immediately after the crisis, the banks began to respond to the financial crisis and the post-crisis market environment. In this context, banks went globally to reorganize and evaluate their growth plans, balance sheet positions, cost principles, organizational structures, scope of operations and geographical presence.

Risk is a fact that is inherent in the life of the financial sector as particular. The business world often grows by taking risks, and the greater the risk, the higher the profit naturally. Therefore, the business world needs to take risks for growth. Lessons are learned from past financial crises and new ways are opened for banks. However, this situation brings new risks. Banks should take these risks and take measures to overcome them.

In addition to this, Shaikh (2011) mentioned that an innate irresolvable conflict exists between capitalism's predisposition to discharge finance and its requirement to control the following instabilities. This innate conflict emerges in the regulation debate starting among unorthodox economics after the beginning of the late world wide crisis. The 2007-2008 crisis has correctly been labeled as the very first major depression of the millennium. According to Sing (2011) there are three main risk categories: credit risk, market risk and operational risk. The techniques and tools necessary to manage these risks are discussed in detail.

A significant characteristic of the neoliberal reconscripting policies was nonintervention and freed internationalization of finance. This functioned to be preventing tendency towards the decreasing profit rate. Additionally, with the expanded labour exploitation, it gave way to reestablishment of the profit rate for duration of time. Yet, usage of finance to handle the problems resulted by capital accumulation while ignoring the essential reasons (emerging from the sphere of production) included important costs. It caused an increasing distance between finance and real accumulation. According to Mavroudeas and Papadatos (2012), hence, the financial increase in 2008 caused the emergence of the long-coming very first major depression of the millennium.

This study examines the effects of regulations on the risk during the 2008 financial crisis. In order to cope with the effects of the crisis, the United States, Europe and other major economies, which constitute the basis of international financial architecture, have started to take measures rapidly. Priority has been given to eliminating the effects of the crisis on financial markets, and measures have been taken to create a new and strong financial architecture and restore financial stability. In addition to the measures taken to combat the crisis, it is important to be able to foresee and prevent future crises before they occur.

In this context, the first part of the study examines the preliminary and comprehensive regulations that emerged at the beginning of the subprime mortgage crisis. The first of these frameworks is the adoption of a shift into a macro prudential policy approach. Dodd Frank and Basel III, which aim to manage financial institutions within the framework of more effective regulation and have a stronger capital and liquidity structure, are also examined under the chapter.

Since those initial responses to the financial crisis include number of target areas in financial system to adopt more resilient regulation frameworks, the second part of this study aims to evaluate the pillars of regulatory efforts under four headings. In the second chapter, the four pillars of the regulation against risk examined in terms of building resilient financial institutions, ending Too-Big-To-Fail (TBTF) issue, making derivatives markets safer and transforming shadow banking into resilient market-based finance. The first section of this chapter analyzes the changes in risk parameters before, during and after the crisis for given economies in order to evaluate the effects of regulations over risk parameters of financial system.

1.2. Regulations During the Crisis

1.2.1. The Initial Responses to the 2008 Financial Crisis

Significantly dramatic events took place during the period of 2007-2008, such collapse of asset values, drying up of the liquidity and freezing of the credit markets, that interbank lending markets stopped, that some financial institutions crashed and many more of them called for public economical support of different descriptions to be able to trade (Claessens, Kodres, 2014, 7).

The pressure and imperative were constantly demanding for an action to be taken as fast as possibly. Noticeably, forging a link between financial distress' symptoms, broken banking systems and freezing interbank markets to the destabilizing the financial market's congenital dynamics and the fall of current methods to regulate finance appealed to a great degree. Contrarily, Baker (2015) explained that associating the crisis to macroeconomic causes by underlying world-wide instabilities, the borders of limited take on inflation, the massive injustice and/or malfunctioning increase model are a lot more complicated

intellectual ideas which need specifying a longer and detailed random link and a less urgent emotional mass appeal.

Evaluating the merits and demerits of these different reactions (a possible ways to deal with the upcoming crises) and unraveling the lasting damages to the financial system are significant momentary duties. Meanwhile, Siron (2018) demonstrated that world-wide financial crisis has an important effect on the consideration of the ideal way to regulate finance, as well. Furthermore, Davis (2009) states that the world-wide financial crisis, in others' opinion, mirrors mainly the unsuccessful attempts to regulate and implement it, which indicates a demand for much better – yet not bigger – options to implement and regulate. Those who are in the same opinion of both views would possibly be in agreement with the fact that regulating finance withstands a much harder assignment in the area of financial innovation, in which advanced financial products and approaches are set up in at a rapid speed to negotiate regulations that disallows profit opportunities and under-supported regulatory agencies are, on a regular basis, try to play 'catchup' while handling those improvements (Beck et al., 2016, 29). As Davis explains (2009), they would most probably acknowledge that governance, incentive arrangements and the ways risk is managed have not been the best possible options and are in need of reformation.

Deregulation was perceived to mirror an increasing sense of security about risks, which as the increase of adequate markets, was another reason for regulatory failure. Stöhr (2015) made a declaration that as a result of decades without experiencing an extensive crisis, it is far too easy to dream that we have built a structure that is impenetrable against risks. Regulators must have forgotten that almost all of the regulation was to prevent the increase of speculative bubbles or signs of overconfidence and overjoy. Thus, Shiller (2010) pointed out that the indirect impacts of the adequate markets theory were meant that regulators should concentrate on hindrance of micro- mismanagement, as though it were not possible for anything to be wrong with the whole market.

During the financial crisis, a new approach to market regulation appeared and shaped by three significant phenomena. In the following section these three phenomena - a shift into a macroprudential policy framework the Dodd-Frank Wall Street Reform and

implementation of Basel III standards will be evaluated with regard to their impacts on new wave financial regulation perspective.

1.2.2. A Shift into a Macro Prudential Policy Framework

The late financial chaos has caught the public and governmental attention from a market regulation, which is about a neoclassical, market-centered, self-regulating and a sort of laissez-faire style, to a much more state-based idea of compulsory legal rules that limit the leeway usually given to the market participants (Rubio, Carrasco-Gallego, 2016: 7). As reported by Seibt and Schwarz (2011), this generally agreed change of mind is most likely owing to (1) the dramatic losses in finance that have been made in the financial industry, and, furthermore, influenced the ‘real’ economy causing costs to be burden for the all society (social costs), (2) the astounding demand and shortage of another option that national state feel to save the financial institutions of systemic relevance (i.e. some type of ‘blackmail situation’), in addition to (3) the lack of confidence in the ethical behavior that all financial market participants do feel.

Following the crisis, differentiating further between supervising the individual financial firms in the micro-prudential level and guiding the systemic risks to the whole financial system (macro-prudential regulation). Gilad (2015) expressed that the idea behind the basic difference between these three functions – micro-prudential, macro-prudential and business-conduct regulation – is provide each task with an adequate thought. On the contrary, the goal of a strengthened regulatory structure is to aid regulatory consistency, collaboration, and information exchange.

The limited consideration of prudential regulation structured on capital requirements for banks fell short to hinder the big chaos towards the end of 2008. As United Nation report demonstrates (2016), of course, the subprime crisis and its results disabled a lot of the world’s biggest banks which totally satisfied the Basel II standards in 2008, which caused government to create highly expensive bailout packages, leading the public debt and social costs to increase to a very importantly high degree.

Following 2009, the era during which affirmation of macroprudential policy scheme was included in different G20 communique’s, there have emerged new policy committees for implementation of macroprudential policy in the USA (Financial Stability Oversight

Council), the European Union (EU) (European Systemic Risk Board) and in the UK (FPC). Moreover, Glivanos (2014) inferred that the Basel III agreement took actions for countercyclical capital buffers, as a macroprudential policy instrument.

The macroprudential approach changes most of the assumptions regarding the efficient markets position as it denies that self-interested investment strategies that are individually rational could provide financial stability and equilibrium by noticing the innate procyclical tendencies of finance, the tendency of investors for herd behavior and financial complexity's destabilizing impacts. Baker (2015) claimed that macroprudential policy includes benefiting from prudential cautions (a range of capital requirements, both fee-related and amount-related instruments) either to meet macroeconomic ends or to seek for protection of the actual economy against instability and financial excess. Additionally, Ennis (2009) described that these involve countercyclical capital demands, dynamic preparation for loan loss, demands of countercyclical liquidity, administrative limits on aggregate lending, reserve demands, caps on leverage regarding asset purchases, loan to income ratios, the lowest margins on secured lending, limits on currency mismatches, controls of capital and regulation of host country.

Krosner (2010) explained that microprudential regulation, aimed to protect consumer, ought to apply every financial institution, particularly attention challenged to protect unsophisticated, "vulnerable" in other words, consumers. Macroprudential regulation ought to be concentrated on main elements of systemic risk: the breakdown of big, interconnected institutions, leverage systematically significant behavior and instruments, and how they interact with the economic cycle. Furthermore, Lothian (2012) stated both macroprudential and microprudential regulation ought to give specific consideration to possible risks the government undertakes via operating implicit or explicit deposit insurances. In addition, Gudmundsson (2015) said that macroprudential regulation has the goal of cutting down the finance's pro-cyclicality and its impacts on the actual economy. It achieves it through explicit incorporation of the macroeconomic variable's influences, which are exchange rate, interest rate movements and growth, on financial risk, particularly hindering the systemic risks accumulation and changing fundamental regulatory variables in a counter-cyclical style in order not to encourage lending booms and hindering credit crunches.

1.2.3. The Reform of the Dodd-Frank Wall Street

The second significant improvement that has been associated with the Dodd-Frank is the Dodd-Frank Act or Wall Street Reform. Although a lot of aspects caused the crisis and the possible effect of these aspects are questionable, the weaknesses and irregularities of the way the U.S. financial system is supervised and regulated made a significant contribution. To deal with such defects, the Reform of Dodd-Frank Wall Street and Consumer Protection Act (the Dodd-Frank Act) were enacted by Congress.

As the Senate Banking Committee's website summarizes, Schultz (2014) brought out that act aims to (1) deal with risks to the U.S. financial system's stability, partially by creating the Financial Stability Oversight Council (FSOC), (2) put a stop too-great-fall bailout of big, complicated financial institutions, (3) expand transparency and regulation for particular complicated financial instruments, finally (4) intensify the ways consumers and investors are protected. Sanders (2013) said that the Dodd-Frank Act is going to be instrumental for the reduction of possibility or harshness of a future financial crisis. These preparations involve as it follows:

- Formation of FSOC (Financial Stability Oversight Council) and OFR (Office of Financial Research).
- Increased prudential standards for systemically significant financial institutions (SIFI).
- Orderly Liquidation Authority.
- Swaps regulation.
- Reforms in mortgage-related and other areas.

The rules of US Dodd-Frank competition are particularly focused on the swap market. Europe's Markets in Financial Instruments Directive (MiFID II) and suggested enforcing regulations are more earnest in capacity than reforms of the U.S. However, they are operated in a much slower way. Duffie (2016) said that enforcement of the most significant rules of trade-competition has been sent back to the beginning of 2018.

1.3. Enforcement of Basel III Standards

In November 2020, these capital reforms, along with the emergence of two international liquidity standards, reacted to the essence of world-wide financial reform agenda, which was presented to the Seoul G20 Leaders summit. The Committee, following the early comprehensive quantitative influence study that was published in December 2020, keeps on guiding and assessing the influence of these leverage, capital and liquidity requirements (abbreviated as “Basel III”) semi-yearly (BIS, 2011). The third part of the Basel Accords was progressed as an answer to the defects of financial requalification illustrated by the 2007-2008 financial crisis. The aim of Basel III is to support requirements of bank capital by reducing bank leverage and expanding bank liquidity (BIS, 2017).

The first demand is about the capital. Further, the rule of Basel III called banks for self-funding themselves with 4.5% of common equity, which was 2% higher than Basel II, of risk-weighted advantages (RWAs). The research by Hessou and Lai shows that a minimum Common Equity TIER 1 (CET1) ratio of 4.5% always have to be provided by the bank since 2015. The minimum Tier 1 capital expands from 4% to 6%, appropriate to 2015, over RWAs. The 6% is made up of 4.5% of CET1, as well as an additional 1.5% of Additional Tier 1 (AT1).

What is more, Basel III brought two more capital buffers (BIS, 2017):

- A compulsory “capital conservation buffer”, which is equal to 2.5% of risk-weighted advantages. Taking into account the 4.5% CET1 demanded by capital ratio, starting in 2019, banks have to have a total of 7 percent CET1 capital ratio.
- A "discretionary counter-cyclical buffer", which makes it possible for national regulators to ask for up to an extra 2.5% of capital in times of increase of high credit. The amount of this buffer changes from 0% to 2.5% of RWA and have to be satisfied by CET1 capital.

As argued by Teixeira et al (2014), another demand is related to ratio of minimum leverage that is a risk-free grounded leverage ratio and its calculation is performed with division of Tier 1 capital by the bank’ average total consolidated advantages (total of the exposures of all advantages and sheet items that are not balanced). Just as the Bank for International

Settlement exposed, its definition is “the capital measure over exposure measure”. Whereas Tier 1 is the capital measure, accounting values (the total of on-balance sheet exposures, derivative exposures, non-balance sheet exposures and transaction exposures financed by securities) make up the exposure measure. It is expected from banks to provide a leverage more than 3 percent as ruled by Basel III. The U.S. Federal Reserve made an announcement in July 2013 that the minimum Basel III leverage ratio was going to be 6 percent for 8 systemically important financial institution (SIFI) banks and for their secured companies that hold bank.

The last one is related to the liquidity ratios that are divided into two groups. The “Liquidity Coverage Ratio” was expected to demand a bank to have adequate high-quality liquid advantages to compensate its total cash discharges during 30 days. Rubio and Carrasco-Gallego (2016) stated that it was expected from “The Net Stable Funding Ratio” to demand the accessible sum of stable funding to go beyond the demanded sum of stable during a one-year duration of extended stress.

1.4. The Causes of The Financial Crisis and Regulation Against Risk

The crisis that occurred in 2007 is one of the biggest crises of recent years. The occurrence and causes of this crisis has caused new concerns to be raised by policy makers, practitioners and academics. According to many researchers, the crisis started with the deterioration in the credit quality of high-interest housing mortgages, especially those with adjustable interest rates. After this deterioration, specialized mortgage companies experienced fund pressures and many of them failed.

One of the most crucial causes leading to the financial crisis was the instant expansion of wealth in a lot of countries throughout the World. A few years prior to crisis, a huge upsurge in the number of advantages accessible to invest for those who seek for both profitable and safe returns. In this chapter, the reasons that caused the crisis and the precautions to avoid these reasons will be considered.

1.4.1. Shadow Banking and Dodd-Frank Act

Financial entities that borrow short-term and lend long-term are called shadow banking. However, unlike traditional banks, they are not covered by the banking regulations. Therefore, the shadow banking system has had more impact on the outbreak of the 2008 crisis compared to the traditional banking system. So, the shock caused by the burst of the housing bubble and the major crisis has more affected shadow banking than the traditional banking system.

Regulations on bank capital have always been the subject of debate by politicians and researchers (Admati, Hellwig, 2014). In addition to these challenges, regulators had to deal with the encounters that emerged after the 2008 financial crisis. As an example, Angeloni and Faia (2013) inserted that systematic banking crises can be prevented and concerns about financial crises need to be taken into consideration when preparing bank capital requirements. Moreover, the emergence of financial intermediaries other than the traditional banking sector, also known as shadow banks, causes problems such as legal arbitrage in the regulations regarding traditional banks. This situation identifies a very important problem. Because, financial instability during the 2008 financial crisis, shadow banking has led to a large extent.

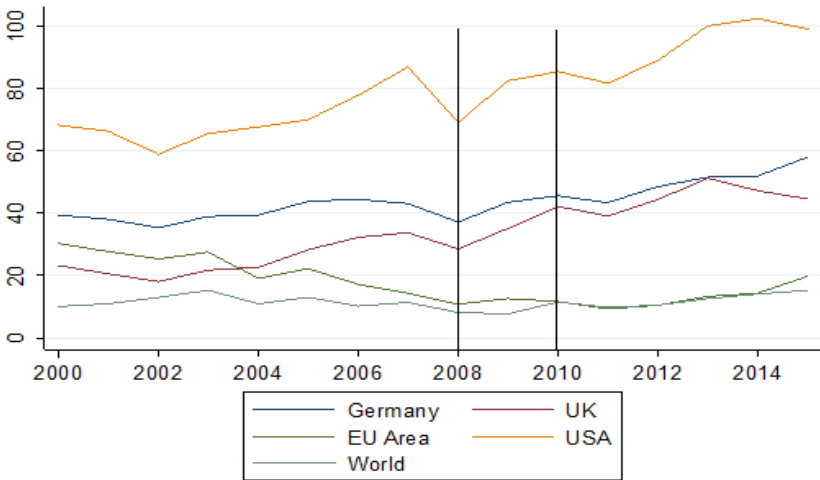
Friedman and Kraus (2011) explained that shadow banking system is made of financial entities beside thrifts and commercial banks. Mortgage specialists, off-balance sheet entities, along with structured investment vehicles (SIVs) as well as conduits for advantage-backed commercial paper (ABCP); and investments banks that are free-standing (independent from commercial banks), Goldman Sachs, Bear Stearns, Morgan Stanley, Lehmen Brothers and Merrill Lynch for instance, and the BHCs' investment-bank arms like Citigroup are also included. Kim et al (2012), meanwhile, investigated that the shadow banking system, believed to took a crucial part in the late crisis, is made up of investment banks, hedge funds and VC/PE ¹. Even though shadow-banking system might increase the possibility of risk and vulnerabilities, it is also functional to give benefit of varied funding to the actual economy. The greatest success in the field of shadow-banking

¹ Venture capital and private equity (VC/PE), providing new-comer companies with support of capital and managements, are gradually thought as the new kind of institution in the field of finance.

is the advanced set of codes to govern money market mutual funds. The type of the constant-net-asset-value's (CNAV) money fund could sometimes be limited to a fixed value, in spite of fluctuations happening in time in the actual market of value of their advantages. Duffie (2016) illustrated that a lot of those who invest, consequently, took CNAV funds for bank deposits, hence subject to a run whenever the redeemed value of the funds could decrease. It is absolutely what occurred on a big scale in the U.S the moment Lehman Brothers fell short.

Money Market Funds (MMFs), the part of the shadow-banking sector in question, are reciprocal funds that are most of the time invested in the short-time debts banks, (local governments) and/or corporations. The tools in which the funds invest consist of commercial loans, government treasury bills or certificates of deposit as explained by Finance-Watch (2017). Shadow banking is characterized as one of the factors leading to the 2007-2008 financial crisis, while at the same time causing the financial sector to grow further. The risks of shadow banking arise from the lack of control and check systems in the sector. In Germany, mutual funds rose to 58.2 percent in 2015 from 37.2 percent of GDP in 2008. Similarly, in the UK it increased from 28.6 percent to 44.6 percent, in the euro area from 10.7 percent to 19.8 percent, in the United States from 82.5 percent to 99.2 percent respective to GDP (Table 1.1).

Table 1. 1: Mutual Fund Assets to GDP



World Bank. 2018. Manufacturing, Value Added (% Of GDP), <https://data.worldbank.org/indicator/nv.ind.manf.zs>, [22.11.2018].

The international reform agenda under FSB (Financial Stability Board) tutelage executed a few initiatives, such as Dodd-Frank Act and suggestions to develop supervision of activities by shadow banking. Plus, G20 countries came to an agreement to gradually include the new standards in their regulatory work grounds (United Nations, 2015: 89). Stated by Dodd Frank, in case of improvement in market discipline, shorter discount for size on yield spreads, especially for banks associated as too-big-to fail (TBTF) or systemically significant (SIFI) can be inspected. In 2014, Balasubramanian and Cyree explained that commission that used secondary market subordinated debt transactions, discovered that size discount is lowered to 47 percent and TBTF discount is lowered to 94 percent, following the DFA. The DFA has influenced the reducing, while has not taken part in the elimination of size and TBTF discounts on yield spreads. It is observed that banks' market discipline have been improved further, following the changes in rating criteria by Moody's.

Kroszner (2010) said the Dodd-Frank Act builds a contemporary work frame that highly promoted the movement of OTC derivatives to platforms cleansed in the center and expands disclosure and exposures. It also maintains a new work frame to regulate, observe and govern the clearinghouses. Powerful incentives via differential capital charges for centrally cleared vs OTC derivatives might be appointed to the big players in derivatives markets in order to transfer the current contracts, to the most possible degree, to other platforms and create contracts with adequate standardization that is possible to cleanse in the center.

The financial crisis has fully demonstrated how shadow banking adversely affects the financial system. Consequently, the Dodd-Frank Wall Street Reform and Consumer Protection Act established the Financial Stability Oversight Council and the Financial Research Office to assess emerging risks and monitor the shadow banking system.

1.4.2. Bank Capital and Basel III Standards

This section analyses the changes of bank capital structure before, during and after the crisis through bank regulatory capital to risk-weighted assets, bank capital to total assets and measures taken within this frameworks.

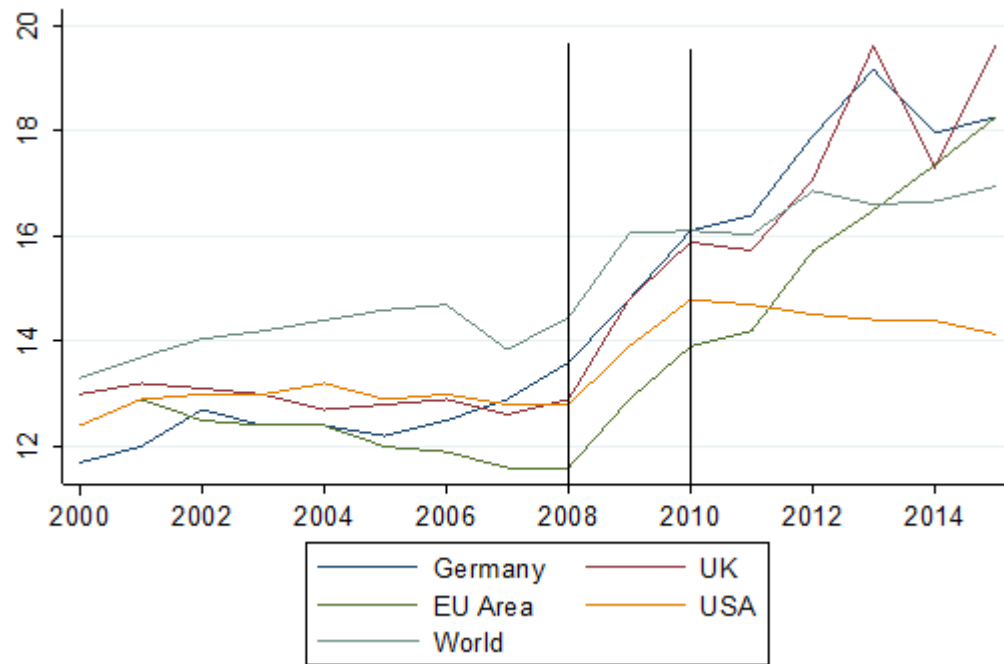
Risk weighted assets is an important measure method at both macro and micro level (Lesle, Avramova, 2012). According to the study of these researchers, risk weights assets have three important functions for banks. (1) Provide a common measure for the risks of the bank; (2) ensure that capital is proportionate to risks, (3) potentially emphasizes where instability entity class bubbles occur. According to the study of Berger and Bouwman (2013), two main results emerge. First, capital always helps small banks (including periods of crisis) to survive and increase their market share. Second, capital helps medium and large banks, particularly those with limited government intervention during banking crises.

The aim of the Basel III² criteria established after the 2008 crisis is to increase the flexibility of the banking and to promote financial stability against unexpected shocks. The most important purpose of Basel III standards is higher and better quality capital. Sanders (2013) explained that one regulator detected the leverage ratio as well as the higher demands of common equity and tier 1 capital required within standards of the Basel III, reflects an important fastening of capital regulation combined with capital's better quality and a few higher risk weights imposition. Further, Cohen (2013) discovered that a lot of national authorities have had publications of figures on bank capital sufficiency. They do not make use of the shared definitions either the numerator, which is capital, or denominator, which is assets, though. They have the tendency to approve a picture that reflects rise of capital ratios in the world-wide banking system.

Regulatory capital to risk weighted assets ratios for large, internationally active banks in world rose from 14.5 % at the end of 2008 to 17% at the end of 2018 while banks in Euro area from 11.6% to 18.3 percent. Even though the figures showing risk-weighted capital ratios are not suitable for a full comparison for the chosen countries because of particular banking legislations, differences in the example banks, quality of data and several relevant descriptions, the guidance and the size of the real expansion is possible to have been generally in league with the results described as it follows (Table 1.2).

² Basel III is an internationally consented set of precautions created by the Basel Committee on Banking Supervision in as a reaction to the financial crisis of 2007-09. The precautions have the goal of strengthening the regulation, supervising and managing risks of banks.

Table 1. 2: Bank Regulatory Capital to Risk-Weighted Assets



World Bank. 2018. Manufacturing, Value Added (% Of GDP), <https://data.worldbank.org/indicator/nv.ind.manf.zs>, [22.11.2018].

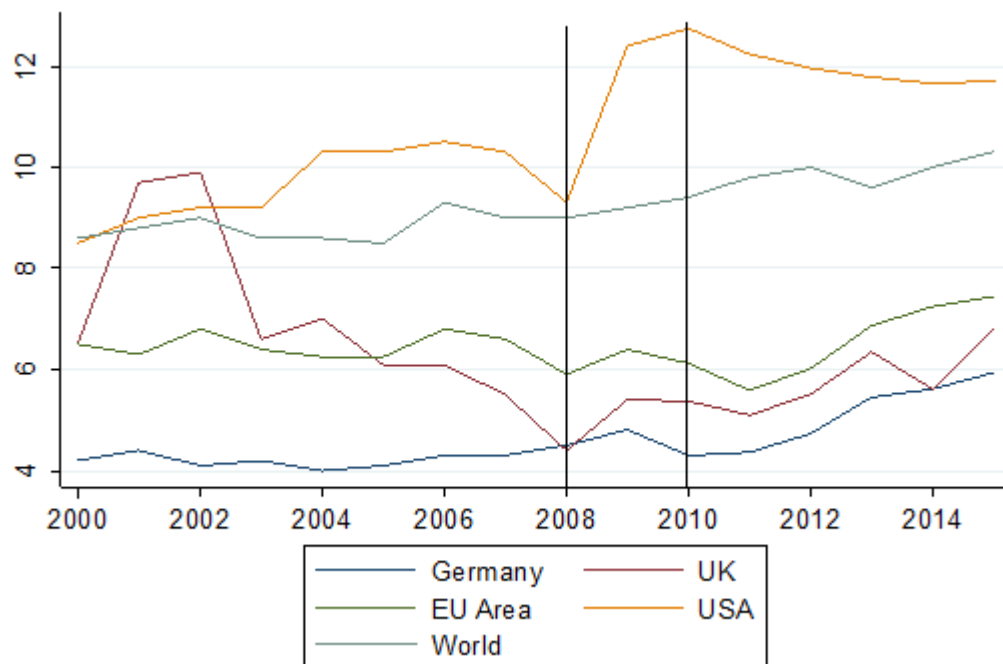
The more the assets of regulatory capital banks, the more resistant they are to the negative shocks. However, due to differences between countries in policy and accounting, it is not healthy to compare data with countries. When analyzing European Union Area, towards the beginning of 2011, it is observed that EU-centered banks possessed a Tier 1 capital ratio of 10.42 percent, a big increase when it is compared to 2007, when Tier 1 capital ratio was estimated as 7.7%.

In the USA's case, The Federal Reserve structured its enhanced regulatory capital standards, partially, on Basel's perspective that is viewed as limited by many experts. It is acknowledged that Basel III standards take into account several of the limitations brought out by the financial crisis in the regulatory work frame, but provide that Basel III goes on placing a great amount of reliance on risk-grounded perspectives while detecting the capital sufficiency (Tian, 2017, 15). Therefore, during and after the crisis period, risk weighted assets to bank capital for US banks slightly reduced but still remained above the pre-crisis periods.

Following the world-wide financial crisis, tightening the capital ratios is a significant improvement in the field of banking. In league with this, the bank capital to total evaluates how much banks could possibly handle losses which is rated among the biggest functions of risk. The bank capital to total assets restrains banks' capacity to leverage up their sheets of balance and could be considered naturally countercyclical, particularly owing to the leverage procyclicality (Giordana, Schumacher, 2013, 635).

The capital ratio to total assets for US commercial banks increased from 9.30 percent to 11.7 percent from 2008 to 2015. The Euro area monetary financial institutions' ratio, evaluated on a consolidated period, rose to 7.5 percent from 5.9 during the same amount of time and date. However, being 10.3 percent, it is much lower than average of the world. Similarly, although there is a tendency to increase after the 2008 financial crisis, the capital to assets ratios of banks in UK and Germany are lower than the World and Euro zone averages (Table 1.3).

Table 1. 3: Bank Capital to Total Assets



World Bank. 2018. Manufacturing, Value Added (% Of GDP), <https://data.worldbank.org/indicator/nv.ind.manf.zs>, [22.11.2018].

During the crisis of 2007-2009, a few banks suffered from capital shortages, partially as they experienced big losses on assets which Basel's standard assigned low risk weights yet posed much bigger risk than risk weights. The Basel III scheme is going to expand risk weight for particular advantage classes – and consisting of a leverage ratio as a defense against irregular risk weights – but specialist notified that the possibility is sustained for financial institutions for “gaming” the Basel risk weights with expanding holdings of advantages that have risk-weights that are not greater than the actual risks. Additionally, in 2013, Quaglia expresses that some specialists sustain their idea that Basel standards generally could not give an adequate buffer for protection of firms in stressed times. This approach is embodied in the given table for each samples of economy during the crisis, however, the extended impact of regulations have started to shown their effects after the crisis period.

Regulations on bank capital have always been the subject of debate by politicians and researchers (Admati, Hellwig, 2014). In addition to these challenges, regulators had to deal with the encounters that emerged after the 2008 financial crisis. As an example, Angeloni and Faia (2013) inserted that systematic banking crises can be prevented and concerns about financial crises need to be taken into consideration when preparing bank capital requirements.

1.4.3. Bank Liquidity and Basel III Liquidity Standards

The aim of this section is to explore the liquidity and crisis issues in the academic literature to understand the role of liquidity in the 2008 crisis. In 2007, problems started to occur in the interbank funding markets in USA, UK, Germany and other European countries. Therefore, banks, especially for long-term liquidities, have started to be reluctant to provide liquidity to other banks. In 2007, problems started to occur in the interbank funding markets in USA, UK, Germany and other European countries. Therefore, banks, especially for long-term liquidities, have started to be reluctant to provide liquidity to other banks. As a result, Libor rose significantly.

There are two obvious reasons for this liquidity-hoarding situation. On the one hand, banks need to protect themselves against greater potentials than expected, thus they needs

deriving from commercial paper markets, syndicated loans and disruptions in the mortgage. On the other hand, uncertainties increased as banks could not fully assess the exposure of their counterparties to securities of high interest and other interrupted markets.

In December 2010, the Basel Committee on Banking Supervision determined the introduction of liquidity standards for banks in addition to the measures taken in Basel II. In addition to the strengthened capital requirements, Basel III introduced a risk-weighted leverage ratio to the markets to ensure adequate funding in crisis situations.

In addition, Basel III criteria developed two measures for liquidity crisis. The first is Liquidity Coverage Ratio, which aims to ensure that banks have sufficient liquid assets to withstand liquidity stress in the short term. The second is the Net Stable Fund Ratio, which aims to encourage banks to be more stable against their liquid assets and to hold long-term funding sources. These measures are aimed to reduce the risk of maturity conversion.

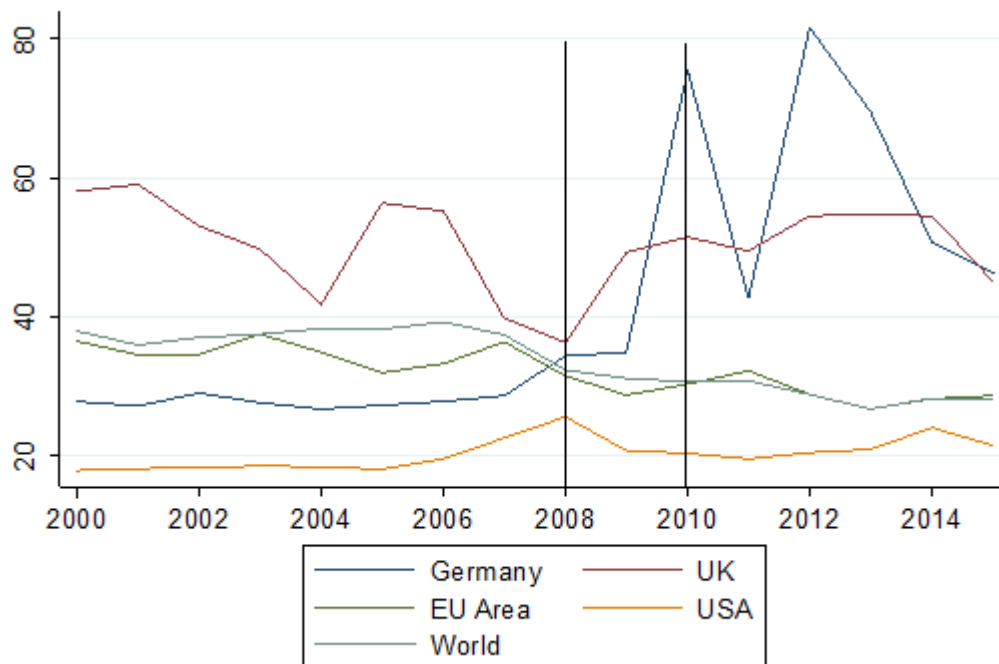
Basel III liquidity standards have undergone significant changes since their first issued in 2010. These changes include further differentiation to allow identification of banks with excessive maturity mismatches and more fragile funding structures (BCBS, 2014). These strategies are likely to affect the liquidity management function of banks if a stronger emphasis is placed on the retention of assets, particularly government securities. Allen et al. (2012) in their study discussed, especially the restructuring of banks' balance sheets for more liquid assets and as a result of the impact on the availability of the loan. Covas and Driscoll (2014) developed a balance to examine the macroeconomic impact of introducing a minimum liquidity standard on existing capital adequacy requirements for banks.

In the case of equilibrium they have developed, the minimum liquidity requirement recommends a 3 percent decrease in loans and a 6 percent increase in securities. While this liquidity regulation prevents banks from using all their profits, the bank reduces the credit supply and increases the cost of funds. Despite the resulting costs, the main purpose of the new regulations is to ensure the stability of banks. According to Farag et al. (2013), although capital and liquidity sources are important for the security and soundness of banks, much is not known about newly established liquidity standards.

It was mentioned by Cerrato et al (2012) because it is an alternate standing for what sum of customer deposits and short term funding could be covered were they to be withdrawn instantly, Short Term Funding ratio and Liquid Assets to Deposits could possibly function as a deposit run off ratio. As the ratio gets greater, the bank becomes more liquid and and it becomes less vulnerable against a classic run on the bank.

In the era prior to crisis, domestic banks showed thicker capital cushions than global banks and stronger signs of structural liquidity. The liabilities of global bank is structured in a way more predominantly dependent on non-deposit funding and built as short-term (Vazquez, Federico, 2012, 11). However, during and after the crisis, the roles of short term funding on risks are more significantly pointed out by regulating bodies. The world average ratio is 25 percent and the Euro area average is 28.7 percent by the end of 2015, both of which are lower than the values during the 2008 crisis (Table 1.4).

Table 1. 4: Liquid Assets to Deposits and Short Term Funding



World Bank. 2019. Manufacturing, Value Added. <https://fred.stlouisfed.org/series/DDSI06USA156NWDB> [08.08.2019].

When the Table 1.4 is examined in detail, the rates of short-term debt borrowing by German and the UK banks are higher than the crisis period, above the world and Eurozone averages. The US banks, on the contrary, tend to fall short-term borrowing rates and move away from the world average. This can be linked with one of the major risk approaches of Dodd-Frank and Basel III applies to liquidity requirements of banks to mitigate risks.

On the other hand, Cihak et al. (2015) revealed that liquid liabilities are the total of central bank's deposits and currency, and electronic currency and deposits additionally (M1), also saving deposits and time, certificates of deposit, foreign currency transferable deposits, agreements on securities purchase, also checks for travelers, time deposits for foreign currency, commercial paper, and shares of common funds or residents' market funds.

1.4.4. Bank Profitability and Z-Score

As mentioned in the above sections, the financial crisis has a negative impact on the financial system and financial stability. In this context, profitability is affected by this process as well as by the bank's unique characteristics and macroeconomic conditions.

In the early stages of the financial crisis, many banks experienced problems due to the discrepancy in their funding of loans. For years, banks have been financing most of the long-term lending through short-term borrowing. Long-term low inflation and low interest rates led to a decline in profit margins for banks. This has affected the risk appetite in seeking higher returns.

In the course of the late financial crisis, the probability of bank has gained a strong attention from policymakers and regulators. Actually, research by Rossi et al (2018) shows that both capital expansions and strategies to self-finance – needed to maintain a bigger level of capitalization – depends on a bank's capacity to produce profits. Yet, the factors determining profitability of bank, which is observed to be certainly defined by preceeding literature, seem to have undergone a change, affected by regulatory and competitive dynamics.

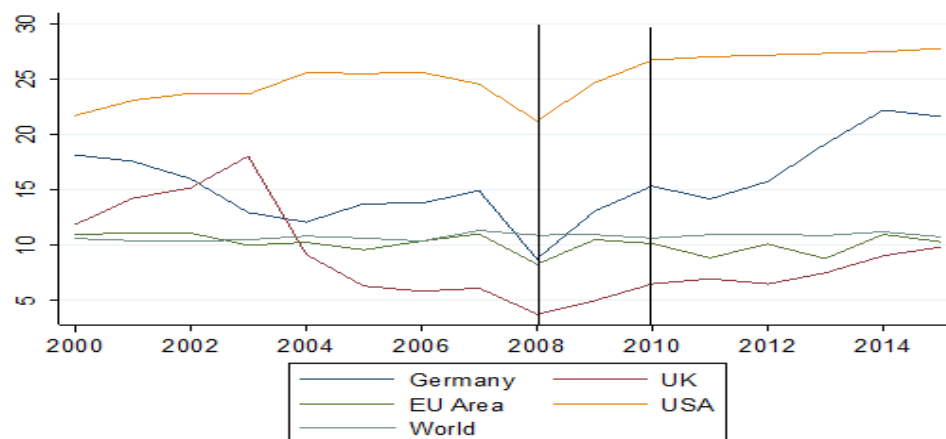
A lot of bank-specific variables that are accounting and/or marked give hints about the health of bank and evaluate its risk. The main alternative for a bank error risk is the z-score, which is the equivalent sum of the return on advantages (ROA) and the capital asset

ratio separated by the standard deviation by ROA after Balasubramanian and Cyree (2015, 160). A well-known risk handling measure z-score was structured by Roy (1952) and improved by Graham (1986). Lacteacru in 2016 said that the major result of the measure z-score is a bank of low-risk is going to possess a big value of z-core, signing that a great number of basic deviations of a bank's advantage return must lower to be called insolvent. The opposite is a very low value of z-score suggests bigger risk for the bank.

In 2007, the credit ratings of securities were rated more than they should have. In this context, the Altman z-score showed that the risks of companies increase significantly and they tend to go bankrupt. Altman calculated the average z-score of the companies in 2007 as 1.81. The credit ratings of these companies correspond to B. The fact that about half of the firms have low grades means that these firms are highly distressed and the probability of bankruptcy is high. Altman's calculations show that there will be a meltdown in the credit market and as a result there will be a crisis.

In the charts below, it is seen that in each of the sample economies, following the 2008 crisis, the bank z-scores were first severely declining, followed by a restoration process. Compared with the respective figures in 2008-2009 and 2015, the average of German banks' z-score rose from 8.75 to 21.6%; as banks in the UK from 3.79 to 9.83; banks in Euro area from 8.31 to 10.31; US banks from 21.2 to 27.75; and the average of world banks from 10.9 to 11.2 (Table 1.5).

Table 1. 5: Bank Z-Score



World Bank. 2019. Manufacturing, Value Added, <https://fred.stlouisfed.org/series/DDSIO1USA645NWDB> [08.08.2019].

The regulations of liquidity cause a shortening in average possibilities of error. It was found by Giordana and Schumacher (2017, 3) that the regulation of liquidity that concentrates on maturity mismatches cause a decrease to happen in average possibilities of error. Interchangeably, the influence on profitability of bank is less obvious, what appears to be significant is funding structure of bank, instead of the features of assets' portfolio. Likewise, it might be expected that greater ROA causes to decrease risk of default and that as it expands the possibility for equity to fall short of losses, the standard deviation on the return on assets decreases the z-score. Basically, the mutually adopted regulatory groundworks and the common monetary system such as Dodd-Frank and Basel have gradually supported these combinations in areas of Euro, the US and the UK.

Yet, contrasting results might be found out the moment ROA is considered along with the simultaneity of CAR. Strictly speaking, as explained by Giordana and Schumacher (2013), the leverage's level influences the ROA and the latter affects the former, which change the dynamics between its components and z-score. For instance, if a bank's ROA is developed by expanding its leverage, it is totally likely that the boost in ROA makes this bank closer to error.

In this sense, macroprudential efforts in regulatory frameworks after the crisis aimed at improving the banking systems' ROA in order to increase its leverage and thus to drop overall risk of the system.

In our analysis of the sample countries, the figures of the normalized ROA for the five economies show a cyclical pattern especially between the period 2006 and 2014. In the case of Euro area, the UK and Germany, it appears that ROA is still lower than the pre-crisis period while the cyclical character of the industry replaces to a rather stable form. In the case of US banks, the recovery period for the US banks is still in progress while their counterparts in Germany, pursue a downwards trend since 2011. The ROA trends in world averages and Euro area showed a similar pattern. It is also seen that there is a similarity between these scales graphically, as the ROA is examined in accordance with the z-scores presented above.

1.4.5. Too Big to Fail (TBTF) and Living Wills as a Potential Solution

Under Dodd-Frank, created after the 2008 financial crisis, the Financial Stability Oversight Council and Orderly Liquidation Authority supervise big major financial firms' financial stability whose fail could cause seriously negative effects on the economy of the U.S (firms labelled as "too big to fail"). Higher loss absorbency implementation, TLAC (Total Loss-Absorbing Capacity) and more thorough oversight is improving in a good level for worldwide systemically significant banks (G-SIBs). Meanwhile, as reported by Financial Stability Board (2017), advance has not been faster on other reforms regarding resolution for the past year and substantial work requires to structure influencing regimes of resolution and for operationalization of resolution plans for cross-border firms.

The main is the elimination of the too-big-to-fail approach and the moral hazard/excessive risk-taking movements elicited by it thanks forcing SIFIs to bigger capital demands and tightened prudential standards. The alleged "SIFI Project" was significant in the work plan recommendations of the FSB. Due to the apparent global significance of SIFIs with a big international existence, in Seoul, the G20 consented that FSB concentrates primarily on the "worldwide" systemically significant institutions of finance. The FSB had agreed on three interrelated ways to deal with prudential standards, oversight and resolution, respectively. Nolle (2012) stated that those criteria consist of leverage, size (considering on and off-balance sheet exposures and extension of credit), maturity mismatch and liquidity risk, interconnectedness, degree of current regulatory scrutiny and lack of substitutes.

It is expressed in Dodd-Frank Act that should market discipline be bettered, shorter discount for size on yield spreads, especially for banks labelled as too-big-to-fail (TBTF) or systemically important (SIFI) is possible to be mirrored. Commission, which used secondary market subordinated transactions, discovered that whereas TBTF discount is lowered by 94 percent as a result of the DFA, the size discount falls down by 47 percent. The DFA has taken an influential part in lowering the size and TBTF discounts on yield spreads, while it did not affect their elimination. Balasubramanian (2014) persistently claim that the changes in the rating criteria by Moody's seem to improve the market discipline of banks.

The Dodd-Frank Act, implemented plans to solve the TBTF problems. According to Article 165 (d) of the Dodd-Frank Act, banks with assets above \$ 50 billion are required to submit annual resolution plans. This requirement includes banks as well as financial institutions designated by the Financial Stability Monitoring Council. This arrangement, commonly known as living will, develops detailed strategies to reach a solution while experiencing financial distress or failure. The act obliges all large-scale financial institutions to organize a “living will” to explain how to get out of this situation when they are in distress. An effective living will probably creates favorable conditions for regular liquidation. Thus, it protects the banks from the danger in the first place and saves them time. Therefore, the reform should lead to lower TBTF subsidies, thus leading to higher capital costs.

In this context, Federal Reserve regulators may approve living will or refuse until the bank develops a sound strategy. Living wills provides a theoretical solution to TBTF, both by reducing systematic externalities and by increasing regulatory commitment. Therefore, from the beginning, regulators have issued specific instructions both to reduce the likelihood of living will in distress and to intensify systematic externalities. These efforts are first initiatives in order to call for bailouts. Furthermore, if these attempts as living wills can be seen as credible, then they come up to the time inconsistency problem which is confronted by the regulator by falling the possible agency costs which can be a cause a bank failure. Consequently, there might be a rise the bargaining power of the regulator in guiding financial distress of a bank because of the downward pressure on the hidden failure cost of uncertainty. There are also rising political costs to bailing out a bank because the regulator signalized publicly that it would not be so. Because of the cost of regulation, it is hard to believe banks differentiated considerable before execution. In addition, Acharya et al. (2016) state that since the TBTF firms are not listed explicitly, TBTF cannot apparently specify the treated group.

1.5. Discussions and Conclusion

In this study, the causes of the 2008 financial crisis are presented and the main reforms made in the field of international banking after the financial crisis and their effects are

offered. In particular, the US government took immediate action to stabilise the financial system in the crisis. Emergency measures for the financial crisis have created an opportunity for new financial arrangements. In this sense, the Dodd-Frank Act has been the most comprehensive revision of financial regulation in the United States since the 1930s. The law stipulated mandatory regulations to improve transparency on certain issues. In this context, it authorized the Federal Reserve for surveillance. It also established the Consumer Financial Protection Bureau to reduce consumer benefit practices. These regulations significantly increased the capital requirements, increased the quality of the goods calculated as capital, and introduced new liquidity and leverage requirements. It also reduced the possibility that banks would use their own internal models to calculate their capital needs and increased the need for large banks to reduce losses. Furthermore, the Dodd-Frank Act, implemented plans to solve the TBTF problems. According to Dodd-Frank Act, banks with assets above \$ 50 billion are required to submit annual resolution plans. This requirement includes banks as well as financial institutions designated by the Financial Stability Monitoring Council. This arrangement, commonly known as living will, develops detailed strategies to reach a solution while experiencing financial distress or failure. The act obliges all large-scale financial institutions to organize a “living will” to explain how to get out of this situation when they are in distress.

As mentioned in the above section, Dodd Frank and Basel III, which aim to manage financial institutions within the framework of more effective regulation and have a stronger capital and liquidity structure, are also examined. Therefore, important efforts under Basel III are also important in order to move away from the effects of the crisis and make new arrangements. Basel III criteria are applicable to all financial institutions in the world. The USA, Europe and many other countries have changed their laws according to Basel III. This is an important step towards financial crises. Basel III has tried to acknowledge pro-cyclicality via measures, whose goal is to maintain stability during the course of time. These consist of counter cyclical capital fees and provisions that are forward-looking, rules of capital protection for powerful capital buffers, systematic-based financial institutions and their systemic capital charges. Dodd-Frank Wall Street Reform and implementation of Basel III standards evaluated regarding their impacts on new wave financial regulation perspective.

Another important regulation is living will. Recently, aftermath of the financial crisis in 2008, regulators are globally calling for alleged living will. It is an incident scheme for financial institutions such as banks that is shelf-dependent if the asset should be resulted in bankruptcy, closing, selling or shattering. At first glance, banks may see living will as regulations made by external force to the living will requirements. Banks and other financial institutions are affected by these regulations, however, if they look at compliance requirements and develop more strategic plans, they will get real benefits. One of the frequently discussed aspects of such a plan is that it can be used to simplify institutional structures. If so, restructure financial institutions that will facilitate their profitability to reduce their financial strength.

Too big to fail is a vital to an economy that it would be disastrous if they went bankrupt. Therefore, urgent arrangements had to be made on this issue. Too big to fail practices reflect the government's perception that large financial firms serve the public good. This situation necessitated a legal regulation. In this context, the Dodd-Frank Wall Street Reform and Consumer Protection Act have introduced practices to eliminate too big to fail practices. The main ones were to prevent excessive financial companies from taking excessive risks and to increase regulation and audits.

After extensive arrangements, the banking sector recorded a significant increase in the amount and quality of capital. This success was mostly achieved with capital increases. In the latest report of the International Monetary Fund (2017), it was shown that the 30 largest banks in the world obtained capital of approximately 1 trillion dollars from 2009 to 2016. As a result, the average ratio between capital and total assets increased from 5% to 7%. Great success has been achieved in these practices.

The same positive situation is true for liquidity. This is seen not only in the improvement of the main liquidity ratios (see table 1.5) but also in the reduction of the simple ratio between loans and deposits. In the sample of the 30 largest banks mentioned above, this ratio decreased from 90% to 75% from 2006 to 2016.

Increases in the amount of bank capital and liquidity have reduced the likelihood of large banks defaulting and taking greater risks in the future. In addition, the obligation to

provide bail for the liabilities of banks reduces the possibility that the banks will be supported by the government through bail in a future crisis.

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2. MEASURING SYSTEMIC RISKS IN THE TURKISH BANKING SECTOR

2.1. Introduction

Over the past three decades, the common effects of computerisation, globalization and deregulation have given rise to a substantial structural transformation in financial sector. Banks have become financial corporations during the financialization era and focused on profitable investment banking activities. As indicated by Seccareccia (2012, 278), in this process, banks layered their assets by trading in securities, taking part in cross-border arbitrage, and relaxing credit terms for the household segment to take on a growing debt load on a scale that has not been seen heretofore. However, especially after the 2008 crisis, the question of whether there is an association between the structural changes in banking system and the systemic risks during the financialization era appear more on the agenda.

Within an increasingly complex financial system, governance mechanisms appear to become more erratic and quickfix in which regulations are persistently trying to come up with the newly created market risks. As Ciro (2012, 216) claims, since the global financial market is interlinked with the financial markets of every other country, the overall effectiveness of systemic risk regulation will necessarily involve cooperation and coordination from other international regulatory authorities. The continuous monitoring of risk is important, since financial innovation has demonstrated that changes in systemic risk can happen quite suddenly and unexpectedly. In order to comprehensively prevent systemic risks in the financial markets, Claessens and Kodres (2014, 22) recommend financial authorities to restructure current approach to financial regulations in a truly accurate, ample and harmonized perspective. In this way, only through the creation of international regulatory authorities and regulatory frameworks will the goal of minimizing systemic risk and disruptions in all financial markets be realized.

Systemic risks can be managed and controlled not only by the independent efforts of financial institutions but also by the efforts of the financial system as a whole. So, as indicated by Tian (2017, 103) in order to understand systemic risks, it is necessary to examine both micro and macro level. The potential spread of systemic risk throughout the financial system served to highlight the limitations and challenges associated with the regulatory framework. The focus of regulations to manage and prevent systemic risk or to promote financial stability may help financial markets to protect themselves from vulnerabilities against any sudden downturns. Thus, there is an increasing trend towards the development and use of monitoring indicators for systemic risk by financial institutions.

This paper focused on measuring the impacts of regulations on the systemic risks in Turkey's banking sector by using two major measures of systemic risk that have been proposed in the literature: conditional value at risk (CoVaR) and marginal expected shortfall (MES). In order to measure the contribution of banking sector to systemic risks, the quarterly MES and ΔCoVaR measures are estimated for the six Turkish banks which are listed on the Borsa Istanbul (BIS) during 2000–2016 period.

Unlike previous studies, we do not only focus on the measuring systemic risks, our testing strategy is more specific, since it is based on Turkish financial institutions. Second, in that sense, it is not only about measuring systemic risk, but also about determining the determinants of the risk. In this context, it is the only research, which is done for Turkish banking sector. Third, this paper connected the systemic risk contribution with the banking regulations, which especially are effectuated after different economic or financial crises periods.

2.2. Literature Review

The financial crisis in 2008 has led to a significant increase in the number of researches on systemic risk either on its definition, regulation or measurement. According to Reavis (2012: 3), the results of the crisis show that even though financial institutions were well governed and supervised, and the common risks were thought to be well diversified systemic risks could not be detected, prevented, and led to massive destruction in financial

system. Since then, there is an increasing effort to identify, measure and monitor systemic risks through better information and analytic models that focus on macro-prudential policies.

However, Cihak et al. (2012, 7) argue that these efforts have not sufficed yet. They claim that a standpoint that allows much more clear understanding to the market failures, interactions and externalities is still required. Further, this perspective should comprise but not just be limited to comprehensive stress tests, public financial stability reviews and other similar analyses. Claessens and Kodres (2014, 10) comment about the indicated analyses and reviews that should be an essential part of a wider course by which all supervisory entities consider their roles predominantly to oversee the financial system as a whole, and then the other financial agents within certain markets. In this way, micro-prudential supervisors might be able to address if required, the potential systemic impacts of the individual institutions.

More specifically, Seibt and Schwarz (2011, 105) pointed out a specific source of fear associated with the high interdependency of the different financial market segments and players that have an extensive effect on the stability of the overall financial system. Such a fear is mainly identified by Bullard et al. (2009, 407) as the “systemic risk” in relation to financial institutions and markets, and identifies the potential risk of an economic downturn such as a collapse of one financial agent or the sudden collapse of a certain market diffusing the whole financial system distressing other markets or institutions as a result of their multifaceted inherent financial interdependencies which is also called as “domino effect”.

Systemic risk is defined by Stöhr (2015, 74) as a risk that can potentially create volatility in majority of the financial system. Once systemic risks occur, individual firms also experience significant difficulties to shelter themselves against its negative consequences.

According to Guntay and Kupiec (2014, 2), the main variables of the systemic risk mechanism are driven by at least one of the SIFIs’ distress due to a large loss in operational level and in turn its impacts on stock returns of individual firms in the financial system. In other words, the spread of a SIFI’s distress throughout the overall economy is likely to shift towards the contraction of credit channels into the real sector. In order to address

this issue, Wagner (2010) claims that, although the costs of distress is reduced towards diversification, in point of fact it increases the prospect of systemic risk. This approach has been supported by the recent empirical studies such as a shift from traditional banking activities is found to increase the market risks and volatility of firms by Stiroh and Rumble (2006) and Stiroh (2006), and the diversification of financial institutions led to a higher systemic risk in financial markets in simulated models proposed by De Jonghe (2010). Therefore, the costs of diversification in financial institutions more than outweigh the benefits and can be seen as one of the factors increasing the systemic risks.

Besides the issues related with diversification, the absolute downward pressure has seen in the financial equity prices around the world which refers to a run on bank capital encompasses another element that aggregating the distress on the system. Talaslı (2013: 26) indicates that the immense amounts of equity sales in financials are likely to cause bank runs. In such periods of stress and uncertainty, the general contagion in stocks may occur without distinction and possibly affect in a way that investors lose their confidence in almost every equity in all segments of the entire financial system. This suggests us that there is not a significant difference between insolvent and solvent parties in the entire system. Particularly, the work of Talaslı maintains that in the short-run, the institutions that are not directly influenced by these liquidity problems are also affected by the stress. Therefore, market capitalizations of most financial institutions may fall, and they encounter difficulties to raise funds in equity markets. This explains the definition of systemic risks proposed by Mishkin (1995) as the “prospect of an unexpected, usually unforeseen event that interrupts flow of information in financial markets, causing them to be incapable of efficiently allocate resources to those parties with most productive investment opportunities”.

In addition to the two main sources of systemic risks, in a more generalized approach, Richardson et al. (2011, 192) assume that the majority of activities undertaken by financial institutions involve systemic risk in some degree related with them. They contemplate splitting up their functions into different fields to realise the nature of their systemic risk. In detail, these firms:

- Operate as commercial bankers by lending and taking deposit at institutional and individual levels,
- Deal over-the-counter (OTC) derivatives and repos in security markets as intermediaries,
- Provide assets for individuals and institutions,
- Provide exclusive trading options for private equity partnerships, hedge funds or asset traders by allowing to use their own accounts,
- Conduct investment banking operations by offering advisory services and underwriting security issues,
- Offer prime brokerage to professional investors, hedge funds and brokerage services to individuals,

In the context of systemic risks, there is a growing interest for distinguishing the financial institutions that constitute the majority of systemic risk in the financial system namely Systemically Important Financial Institutions (SIFIs). SIFIs are identified by the Financial Stability Board (FSB, 2011) as "Financial institutions whose disorderly failure or distress, owing to their systemic interconnectedness, complexity and size, would reason substantial disruption to the overall economic activity and financial system". However, defining these institutions is not forthright under the broadly changing circumstances, levels of development and regulations in dissimilar financial systems. Komarkova et al. (2012, 101) identifies SIFIs in the context of micro-prudential supervision as a body whose disruption would lead its shareholders and creditors to encounter huge direct costs. Alternatively, in the perspective of macro-prudential supervision, Komarkova et al. focused significantly on the indirect yet huge effects that SIFIs created over the interconnected institutions contain the potential to initiate a prolonged and major crisis.

From the macro-prudential perspective, Duffie (2010) identified these institutions through the combination of their intermediary roles in payments system, insurance brokerage, asset management, investment banking and commercial banking, whose failure triggers a systemic risk in the entire financial system. Similarly, Komarkova et al. (2012, 102) referred SIFI as a component of the system which constitutes a significant source for to

the accretion of systemic risk and failure of a SIFI would enact huge interconnected losses that hover the fine functioning of the entire financial system the real economy as a whole. Therefore, as asserted by Weistroffer (2011), an uncontrolled failure of SIFIs comprises serious risks for the overall financial system, nonetheless its presence is central for the viability of the real economy and the financial system.

One of the main challenges here is centred on how SIFIs can be classified in a financial system to identify their systemic importance. In order to resolve this, Brunnermeier et al. (2009) provided a standard classification for identifying systemic importance of SIFIs based on:

- the financial institutions' concentration of activities,
- the interconnectedness the financial institution
- its size
- overall economic macro financial circumstances,
- the overview of the financial institutions' balance sheet and
- the macro financial conditions and overall context (such as the structure of the financial industry and the political system)

It is important to analyse the role of SIFIs on systemic risks, which are given a high degree of importance in the research on this field.

2.3. Measuring Systemic Risks

Hypothetically, two approaches are considered for measuring the influence of a financial institution to constitute risk for the system. According to Benoit et al. (2012, 2), the first model based on theoretical approaches relies on information that are regarded to reflect market data about publicly traded firms such as CDS spreads, option prices and stock returns. Such measures are utilized in four major methods such as the Systemic Expected Shortfall (SES) and the Marginal Expected Shortfall (MES) proposed by Acharya et al. (2010); Delta Conditional Value-at-Risk (CoVaR) proposed by Adrian and Brunnermeier (2011) and the Systemic Risk Measure (SRISK) studied by Brownlees and Engle (2012)

and Acharya et al. (2012). Benoit et al. (2012) identifies the second approach based on certain indicators that rely on information on risk exposures and positions. These firm specific confidential materials are afforded to regulator by the financial firms.

In this study, empirical evidences and data in relation with Turkish banking system will be analysed by using CoVaR and MES models of measuring systemic risk. In order to provide initial knowledge about the measurement of systemic risks this section critically presents the foundations of theoretical models and indicator-based models respectively.

2.3.1. Theoretical Models of Measuring Systemic Risks

Ever since the financial crisis, the measurement of systemic risk through financial market variables researched by many authors through the analysis of credit default swap (CDS) spreads, stock returns or data from balance sheet (Sun, Yu, 2016, 2)., These studies have specifically evaluated the associations between financial institutions via the analysis of the asset structure of financial institutions. Billio et al. (2010) and Acharya (2009) showed that the prospect of a foremost financial disruption hinges on the extent of correlation amid the financial institutions' assets. Moreover, as argued by Binici et al. (2012, 2) the susceptibility of those assets to be sensitive against the external and domestic macroeconomic conditions and variations of market prices, and the concentration of those institutions on specific industries are probably the factors which financial disruptions could be linked to.

In another approach, Arnold et al. (2012) analyses the measurement of systemic risk by classifying it under three major issues. The first issue is related with difficulties in ensuring about the adequate capitalization of financial institutions. With regard to this issue, regulatory authorities have focused on stress testing which refers to determine how much capital is required in stressed events on the basis of historical or simulated scenarios by using BCBS guidelines in order to perform a comprehensive stress testing (BIS, 2009). For instance, the model developed by Varotto (2012) that adopts the scenario in the Great Depression to evaluate the requirements of Basel III, finds that banks would absorb their losses in the given scenario however the related losses would surpass the capital buffers proposed by the regulators.

One of the advocates of stress testing literature Acharya et al. (2012) suggests that individual measures of systemic risks such bank profitability and wholesale funding are among the major predictors of the extent of a stock's expected fall during a market decline and considered among the factors that contribute the systemic risk during crises. According to Acharya et al. (2012), in an unregulated market downturn, capital structure of financial institutions may fall short and this situation potentially leads a shut-down followed by contagion. Another aspect of regulation to measure systemic risks are highlighted by Duan and Van Laere (2012) in terms of information asymmetries and the role of credit rating agencies in provision of public information which constitute a basis for to make a fully informed investment. On the basis of the preliminary information provided with association to the theoretical models, CoVAR and MES models of measuring systemic risks will be evaluated in detail due to their compatibility with data collected in this research.

2.3.1.1. CoVAR Model of Measuring Systemic Risk

First proposed by Adrian and Brunnermeier (2011), the CoVaR model has gained notable attention in systemic risk literature in recent years. The CoVaR is defined by (Yun, Moon, 2014, 95) as the VaR (value-at-risk) of the quantile of the market returns in the case of the distress of a financial institution. The concept of CoVaR proposed by Adrian and Brunnermeier (2011) in order to estimate the extent of the severity of a systemic risk within a financial system.

Since VaR (Adrian and Brunnermeier, 2009; Acharya et al., 2009; Engle and Brownlees, 2010) is an estimation of the extent of the amount of portfolio that can be lost for a given confidence level and within a given time period, the CoVaR relates to the VaR of the market returns achieved given the outcome of a particular situation on the returns of firms. The work of Shi and Werker (2011) that focused on the application of VaR models in short term capital inadequacy conditions for financial institutions to reduce their potential losses and contribution to systemic risks in long-term distress incidents. Their study showed that capital adequacy levels tested by stress measures of VaR model can be used as estimates of the given firm's resistance in long term stress scenarios. In the framework of CoVaR Adrian and Brunnermeier (2011) outlines the impact of the institution on

systemic risk, namely ΔCoVaR , as the difference between its CoVaR and the CoVaR measured in the median state.

The popularity of the model has recently led numerous researches to apply this framework into measuring and estimating the projected outcomes of systemic risks. Among these studies, the paper by Lopez-Espinosa et al., (2012) ascertained factors affecting systemic risk and found that systemic risk conditions are significantly determined by short-term wholesale funding factor. Because of this finding, the paper accomplished results supporting the measures taken by the Basel Committee via introducing net stable funding ratio in order to penalize excessive exposure to liquidity risk.

Using CoVaR systemic risk measures, Galsband and Nitschka (2013) exhibited significant associations between systemic risk contribution of the firm and its size in the cross-sectional dimension. Their study also found that the systemic risk contributions of a firm relates with and the market to book ratio and leverage ratios of that firm. Yet, the results could not associate current ratio and maturity mismatch with the systemic risk contribution of a financial institution in all circumstances. Therefore, major factors affecting the systemic contribution of a financial firm outlined by the previous studies focus on factors associated with market returns such as the size of firm, the market to book ratio, leverages ratios, net stable funding ratio, short-term wholesale funding ratio and etc.

2.3.1.2. MES Model of Measuring Systemic Risk

The MES model is identified as the anticipated loss in equity per dollar invested in a specific financial institution in the case of declining the whole market by a definite amount. As Brownlees and Engle (2012) signifies, marginal contribution of a financial institution to systemic risk is measured by MES and estimated by expected shortfall (ES) of the system. To sum up these definitions, the systemic risk contribution is defined in the MES model as an individual financial institution's conditional expected equity returns in the case of distressed markets.

In a work of Talash, (2013, 28), descriptive impact of predictable risk measures for financial institutions such as stock beta, stock return volatility and expected shortfall are grouped into a set of variables and compared with or is compared with MES and leverage ratio prior to the crises. The results of regressions analyses by setting independent

variables as the pre-crisis period risk measures and dependent variable as crises period losses showed that MES and leverage describes both dependent and independent variables of crises better than the other measures.

MES framework enables researchers to adopt its cross-sectional variations to similar models that are designed to measure systemic risk such as the SES model of systemic risk. In line with this, MES is used as a cross-sectional input by Acharya et al. (2010) to measure the systemic risk contribution of an of individual bank through susceptibility to be undercapitalized when the overall financial system is undercapitalized. The results of the study undertook that individual financial institutions' capital shortages could pose an externality when the whole financial system shows signs of instability.

On the other hand, the work of Guntay and Kupiec (2014, 2) applied MES and CoVaR in same stock return data set in order to measure a financial institution' propensity to contribute systemic risk. As results of this study, although MES and CoVaR differentiated in terms of exact conditional events, they provided viable results in the case of distribution of conditional returns as means of measuring and identifying systemic risk contribution of an individual financial institution.

2.3.2. Indicator based Models of Measuring Systemic Risk

The fast changing nature of financial system has led regulators to adept alternative supervising techniques to deal with the increasingly evolving and complex structure of banking system as rigid supervisory regimes have fallen short to meet the contemporary demands of managing systemic risk (Gigliobianco, Toniolo, 2009, 37). Indicator based models are generated from the results of accumulations of bank-related variables that are affecting the systemic risk propensity of banks. Some of the indicator-based measures can be utilized in interconnectedness externalities (Zhou, 2010; Segoviano, Goodhart, 2009) others are mainly used in measuring the contribution of individual institutions to systemic risk (Brownlees, Engle, 2016; Tarashev et al., 2009; 2010).

According to Claessens and Kodres (2014, 4), the widespread approach to undertake reforms for systemic risks are likely to disclaim the fundamental sources of risk bearing factors in financial system despite there are a lot of referrals made to the characteristics of systemic distress in modern financial interrelations. These authors assume that the endogenous characteristics of the systemic risks in contemporary financial systems cannot

be determined by the specific asset price-based and market measures or balance sheets of financial institutions solely due to backward looking or static nature of these metrics. In line with these, three of the mostly used metrics such as leverage ratio, liquidity and interconnectedness of financial system and real estate prices and bubbles will be examined in this section as the fundamentals of indicator-based models.

2.3.2.1. Leverage Ratio

The two dimensions of leverage ratio (LR) namely structural and cyclical are targeted to minimize systemic risk and mitigate excessive leverage. Three of the most significant interconnections that enable leverage ratio to increase efficiency of other policies serving the similar aims are underlined by BBVA (2015, 6) as:

- The reduction of sovereign-bank nexus and leverage ratio
- Risk weighted capital ratios and leverage ratio
- The mandatory composition of the bank liabilities and leverage ratios

A recent study by BOE (2011, 19) claims that leverage ratios are better indicators of pre-crisis distress in financial markets compared to risk-based capital ratios due to they are less vulnerable against mis-measuring risk and arbitrage factors. Also, the work of Acharya and Thakor (2016, 18) shows that higher the bank leverage solidier the creditor discipline, which leads to a reduction in the risk of contagion when the banks are liquidated by creditors.

Some of the activities of financial institutions, such as lending to institutions and individuals, and proprietary trading propose a straight risk for the capital of firms. In this sense, Richardson et al., (2011, 193) emphasize on the degree to which portfolio of loans and trading positions and reveal that it creates risk for the whole market and that leverage is utilized to accumulate the firms, systemic risk occurs. Verifying this approach, financial institutions operating under Basel II, including investment banks, banks in the U.S. and EU generated many inventive approaches to have high leverage ratios and to escape the requirements by transferring risks to other institutions or misleading credit ratings by leathering their leverage ratios behind faulty risk models as acknowledged by Admati and Hellwig (2013, 96). Such behaviours decreased the degree of capitalisation and leverage

of financial institutions, augmented the systemic risk and therefore after the crisis influenced the new framework of supervision in Basel III.

2.3.2.2. Liquidity and Interconnectedness of Financial System

As underlined by Admati and Hellwig (2013) low capital requirements, the usage of credit default swaps (CDSs) and the application of structured investment tools and securization increased the impacts of interconnectedness among financial institutions and permitted them to escape the rules of regulation by utilizing off-balance accounting before the crisis.

In order to prevent high losses undertaken by financial firms in terms of market to book values Talash (2013, 27) proposed a series of risk management measures that aimed at reducing the degree interconnectedness between financial firms within the circle of interbank funding markets through diversification of their portfolio. However, as argued by Helwig (2009, 136), the widespread transfer of the market risk through which the public resources made available for the financial institutions under stress can be prevented by limiting the obligations of creditors against third parties that contribute the greater share of the market risk.

Moreover, as maintained by Hannoun (2010, 7) the role of central banks to oversee the systemic risks should be improved through implementing innovative methods in payment systems by using their responsibility, expertise and knowledge by means of macro prudential supervision. In line with this approach, Ojo (2011, 526) alleges that even strongly equipped financial institutions' vulnerability to systemic risks are unguarded against the waves of fear, uncertainty and doubt as a result of interconnectedness of financial infrastructures and markets unless supervising agencies implement a well-integrated macro prudential approach. When it comes to the issue of excessive interconnectedness among SIFIs, Samucci (2018, 3) suggest that the susceptibility of SIFIs against amplified shocks could lead to procyclicality sourced by bail-in debt, contingent capital and capital surcharges.

In line with these suggestions, some of the capital requirements proposed by the Basel Committee to mitigate the risks caused by firm-level disclosures among the financial firms are likely to help addressing interconnectedness and systemic risk. These comprise (BIS, 2011, 8):

- The requirement for tighter capital requirements for exposures among individual financial institutions,
- Introducing new perspective in liquidity requirement policies to create penalizing mechanisms for excessive dependence on short run, interbank funding to support assets in long run.
- Introducing capital incentives for financial institutions to utilize central counterparties for OTC derivatives, and
- Introducing tighter capital requirements for complex securitisations, derivative activities, off-balance sheet exposures and trading.

2.3.2.3. Real Estate Prices and Bubbles

The majority of the authors focused on the systemic risk measures tend to concentrate on banking system due to the reputation of banks as a foundation of systemic risks. On the other hand, even it is limited, some researchers such as Reinhart and Rogoff (2009) have provided comprehensive evidences on the indirect role and contribution of the real estate sector on systemic risks. As indicated by Ferrari and Pirovano (2014) the majority of research looking for an association between systemic risks and the real estate industry mainly revolve around identification of the determinants of booms and busts in asset and/or real estate prices. The main reason underlying this explained by Martins et al. (2011) through high exposure of bank portfolios for the real estate industry indirectly or directly in many economies, such as the UK, USA, Germany and some of the developed Asian countries.

Therefore, as proposed by Li and Pan (2016) fluctuations in the real estate industry in these economies could distress the value of both the real estate collaterals of loans and the direct exposures in property loans and hence the risk or performance of banks could alter suggestively in the case of the collapse of real estate industry.

2.4. Regulations in Turkish Banking System to Mitigate Systemic Risks

2.4.1. Stylized Facts about Turkish Economy

Turkey achieved a significant social and economic development performance following the comprehensive fiscal and macroeconomic policies after 2001 crisis that have led to positive signs in employment and GDP per capita, made Turkey an upper-middle-income country (MFA, 2018). During this period, Turkey's long-term focus and dedication of government on implementing ambitious and wide-scale reforms, facilitated its urbanization, increased the volume of foreign trade and contributed to the progress in convergence with the EU standards in many areas as reported by World Bank (2018b). Owing to this period of abundance, Turkey also managed to recover well from the direct and indirect effects of global crisis of 2008. However, as commented by BBVA (2018) Turkey's achievements in some areas have been slowing down since the mid-2018 following acceleration of the exchange rate depreciation since the beginning of 2017. The recent (OECD, 2018) report exhibits that the most significant threats for the economy for the oncoming period are sharp fall in domestic demand, increasing inflation and instable ON borrowing rates from the beginning of 2018. Table 2.1 illustrates the major components of Turkey's macroeconomic outlook between 2013 and 2017.

In general Turkey's GDP and GDP per capita tends to decline mainly due to the devaluation of its currency against US dollar that accelerates in recent years. Similarly, Turkey's growth rate declined from 8.5 percent in 2013 to 3.2 percent in 2016 but it showed strength in 2017 by increasing to 7.4 percent. In line with this, there are still optimistic estimations about the economic growth of Turkey signifying that the ongoing turbulence may pass with minimal damage. However, a recent LPL Research (2018) consensus market survey revised Turkey's GDP estimates in 2019 from 3.7 percent to 3.4 percent.

Table 2.1 suggests a link among domestic demand, consumption and investment which are reflected on this table as some of fundamental sources that Turkey's growth and GDP are based on. The increase in local demand, consumption and investments lead to an increase in GDP and growth rate and vice versa in recent years. Unemployment in Turkey,

on the other hand shows a rather stable outlook since 2014 and revolves around and slightly over 10 percent.

Turkish economy is characterized by its strength in sustainable public debt to GDP ratio which is considerably below the OECD (2018) averages and most of the EU countries. On the other hand it shows significant vulnerabilities in terms of the increasing inflation with around 15 percent, current account balance with approximately 47 billion USD, trade deficit with around 60 billion USD and external debt with over 50 billion USD which are accompanied by declining international reserves of CBRT. The policy rates, which was already considered as a burden on fiscal balance, increased by 6.25 percent in September, from 17.75 to 24 percent (CBRT, 2018) as a result of high volatilities in currency rates of Turkish Lira.

Table 2. 1: Turkey's Macroeconomic Outlook

	2013	2014	2015	2016	2017
GDP per capita (USD)	12.386	12.026	10.898	10.805	10.536
GDP (USD bn)	950	934	858	862	851
Economic Growth (GDP annual variation in %)	8,5	5,2	6,1	3,2	7,4
Domestic Demand (annual variation in %)	10,0	3,2	5,4	4,4	7,1
Consumption (annual variation in %)	7,9	3,0	5,4	3,7	6,1
Investment (annual variation in %)	13,8	5,1	9,3	2,2	7,3
Unemployment Rate	9,1	10,0	10,3	10,9	10,9
Public Debt (% of GDP)	31,3	28,6	27,5	28,3	28,3
Inflation (PPI. annual variation in %)	7,0	6,4	5,7	9,9	15,5
Policy Interest Rate (%)	4,50	8,25	7,50	8,00	8,00
Current Account (% of GDP)	-6,7	-4,7	-3,7	-3,8	-5,6
Current Account Balance (USD bn)	-63,6	-43,6	-32,1	-33,1	-47,4
Trade Balance (USD billion)	-79,9	-63,6	-48,1	-40,9	-58,9
International Reserves (USD)	111	107	92,9	92,1	84,2
External Debt (% of GDP)	41,3	43,3	46,6	47,3	53,2

Focus Economics. 2018. Turkey Economic Outlook, <https://www.focus-economics.com/countries/turkey> [23.12.2018].

2.4.2. Overview of the Turkish Banking System

The financial sector of Turkey is supervised by three main supervisory and regulatory institutions (Batur, 2015, 12). The regulation and supervision of the banking industry as

well as asset management companies, consumer financing, specific institutions for payment systems, financial holding companies, factoring, financial leasing and electronic money institutions are carried out solely by the BRSA. The insurance sector is regulated and supervised by the GDIISB (General Directorate of Insurance and the Insurance Supervisory Board) which is operating under the Treasury and the securities markets by the CMB (Capital Markets Board of Turkey).

The supervision and regulation of banking system are also supported by other industry representatives and enablers through different functions such as preserving the robust development of banking system by the Association of Financial Institutions (AFI), sustaining the monetary policy by Central Bank of the Republic of Turkey (CBRT), combating against financing of terrorism and money laundering by the Financial Crimes Investigation Board (MASAK) (ISPA, 2018, 3).

The assets of Turkish financial system is approximately 120 percent of gross domestic product (GDP) by 2017 and has grown considerably faster than GDP since 2008. There are 33 deposit money banks, 13 development and investment banks and 5 participation banks by the end of December 2017, under the regulation and supervision of BRSA (2017).

Turkish financial industry is dominated by the banking sector as the deposit money banks' assets to GDP ratio is approximately 70 percent while is vital to financial stability in Turkey. On the other hand, as shown in the Table 2.2, the sum of assets of pension funds and insurance companies to GDP with 4.8 percent and Nonbank Financial Institutions (NBFIs) with 4.3 percent still represent a smaller proportion of the financial system despite their considerable growth by asset ownership during the past decade.

Table 2. 2: Composition of Turkish Financial System by Assets and Concentration

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Deposit Money Bank Assets to GDP	32,6	35,3	34,9	36,2	35,6	40,4	43,7	46,3	49,7	58,8	64,0	64,6	68,9	74,7	81,3	70,7
NBFI's Assets to GDP	1,15	1,16	1,12	1,14	1,08	1,13	1,13	1,13	2,79	3,01	3,46	3,66	3,89	4,35	4,89	4,33
Pension Fund Assets to GDP				0,00	0,05	0,17	0,33	0,45	0,67	0,94	1,09	1,10	1,44	1,66	2,15	2,46
Insurance Company Assets to GDP	1,47	1,54	1,40	0,80	0,93	1,18	1,30	1,47	1,48	3,45	3,34	3,15	3,59	3,98	4,52	4,77
Concentration of Banks	69,3	76,7	77,2	70,0	71,5	64,8	45,5	42,5	42,7	44,2	43,6	41,7	39,5	38,8	39,9	43,2

FRED. 2017. Federal Reserve Economic Data, <https://fred.stlouisfed.org/series/DDDI02TRA156NWDB> [11.12.2018].

According to a recent IMF (2017, 10) report, the size of Turkish banking system is average compared to the peer emerging countries although the non-deposit channels represent a larger share in credit financed. The IMF report argues that concentration of banks in the Turkish financial system in terms of the ownership structure is equally distributed among state-owned, foreign-owned and private domestic banks and at admissible levels in terms of the market share of largest three banks as demonstrated in Table 2.2.

Table 2.3 which examines the changes in the credits, assets and deposits of different types of banks in the Turkish banking system, shows an increase in the share of private banks and participation banks in credits and a slight decrease in the share of assets and deposits of private and state banks. This situation was mainly due to the emergence and the increasing market share of the participation banks, which started to operate in the sector after 2001.

Table 2. 3: Distribution of Credits, Assets and Deposits according to Banks (2001-2016)

	Share in Credits (%)			Share in Assets (%)			Share in Deposits (%)		
	2001	2010	2016	2001	2010	2016	2001	2010	2016
Private Banks	59	59	60	63	60	61	65	63	62
State Banks	35	33	30	32	31	29	35	33	33
Development & Inv. Banks	6	5	5	5	5	5	n/a	n/a	n/a
Participation Banks	n/a	3	4	n/a	4	5	n/a	4	5

TBB, https://www.tbb.org.tr/Content/Upload/Dokuman/7453/Turkiye'de_Bankacilik_Sektoru_2013-2017_Eylul.pdf, [12.07.2018].

2.4.3. The Regulatory Framework of Turkish Banking System

Turkey's financial regulatory system includes a multi-layered and fragmented structure. Among the major supervising bodies, insurance industry is regulated by The Treasury, capital markets are regulated by the Capital Markets Board of Turkey (CMB) and the banking system is regulated by Banking Regulation and Supervision Agency (BRSA) (TCMA, 2016, 3).

In the past 25 years the financial crises triggered three important successive regulatory frameworks to be put into practice in Turkey. Ozkan et al. (2014, 196) classify these frameworks into three main bodies:

- (1) Restructuring program in Turkish the banking sector in 2002,
- (2) Restriction of the full deposit insurance system in 2004, and
- (3) Setting the corporate governance standards in banking industry via the Banking Law no. 5411, in 2005.

Among these, regulations associated to banking legislation involves the Banking Law No. 5411 in the late 2005 and the notifications and guidelines on the basis of this law. BRSA independently exercises and executes the duties and responsibilities related to the regulation and supervision given to it within the scope of the related law and legislation to take safeguards for legal bureaucracy. The independent body authorized to make sub-regulations related to the Law is the BRSA (Demir and Yalcin, 2017, 1).

2.4.4. Regulations Addressing the Systemic Risks in Turkey's Financial Sector

The characteristics of macro-prudential regulations implemented in Turkey for the past two decades involve broad range of restrictive tools imposed on both financial institutions and borrowers in an emerging economy perspective centred on the capital flows (Kara, 2016, 124).

As Turkey's main regulation bodies have undertaken reforms to strengthen its financial industry upon institutional and legal frameworks, Financial Stability Committee was given the responsibility to elaborate warnings and to identify the signals of systemic risks (BBVA, 2015, 5). The power and responsibility of BRSA, CBRT and SDIF, three main bodies of regulations and supervisions, have been widened to comply with Basel III capital framework including the reforms related with value at risk, liquidity, leverage, and return on asset and loan-deposit ratios of financial institutions (CBRT, 2014).

Among these, regulations addressing liquidity standards in order to supervise leverage ratios in the sector was adopted in the beginning of 2015 following to the reforms targeting adjustments in risk based capital through establishing comprehensive standards for Liquidity Coverage Ratio (LCR) in 2014 (BIS, 2016). On the other hand, reforms that aim to stabilize the deterioration of capital adequacy ratios of Turkish banking system over the past five years focused on improvements in loan-deposit ratios and return on assets of banks. IMF (2017) points out that policies implemented towards decelerating the balance sheet expansion of banks by countercyclical capital buffers and capital conservation against lower margin corporate lending has been falsified by currency fluctuations in recent years.

According to Turhan and Kilinc (2011: 44), CBRT's efforts to discourage excessive leverage and in turn preventing corporate sectors and banks from overabundant debt ratios by increasing its control over interest rates helped shortening the spread between Turkish and US interest rates hence cool off the economy. Additionally, CBRT jointly adopted complementary policies towards more restrictive tools in terms of reserve requirements, liquidity management and funding strategy (Akçelik et al., 2013: 18). Yet, global developments occurred since 2012 has created adverse effects on the volatility of capital flows and the quality of funding (Kara, 2016, 127) which may lead to an increase in the

vulnerability of Turkish banking system against systemic risk (Grant and Wilson, 2012, 124). In association with this, profitability of Turkish banking industry has recently decreased simply owing to regulatory demands macro-prudential policies to keep household debt and growth of credit in check. It was expressed by Bocchi and Cuerto (2016), Turkish banking sector's NIM (Net Interest Margin) was lowered down from 4.5 percent to 3.2 percent in 2008. It was fairly higher than its peers, however. The study by Bocchi and Cuerto foresees the NIM to reduce to 2.8 percent towards 2018, as a result of major transition in the economies.

Despite the measures taken by regulatory authorities, as demonstrated in Figure 2.1, the rate of domestic credit provided by financial sector to GDP increased until 2016, but slightly reduced by 2017 (World Bank, 2018a).



Figure 2. 1: Domestic Credit Provide by Financial Sector (% of GDP) 2000-2017

World Bank. 2018a. Domestic credit to private sector [% of GDP], <https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS> [22.08.2018].

As a consequent and one of the significant aspects of the regulatory framework, the BRSA (2017) administer the procedures for banks to provide sufficient liquidity, to handle their liabilities with advantages. The main administrations discussed in this groundwork is outlined by Taktak et al. (2017) as:

- The total liquidity sufficiency ratio for the maturity's second portion, grounded on the weekly basic estimated average of total liquidity sufficiency ratios for the maturity's first portion, have to be more than 100 percent.
- The second portion of maturity's foreign currency sufficiency, grounded on the weekly basic estimated average of the foreign currency liquidity sufficiency for the maturity's first portion, have to be more than 80 percent.
- The lowest leverage ratio is 3 percent, grounded on calculation of the estimated average of the three-months-length leverage ratio, every one of them beginning from March, June, September and December.
- Capital sufficiency is described as providing sufficient equity capital for losses against risks that might emerge out of arise operations of the bank. The capital adequacy ratio have to be more than 8 percent.

2.5. Methodology

2.5.1. MES

The measures of MES are computed on the basis of the model proposed by Brownlees and Engle (2012). This model is used in order to measure each bank's contribution to overall systemic risk. The model of Brownlees and Engle (2012) applied the bivariate GARCH process to measure demeaned returns as follows:

$r_t = H_t^{1/2} v_t$ where $r'_t = (r_{m,t} \ r_{i,t})$ signifies the returns and vector of market where the random vector $v'_t = (\varepsilon_{m,t} \ \eta_{i,t})$ is i.i.d.³ and has the following first moments: $E(v_t) = 0$ and $E(v_t v'_t) = I_2$, a two-by-two identity matrix. The H_t matrix signifies the covariance matrix and conditional variance:

$$H_t = \begin{pmatrix} \sigma_{m,t}^2 & \sigma_{i,t} \sigma_{m,t} \rho_{i,t} \\ \sigma_{i,t} \sigma_{m,t} \rho_{i,t} & \sigma_{i,t}^2 \end{pmatrix}$$

³ Brownlees and Engle (2012) presumed that $\varepsilon_{m,t}$ and $\eta_{i,t}$ share zero correlation yet they are not dependend. Thus, they do not disallow tail dependence.

Where $\rho_{i,t}$ represents the conditional correlation and $\sigma_{i,t}$ and $\sigma_{m,t}$ the conditional standard deviations. It is simply supposed that the time-varying conditional correlations completely seize the dependency between market and the firm returns. Properly, this postulation infers that the unvarying innovations $\varepsilon_{m,t}$ and $\eta_{i,t}$ are independently distributed at time t .

The MES at date t is identified by Brownlees and Engle (2012) as;

$$MES_{i,t}(C) = E_{t-1}[r_{i,t}|r_{m,t} < C]$$

Where $r_{i,t}$ and $r_{m,t}$ specify an individual bank i 's equity returns at date t and the market index return (e.g., BIST 100 index returns) respectively, C is a threshold value to denote the systemic event and, like in Brownlees and Engle (2012), set to -2% .

Let us contemplate the Cholesky decomposition of the variance-covariance matrix H_t :

$$H_t^{1/2} = \begin{pmatrix} \sigma_{m,t} & 0 \\ \sigma_{i,t}\rho_{i,t} & \sigma_{i,t}\sqrt{1 - \rho_{i,t}^2} \end{pmatrix}$$

In order to measure the MES, the Dynamic Conditional Correlation (DCC) model proposed by Engle (2002) will be employed. The conditional refers to both an individual bank's and the market's equity returns which are examined in AR (1) processes represented by $\mu_{m,t}$ and $\mu_{i,t}$, respectively. Actually in terms of conditional mean dynamics (e.g., ARMA (p,q) models) more complex models could be adopted however due to the significance of modelling the conditional volatility dynamics in an accurate manner, conditional mean modelling has attached a second-order effect. Moreover, a more refined model may lead to an issue of data snooping bias. With regard to these, the conditional mean specification was planned to estimate via the simple AR(1) model. The AR(1) process is also used by Girardi and Ergun (2013) for modelling conditional mean dynamics. In a more simplified approach, any conditional mean dynamics models are not used by Brownlees and Engle (2012). The residuals filtered by the AR(1) models will be used for estimation of the univariate GARCH models hence the bivariate process of the an individual bank and the market is formulated as follows:

$$r_{m,t} = \sigma_{m,t}\varepsilon_{m,t}$$

$$r_{i,t} = \sigma_{i,t}\varepsilon_{i,t} = \sigma_{i,t}\rho_{i,t}\varepsilon_{m,t} + \sigma_{i,t}\sqrt{1 - \rho_{i,t}^2}\eta_{i,t}$$

A threshold GARCH model by Glosten et al. (1993), will be adopted for the individual GARCH processes, to find out the negative relationship between equity returns and the volatilities. More specifically, the conditional volatility dynamics are indicated by

$$\sigma_{m,t}^2 = \omega_m + \alpha_m r_{m,t-1}^2 + \gamma_m r_{m,t-1}^2 I_{m,t-1} + \beta_m \sigma_{m,t-1}^2$$

$$\sigma_{i,t}^2 = \omega_i + \alpha_i r_{i,t-1}^2 + \gamma_i r_{i,t-1}^2 I_{i,t-1} + \beta_i \sigma_{i,t-1}^2$$

Where $I_{m,t}$ is an indicator function that has a value of 1 if $r_{m,t} < 0$, and $I_{i,t}$ is formulated in the same means. The key focus in this connotation is its ability to seize the so-called leverage effect (γ coefficient) which is the propensity to volatility which increases further by the negative news rather than positive ones. QML is used for estimating this model to ensure providing viable and accurate parameters and to properly achieve the exact conditional variance equation.

Engle (2002)'s DCC approach is employed by modelling the the time-varying conditional correlations:

The Variance covariance matrix Σ is formulated as follows:

$$\Sigma_t = D_{i,t}P_{i,t}D_{i,t} = \begin{bmatrix} \sigma_{i,t} & 0 \\ 0 & \sigma_{m,t} \end{bmatrix} \begin{bmatrix} 1 & \rho_{i,t} \\ \rho_{i,t} & 1 \end{bmatrix} \begin{bmatrix} \sigma_{i,t} & 0 \\ 0 & \sigma_{m,t} \end{bmatrix}$$

There is a so-called pseudo-correlation matrix $Q_{i,t}$ introduced by the standard DCC framework and postulates a positive definite matrix, such as

$$P_{i,t} = \begin{bmatrix} 1 & \rho_{i,t} \\ \rho_{i,t} & 1 \end{bmatrix} = \text{diag}(Q_{i,t})^{-1/2} Q_{i,t} \text{diag}(Q_{i,t})^{-1/2}$$

Here $Q_{i,t}$ follows a process of

$$Q_{i,t} = (1 - a - b)S_i + a\varepsilon_{i,t-1}^* \varepsilon_{t-1}^{*'} + bQ_{i,t-1}$$

with S_i being an intercept matrix (unconditional covariance of standardised disturbances), a and b are scalars, $\varepsilon_{i,t-1}^*$ is a standardized residual with unit variance as follows:

$$\varepsilon_{i,t-1}^* = r_{i,t-1} / \sigma_{i,t-1}$$

$\varepsilon_{i,t}^* = \varepsilon_{i,t} Q_{i,t-1}^*$ with $Q_{i,t}^* = \text{diag}(Q_{i,t})^{1/2}$ where $\text{diag}(Q_{i,t})$ is the (2x2) matrix with the diagonal of $Q_{i,t}$ on the diagonal and zeros off-diagonal. $Q_{i,t}$ is an exponentially weighted moving average of past outer products of the standardised returns and is a positive definite matrix under certain conditions which are $a > 0$, $b > 0$, $a+b < 1$ and the positive definitiveness of S_i (unconditional correlation) (Engle and Mezrich, 1996). The conditional correlations are time-varying and follow a structure similar to a GARCH (1, 1) model. The matrix S_i is estimated by

$$\widehat{S}_i = \frac{1}{T} \sum_{t=1}^T \varepsilon_{i,t}^* \varepsilon_{i,t}^{*'}$$

Given the conditional volatilities and correlations, with the threshold value C , the MES is represented at date t as;

$$\begin{aligned} MES_{i,t}(C) &= E_{t-1}[r_{i,t} | r_{m,t} < C] \\ &= \sigma_{i,t} E_{t-1} \left[\rho_{i,t} \varepsilon_{m,t} + \sqrt{1 - \rho_{i,t}^2} \eta_{i,t} \middle| \varepsilon_{m,t} < \frac{C}{\sigma_{m,t}} \right] \\ &= \sigma_{i,t} \rho_{i,t} E_{t-1} \left[\varepsilon_{m,t} \middle| \varepsilon_{m,t} < \frac{C}{\sigma_{m,t}} \right] + \sigma_{i,t} \sqrt{1 - \rho_{i,t}^2} E_{t-1} \left[\eta_{i,t} \middle| \varepsilon_{m,t} < \frac{C}{\sigma_{m,t}} \right] \\ &= \sigma_{i,t} \rho_{i,t} E_{t-1} \left[\varepsilon_{m,t} \middle| \varepsilon_{m,t} < \frac{C}{\sigma_{m,t}} \right] \end{aligned}$$

That is why $\varepsilon_{m,t}$ and $\eta_{i,t}$ are supposed to be independent the fourth equality is employed. In this case, in order to calculate MES the distribution of $\varepsilon_{m,t}$ requires to be specified. The model used in this paper takes into account the fat tails observed in equity returns⁴ in order to improve the empirical distribution. That is, $\{\widehat{\varepsilon}_{m,t}\}$ from the consequence of the DCC estimate, and conduct the following Monte Carlo integration to compute the conditional expectation in the last line of the equation above:

$$E_{t-1} \left[\varepsilon_{m,t} \middle| \varepsilon_{m,t} < \frac{C - \mu_{m,t}}{\sigma_{m,t}} \right] \approx \frac{1}{T} \sum_{t=1}^T \widehat{\varepsilon}_{m,t} I \left[\widehat{\varepsilon}_{m,t} < \frac{C - \mu_{m,t}}{\sigma_{m,t}} \right]$$

⁴ Differently from this paper, Brownlees and Engle (2012) use a nonparametric kernel estimation approach.

Where $I[.]$ is an indicator function that takes 1 if the argument is true and otherwise it postulates zero.

2.5.2. CoVaR

This paper adopts the CoVaR measure based on the proposition by Girardi and Ergun (2013). Firstly, the value-at-risk of a bank is outlined by Girardi and Ergun (2013) as $i(VaR_{q,t}^i)$ as the q -th quantile of the return distribution, given the returns $r_{i,t}$ of an institution i and the confidence level q ;

$$\Pr(r_{i,t} \leq VaR_{q,t}^i) = q$$

For instance, if $q=0.01$, $VaR_{0.01,t}^i$ is the 1st quartile of the return distribution. Adrian and Brunnermeier's (2011) define $CoVaR_{q,t}^{m|i}$ as the VaR of an institution i conditional on market being in financial distress, i.e., its return being at its VaR. The $CoVaR_{q,t}^{m|i}$ is implicitly defined by the q -quantile of the conditional distribution;

$$\Pr(r_{m,t} \leq CoVaR_{q,t}^{m|i} | r_{i,t} \leq VaR_{q,t}^i) = q$$

The conditioning situation is that the bank i 's return is either lower than or equal to its VaR. The CoVaR is the market return conditional's the q -th quantile on this conditioning situation. Pay attention that the CoVaR's description is not same as that of Adrian and Brunnermeier (2011), according to whom the conditioning situation is that a bank i is totally at its VaR. Girardi and Ergun (2013) suggest that current description of the CoVaR by them aid back testing, and moreover that the new CoVaR becomes an ongoing and expanding act of the market and bank i ' interdependence, which is different from the original CoVaR measure.

An individual bank i systemic risk contribution could be estimated by the $\Delta CoVaR$ calculation below:

$$\Delta CoVaR_{q,t}^{m|i} = 100 \times (CoVaR_{q,t}^{m|i} - CoVaR_{q,t}^{m|b^i}) / CoVaR_{q,t}^{m|b^i}$$

The $\Delta CoVaR$ stands for the market conditional's portion change of the VaR on the distressed state of bank i from the market conditional' VaR on the benchmark state of bank i , described as $b^i \sim (\mu - \sigma \leq r \leq \mu + \sigma)$. The benchmark state b^i suggests the situation

in which the bank i 's return lies between $\mu - \sigma$ and $\mu + \sigma$, i.e., $\mu - \sigma \leq r \leq \mu + \sigma$. The benchmark state here is adoption of the one by Girardi and Ergun (2013), which is not identical to that of Adrian and Brunnermeier's (2011). The median event of the bank i is thought to be the benchmark state by them.

As in the calculation of the MES measure, the DCC model will be used as well. Contrary to the MES, the direction between an individual bank to the market is considered by the CoVaR, which allows that the upcoming specification will be dealt:

$$r_{i,t} = \sigma_{i,t} \varepsilon_{i,t}$$

$$r_{m,t} = \sigma_{m,t} \rho_{i,t} \varepsilon_{i,t} + \sigma_{m,t} \sqrt{1 - \rho_{i,t}^2} \eta_{m,t}$$

As observed, as in the MES, $\varepsilon_{i,t}$ and $\eta_{m,t}$ are presumed to be error terms independent from one another. For model distributions of $\varepsilon_{i,t}$ and $\eta_{m,t}$, Girardi and Ergun (2013) hire a specific parametric asymmetric distribution – i.e., Hansen's (1994) altered t-distribution. They then take on analytical approach to solve for the CoVaR and Δ CoVaR. Unlike Girardi and Ergun (2013), and as in the case with the MES as well, the empirical distribution of $\varepsilon_{i,t}$ and $\eta_{m,t}$ is used.

2.6. Empirical Results

2.6.1. Data

After the global financial crisis in 2008, various systemic risk measures have been developed. These measurements are based on market data, which are considered to effectively reflect the information of publicly traded companies. According to Bisias et al. (2012), since the financial system of banks is complex, it is thought that a single measurement system cannot reveal all aspects of systemic risk. Therefore, in this study, the conditional value at risk (CoVaR) measure and the marginal expected shortfall (MES) is applied to the Turkish banking system. MES is a measure of the damage of an organization in the loss distribution of the system. CoVaR is based on the concept of Value-at-Risk, denoted VaR, which is the maximum dollar loss within the %-confidence interval (Jorion, 2007).

Among Turkish banks, the six banks whose stocks are listed on the Borsa Istanbul with resulting Akbank, Finansbank, Garanti Bank, Is Bank, Commercial Bank of China Limited and YapıKredi Bank. Since the data are simultaneously available during the period of 2000 through 2016 for only these six banks, the measuring systemic risks during this sample period for these banks is studied. The stock prices of these banks are collected from Borsa Istanbul, the data is publicly available.

2.6.2. Estimation Results of DCC Models

Multivariate GARCH models are hired, so that both the MES and the CoVaR measures could be computed. Previously expressed, the Engle DCC model (2002) is used. It worth to note that the leverage coefficients of their equity return (γ) are measured to be important for six banks. With this respect, the leverage impact is therefore needed to model equity returns.

Figure 2 displays the main result emerging out of the DCC estimations. To illustrate clearly, the conditional correlations' medians and conditional volatilities (standard deviations) are reported during the course of time. Amidst them, the top panel Figure 2.2 demonstrates the time-changing conditional correlation. As observed, there is noticeable change over time — varying between 0.4 and 0.8. Conditional correlations are prone to increase in financial instability times, and this study also demonstrates the conditional correlation to have expanded in systemic crisis times such as the Turkish domestic (2001), global financial (2008) and euro area fiscal (2011) crises. Meanwhile, there are two sharp jumps in the conditional correlations. One belongs to 2001 crisis and the other one belongs to the first quarter of 2009. Turkey has negative growth rates in the last quarter of 2008 (-6.2%) and the first quarter of 2009 (-13.2%) that has the significant impact of the correlation.

The bottom panel of Figure 2.2 plots the time series of the median of the conditional standard deviations of the banks' equity returns. The VaR of a bank is defined in methodology section as the q -th quantile of the return distribution, given the returns $r_{i,t}$ of an institution i and the confidence level q ;

$$\Pr(r_{i,t} \leq VaR_{q,t}^i) = q$$

By this definition of the value-at-risk of a bank by Girardi and Ergun (2013), the conditional standard deviations are going to be quite identical to the VaR measure. Henceforth, a bank's conditional standard deviation is going to be the most significant sign in the situation where banking prudential regulations are laid on the individual banks without considering the whole financial system. This figure also shows the parallelism with the conditional correlation, namely, the Turkish financial history.

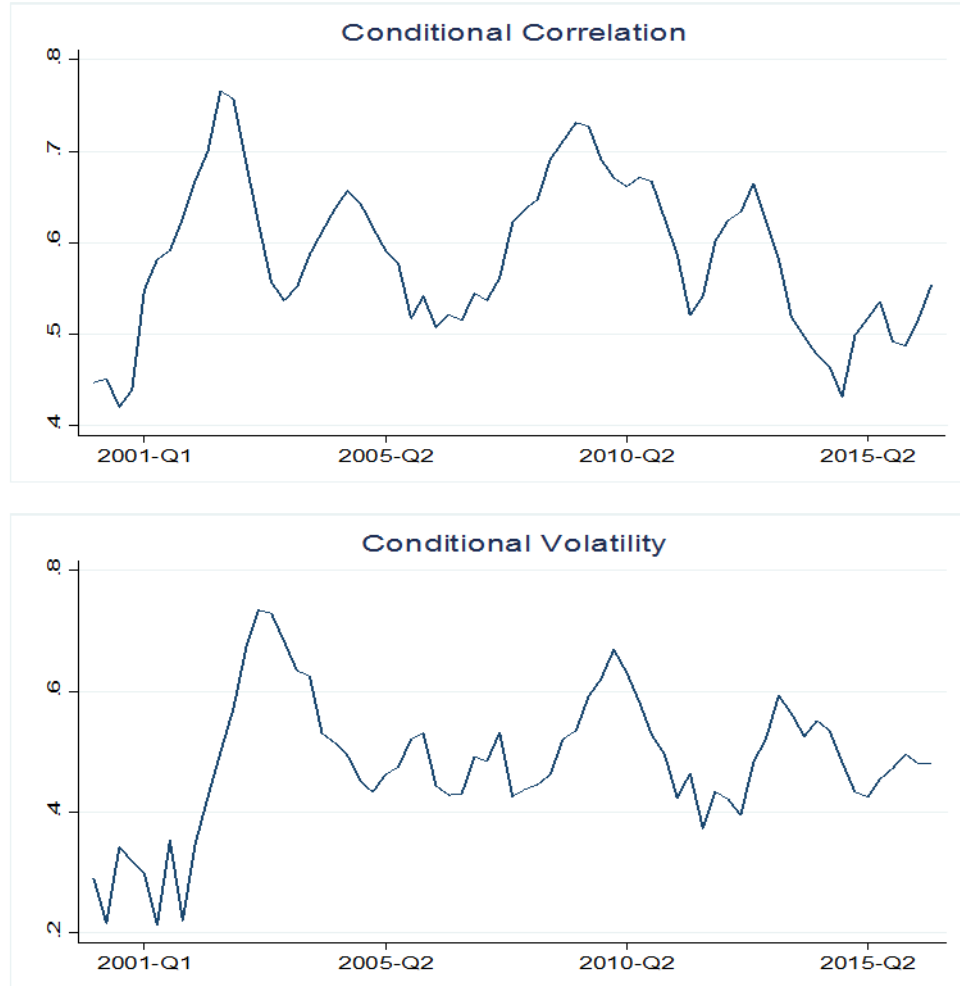


Figure 2. 2: Conditional Correlation and Volatility

2.6.3. Systemic Risk Contributions of Individual Banks

By making use of the DCC model, the periodically MES and ΔCoVaR measures are calculated for Turkey's six banks from 2000 to 2016. This part analyses the calculation

conclusions, evaluates the the individual banks' systemic risk contributions in both the cross-sectional dimensions and the time series, and makes a comparison between the two systemic risk measures.

Table 2.4 shows the averages of the MES and ΔCoVaR measures for the individual banks, and their parallel rankings, for periods defined before. As demonstrated, the rankings in terms of individual banks' systemic risk contributions are fairly different as observed in the two systemic risk measures. Yet, it is apparent that measures of the MES and ΔCoVaR are extremely dependent on one another.

Table 2. 4: Systemic Risk Contributions of Individual Banks

	MES	Rank	ΔCoVaR	Rank
AKBNK	0.0805	(3)	0.8201	(4)
FINBN	0.1177	(1)	0.9479	(1)
GARAN	0.0333	(5)	0.6332	(5)
ICBCT	0.0863	(2)	0.8584	(2)
ISCTR	0.0150	(6)	0.4954	(6)
YKBNK	0.0606	(4)	0.7426	(3)

Figure 2.3 shows scatter diagrams in the MES and ΔCoVaR in the time period. Each measure estimates each systemic risk contribution of every bank in identical ways. Henceforth, to explain systemic risk contribution' cross-sectional differences across banks, it is clear that the MES and the ΔCoVaR are qualitatively quite identical.

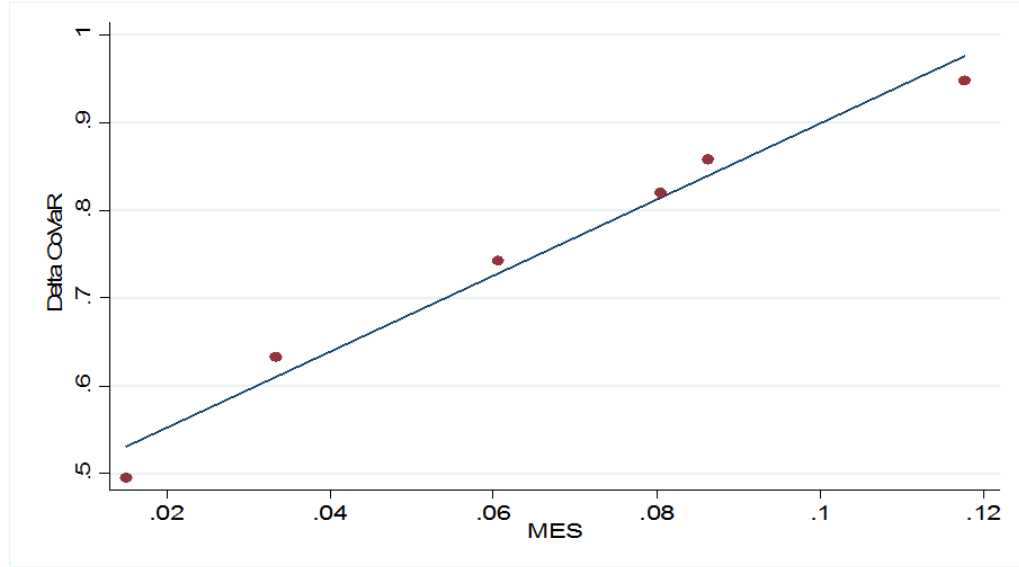


Figure 2. 3: Comparison Between MES and Δ CoVaR

For finding the major factors contributing to systemic risk of individual banks in the time series and the cross-sectional dimension, a panel data regression analysis is conducted along with quarterly data. For each bank's explanatory characteristic variables, financial market variables are included as well macro variables. Not to cause the probable endogeneity problem, explanatory variables decreased by one part are included. As control variables, moreover, some financial statement variables of each bank are included.

When that data consists of a panel made of a small cross section and long-time series, a time dummy within explanatory variables is excluded. Instead, a few macro variables as well as variables of financial market are included, so that the potential time influences could be considered. To acknowledge the results' robustness, many data estimation methods for panel like pooled OLS (POLS), a random effect (RE), a fixed effect (FE) model and a dynamic panel model are considered⁵ (Arellano and Bond, 1991).

Table 2.5 shows calculation results of the panel regression for the MES, which demonstrates that, excluding the dynamic panel model, a decreased VaR comes to possess an important positive impact on the MES. It is noteworthy that an important coefficient for

⁵ Among the pooled OLS, fixed effect and random effect models, the results of the F test, the Breusch and Pagan test (1980), the Hausman (1978) test and the Sargan (1985) are found and the fixed effect model is the most appropriate one.

the decreased VaR even in the certain effect model has the explanatory variables' time series impact. Therefore, the VaR affects positively an individual bank's systemic risk contribution in the dimension of the time series and the cross-sectional dimension. Previously mentioned above, it is not same as the findings by Adrian and Brunnermeier in their past studies (2011) and by Girardi and Ergun (2013).

Significantly, it is understood that the leverage ratio across every model should be considered for both positive and important coefficients. Within the context of the time-series, a bank's bigger leverage ratio has the tendency to contribute to systemic risk as time passes increasingly. In the cross-sectional examination conducted above, a bank's size, proxied by its equity's log, does not affect that bank's systemic risk contribution to a great degree. Yet, estimation's results, which used the certain influence and dynamic panel models, which naturally eliminate the time-invariant latent variable's impacts, shows that a bank's size does not hold a great explanatory power over its systemic risk contribution. There exists an important positive coefficient for the log equity within only the pooled OLS and arbitrary effect models, and henceforth it appears that a bank's size is related to the way it contributes to systemic risk so long as within the limits of cross-sectional dimension. Table 5 demonstrates in addition that there are a lot of macro variables and financial market variables, influencing the MES to important degrees. Therefore, systemic risk contributions of banks are proved to be highly related to the cycle of business.

Table 2. 5: Determinants of MES

	POLS	FE	RE	AB
VaR (-1)	0.163*** (0.0273)	0.196*** (0.0200)	0.163*** (0.0271)	1.244 (1.689)
Log equity (-1)	0.0102* (0.00423)	0.00298 (0.00793)	0.0102* (0.00426)	0.00145 (0.0096)
Leverage (-1)	0.0183*** (0.0017)	0.00228* (0.00124)	0.0183*** (0.0016)	0.00855* (0.00511)
Loan-deposit ratio (-1)	-0.0626** (0.0227)	-0.0171 (0.0241)	-0.0626** (0.0223)	-0.000673 (0.00115)
ROA (-1)	0.0122*** (0.0024)	0.00531** (0.0019)	0.0122*** (0.0025)	0.00628* (0.00315)
GDP growth rate (-1)	0.00866** (0.0033)	0.00693* (0.00296)	0.00866** (0.0037)	0.00530 (0.00924)
Housing index (-1)	-0.00123 (0.0041)	-0.0129* (0.0076)	-0.00123 (0.0041)	-0.0022 (0.0021)
BIST index return (-1)	-0.0678* (0.0321)	-0.0505* (0.0230)	-0.0678* (0.0328)	- 0.00995** (0.00283)
BIST index volatility (-1)	-1.304** (0.689)	-1.099*** (0.268)	-1.304** (0.3691)	-0.869** (0.325)
TL/Dollar FX return (-1)	0.153* (0.073)	0.149* (0.068)	0.153* (0.074)	0.136* (0.069)
TL/Dollar FX volatility (-1)	-1.532* (0.739)	-1.401** (0.533)	-1.532* (0.735)	-0.983* (0.439)
MES (-1)	-	-	-	0.4894*** (0.056)
Constant	-0.175** (0.0612)	-0.143* (0.0677)	-0.175** (0.0612)	-
Observations	396	396	396	396
R ²	0.577	0.422		

POLS, FE, RE and AB stand for pooled OLS, a fixed effect model, a random effect model and a dynamic panel model (Arellano and Bond, 1991), respectively. Standard errors are in parentheses. Explanatory variables listed in the table are lagged by one quarter. The explanatory variables are VaR, log of equity, leverage ratio, loan-deposit ratio, return on assets, GDP, BIST, foreign exchange rate, volatility of foreign exchange rate, volatility of BIS and housing index. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.6 reports the determinants of the ΔCoVaR measure. The estimation results are like those for the MES but should note that the relations are weaker. It should be importantly underlined that while Adrian and Brunnermeier (2011) discovered that VaR and their ΔCoVaR do share just a weak affiliation yet they have a very important affiliation when it comes to the time series. The findings of this paper indicate that the affiliation of VaR and ΔCoVaR measures is not powerful either in the time-series or in the cross-section. Furthermore, there are no significant macroeconomic variables in the analysis of ΔCoVaR compares to MES. It should be taken into account that in the examination of table 5 and 6, the lagged GDP growth rate's positive and significant coefficients are gathered. The previous result might suggest that economic booms could lead systemic risks to accumulate. It is probable that the latter result is owing to the leverage effect, by which an expanding in the stock prices is prone to accompany a decay in the stock price volatility.

Table 2. 6: Determinants of ΔCoVaR

	POLS	FE	RE	AB
VaR (-1)	0.458* (0.226)	0.564** (0.217)	0.458* (0.226)	0.789 (0.578)
Log equity (-1)	-0.149 (0.191)	-1.097 (0.779)	-0.149 (0.188)	-0.662 (0.489)
Leverage (-1)	0.209** (0.0752)	0.135 (0.0748)	0.209** (0.0746)	2.433 (2.855)
Loan-deposit ratio (-1)	-0.00987 (0.0104)	-0.0199 (0.0146)	-0.00987 (0.0101)	-0.314 (0.349)
ROA (-1)	0.329** (0.111)	0.226 (0.115)	0.329** (0.117)	2.96 (3.35)
GDP growth rate (-1)	0.524** (0.189)	0.395* (0.189)	0.524** (0.186)	1.918** (0.798)
Housing index (-1)	-0.163 (0.182)	-0.308 (0.183)	-0.163 (0.188)	-0.844 (1.241)
BIST index return (-1)	-1.120 (1.667)	-0.486 (1.642)	-1.120 (1.676)	-0.723 (1.056)
BIST index volatility (-1)	-14.22 (16.85)	-14.54 (16.29)	-14.22 (16.76)	-9.874 (12.764)
TL/Dollar FX return (-1)	-1.235 (4.263)	0.509 (4.166)	-1.235 (4.268)	0.956 (2.568)
TL/Dollar FX volatility (-1)	4.966 (33.24)	4.695 (32.38)	4.966 (33.24)	2.846 (24.85)
ΔCoVaR (-1)	-	-	-	0.363*** (0.072)
Constant	-3.352* (1.361)	12.50** (4.067)	-3.352* (1.361)	-
Observations	396	396	396	396
R^2	0.278	0.183		

POLS, FE, RE and AB stand for pooled OLS, a fixed effect model, a random effect model and a dynamic panel model (Arellano and Bond, 1991), respectively. Standard errors are in parentheses. Explanatory variables listed in the table are lagged by one quarter. The explanatory variables are VaR, log of equity, leverage ratio, loan-deposit ratio, return on assets, GDP, BIST, foreign exchange rate, volatility of foreign exchange rate, volatility of BIS and housing index. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

One of the advantages of the MES seems that it could be accumulated across banks, and the following accumulation may sustain a considerable economic analysis as verging anticipated shortfall of the return of the portfolio that includes equities of individual banks conditional on the market results that are not above a particular threshold level. The accumulated MES is estimated as the individual banks' MES' weighted median, in which the individual banks' weights are in proportion with the equities.



Figure 2. 4: Aggregate MES

This part analyses if the accumulated MES can take part of the overall systemic risk measure. It could function as an initial warning sign for the whole system of finance, which unfortunately could not be performed by ΔCoVaR as it does not have the required additivity. Therefore, the accumulated ΔCoVaR determine the systemic risks' degree across various crisis chapters. Contrary to the accumulated MES case, according to accumulated ΔCoVaR , the crises are not highly different from one another.

The Figure 2.4 demonstrates the accumulated MES' direction in time. Following expanding with 2001's domestic crisis, systemic risk lowered afterwards but it again increase as a result of worldwide financial crisis and 2011 saw the identical event for euro area fiscal crisis. From that event onwards, it has been decreasing gradually to the current

time. As mentioned above, the accumulated MES shows various heights of peaks for various crisis chapters.

2.7. Conclusion

This study analysed the impacts of regulations on systemic risks in Turkish banking sector by measuring the quarterly MES and ΔCoVaR values of six banks in Turkish banking sector. Literature in this field suggests that the major focus of the regulative actions have been to safeguard against the distress of SIFIs or to mitigate the systemic impact of their failure. In order to maintain this issue, this paper first evaluated the role of SIFIs in emerging systemic risks and addressed how macro-prudential and micro-prudential regulations are measured to mitigate these risks.

Systemic risk is closely associated with a stable financial system and would be outlined as disruption of risk away from financial institutions that is initiated by a deficiency of any part of financial system and has the propensity to bear serious negative effect the whole economic activities. Turkey's banking system demonstrates compliance with the banking systems in developing countries to with at lower concentration level and exhibits a distant structure compared to the banking systems of developed economies in which SIFIs take part a considerably large proportion. In line with this, in recent years, Turkey has been quite successful on implementing many the macro-prudential reforms using a broad range of policies on both individual financial institutions and borrowers. Besides, the implementation and design of these macro-prudential reforms have demonstrated their effects over the most vulnerable issues associated with systemic risks in Turkish banking system such as value at risk, liquidity, leverage, loan-deposit ratio and return on asset. Therefore, this study focused on the availability of the banks' data during the period of 2000 through 2016 to measure the impact of banks on systemic risks in Turkish banking sector. To measure the systemic risk, two methods the MES (Acharya et al., 2010; Brownlees and Engle, 2012) and the CoVaR (Adrian and Brunnermeier, 2011; Girardi and Ergun, 2013) have been employed by using Engle's (2002) DCC model.

The findings of the analysis carried out in this study can be summed up under three main inferences. First of all, as the two systemic risk measures (eg. CoVaR vs. MES) are

critically compared by concentrating on how inversely they appraise an individual bank's contribution to systemic risk. We found that though these measures deliver dissimilar rankings on the systemic risk contributions, qualitatively they appear to be very alike in explanation of the cross-sectional alterations in terms of systemic risk contributions. However, this study assumes that the aggregate MES can be used as an inclusive systemic risk indicator for the banking system as a whole due to its compatibility with the historical changes in real economy.

Secondly, using simple panel data regression methods for both models, the association between the systemic risk contributions and individual bank specific variables is studied. The results showed that an individual bank's VaR influences that bank's systemic risk contribution both in terms of the time series and the cross-sectional dimensions. This is contrary to the results of Girardi and Ergun (2013) and Adrian and Brunnermeier (2011) where noteworthy links between the systemic risk contribution measures and VaR for US banks could not be found. The estimation results of MES and ΔCoVaR measures are like but the relations in ΔCoVaR are weaker. It is on the same path with Adrian and Brunnermeier (2011). The main different is that while VaR and their ΔCoVaR measures a weak relation only in the cross-section, this study find it in both the time-series and the cross-section.

Thirdly, the results of this study could not find a close relationship between systemic risk contributions and leverage ratios in the cross-sectional dimension, however rising leverage ratios lead to an increasing systemic risk contribution in the long term. Additionally, the results of showed that there is a weak relationship between the size of a bank and its contribution to systemic risk.

Last, the additivity property of the MES relative ΔCoVaR is used in this study in order to make such economic interpretation by calculating the accumulated MES as individual banks' MES' weighted median, in which the individual banks' weights are in proportion with the equities. By the help of this calculation, the accumulated MES shows various heights of peaks in the various crisis chapters which fit the Turkish financial history.

Data utilised in this study is limited to the stock market information in order to assess the systemic risk measures. Yet there may be many valuable data sources such as option

prices, CDS premium or other financial and macro variables. Integration of such macro or market data into evaluation of systemic risk measures will be a significant future research topic. Furthermore, most of the policy decisions, including the policy rate determinations of central banks are temporarily carried out on a monthly basis. Similarly, most of the macroeconomic data are released on a weekly or monthly basis. Hence, in terms of data convenience the complete systemic risk measures can be administered by monthly indicators.

In conclusion, we believe that VaR and MES systemic risk measures are informative and useful for Turkish financial institutions. For future studies, we encourage a thorough and systematic risk studies in as many countries as possible. The models, which are studied, will also enable us to examine the similarities and differences between different systemic risk measurements. Therefore, further research should be done to find the most appropriate macroeconomic factors that may affect systemic risk assessment in terms of volatility and correlation modelling.

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3. FINANCIALIZATION AND INVESTMENT BEHAVIOR OF MANUFACTURING FIRMS IN TURKEY

3.1. Introduction

Financialization, defined briefly as the growing role of financial markets, institutions, instigators and actors, present new challenges in terms of manufacturing, as capital is withdrawn from basic manufacturing functions and used only for make money by using increasingly diversified financial methods. (Weller, O'Neill, 2014, 512).

Using the widely accepted definition of financialization, which stands for the growing significance of financial investments as a revenue resource for non-financial firms, the work of Akkemik and Özen (2014, 73) showed that macroeconomic uncertainty during the 1990s, has mainly led Turkey's non-financial firms to be financialised. Turkish non-financial firms have been encouraged to develop some institutionalized firm behaviour during the financial liberalisation process in Turkey. For example, in order to gain tax rebates from exporting, large firms continued their rent-seeking behaviour during the 1980s (Akkemik, Özen, 2014, 78).

According to Boratav et al. (2000), private firms have been financed by the Turkish government in order to enable them finance public disbursements during the 1990s. Boratav et al. claim that such s a populist macroeconomic policy fulfilled the interests of large conglomerates against the interests of workforce in an unsteady macroeconomic environment. Consequently, they emphasize that such policy served "speculative rentier type of capital accumulation" by businesses that performed somewhat as rentiers and partially as "borrower-industrialists".

A theoretically conflicting association between financial and real investment that defined by Tobin (1965) before the financialization literature, and even before financialization

itself took place in the early 1980s. According to Tobin, real investment and financial investment could perform as substitutes, due to available funds can be invested in real assets or financial assets. That is, real investment will be crowded out by financial investment. Nevertheless, these assertions were not elaborated further by Tobin.

Today, there is a growing body of empirical research aimed to find out the grounds and impacts of the growing substitutability of financial and fixed investments by firms in the manufacturing sector. Particularly the following long-term and short-term implications of “financialization” are examined in the literature as identified by Demir (2009, 593):

- (a) Diminishing fixed investment rates that postulates an increasing share of firms investing in short-term financial assets compared to firms investing in long-term fixed assets.
- (b) Increasing amount of short-term financial assets acquired by manufacturing firms, and
- (c) Accumulative returns on financial capital above and over those on fixed assets.

Starting from 1970, the changes occurred in financial investment and portfolio behaviours of non-financial corporations all around the world, raises the question whether this phenomenon show compliance with the investment behaviours of non-financial corporations in Turkey. This study examines the relationship between financialization and investment decisions of non-financial corporations and the implications of these changes in their investment behaviour by using firm-level econometric data for Turkish manufacturing firms.

Although there have been many analyses about the relationship between the financialization and the investment behaviour, there are two main contributions of this study. Firstly, it is the first study which analyse the effect and extent of financialization with the firm-level data for Turkey and Turkish manufacturing firms of different sizes. Secondly, the data set which is created by the author, includes all publicly traded manufacturing firms and it is unique for this study.

The remainder of the study is organized as follows. In the next section, the theoretical literature about financialization in manufacturing industries and indicators about financialization in Turkey are reviewed. Then, in the third section, the data and stylized

facts which are derived from the data set are introduced. In the fourth section, the statistical specification and the estimation strategy are presented. In the fifth and the sixth sections, the empirical results are summarized just before the concluding remarks.

3.2. Stylized Facts About Turkey's Manufacturing Industry

As argued by Smith (2012: 20) financialisation showed its impacts mostly in labour intensive industries in the context of global labour arbitrage through outsourcing and export-oriented industrialisation that globally shifted production processes to low-wage countries in turn led to increasingly transnational capital-labour relations.

Harvey (2005, 64-65) suggests that the impacts of financialization on the economies of developed countries show a dual characteristic. As also indicated by Smith (2012), Harvey points out the great benefits caused by the shift towards financial resources such as cheaper imported products have led to traumatic impacts upon the manufacturing investments and contributed to deindustrialisation and offshore production. Although both Smith (2012) and Harvey (2005) draw attention to the negative effects of financialization on capital accumulation on developed economies through deindustrialization, they do not explain what mechanisms involve these occurrences. However, their work clarify that capital accumulation and funds directed from developed economies to less developed economies are associated with seeking cheaper labour at a significant degree. This situation also significantly transforms the structure of the manufacturing industry, sectoral diversification and the labour demand in the respective countries (Harvey, 2005, 66)

A recent research addressing the reasons for declining employment in manufacturing industries in the U.S. as well as the most of developed countries suggests that the domestic industries competing directly with Chinese imports encountered large job losses due to tariffs, exchange rates and other trade issues have resulted a less competitive domestic manufacturing in these countries (Houseman, 2018, 5).

Dey et al. (2012) stated that since the beginning of the 1980s, developed countries have focused on the sectors that require automation and high technology instead by reducing the labour intensity in textile and apparels, iron, steel and similar labour-intensive manufacturing sectors. As a result of this situation, the mentioned sectors have led to the

formation of new manufacturing industries for developing countries and in some sense have been outsourced to developing countries.

On the other hand, the problems related with the aging population faced by developed countries, especially Japan, Germany, the US and the UK since the early 1990s, has also shown its effects on labour supply processes. This situation had negative effects on the employment in the automation-intensive manufacturing sectors such as automotive and semiconductors industry and led to the shift of these industries in countries with younger population such as China, India and Indonesia and countries aim to shift their developmental model such as Korea, Brazil and Malaysia (Benedetto 2018).

Turkey's growing manufacturing sector is diversified across number of dominant industries such as construction materials, textiles, automotive, paper, mining (copper, chromate, coal, boron), food processing, petroleum, steel, lumber, and led by private-sector conglomerates (Topcu and Çoban, 2017, 1759).

As indicated by Turanlı (2012: 27), Turkey's economy before 1980s is predominantly characterised by planned development programs, government intervention and import substitution-oriented policies. However, starting from the recessionary signs in 1977, Turkish economy went into a significant balance of payments crisis in 1979 that was also influenced by the worldwide damages of OPEC crises (Turanlı, 2012, 27).

In 1980, several fundamental reforms introduced following the harsh crisis, as the major emphasis of the reform package involved policy changes to provide greater trade openness. In the beginning of the program, the focus was on stimulating exports through different indirect and direct measures such as the duty-free access to imports, foreign exchange allocations, preferential export credits and export tax rebates. The sum of the subsidy rates received by manufacturers of exported products reached 20-23 percent during this period (Taymaz and Yılmaz, 2007, 129). The main reason of such a high rate of subsidy was related with the low proportion of industrial products in Turkey's exports before 1980 that has been seen as the underlying reason of the balance of payments crisis. Therefore, the government has exchanged the import substitution strategy with the export substitution as the primary industrial strategy in order to open up the economy. As a result

of this policy, the share of industry exports has progressively increased from 37 percent to 94 percent in the next 20 years of Turkish economy (Dogruel, Dogruel, 2012, 341).

On the other hand, Turkey's manufacturing industry has faced with a sluggish productivity growth, lost competitiveness and performed less well in the global markets. Although its share in exports increasing, the share of manufacturing in national output accounts smaller than in many other developing market OECD (2016) countries.

A recent OECD (2016, 37) report suggests that still-low backward participation of Turkey is identified by the composition of industry, as its overall exports are more focused in low-to medium technology industries which typically depend less on foreign intermediary inputs in comparison to emerging OECD economies.

An increasing proportion of workforce is employed in the manufacturing sector in Turkey and it reached 27.5 percent in 2017. When it is compared with low income, middle income, upper middle income and high-income countries, Turkey has the highest rate of employment in manufacturing industry. This is somewhat related with the previously suggested issues in productivity in manufacturing and the lower degrees of mechanisation compared to high income countries identified in Figure 3.1. In addition to the conventional reasons such as the increase in the young population, the increased level of higher education and the increase in female labour force participation (OECD, 2017), the increased employment in Turkey's manufacturing sector can be associated with the employment growth in labour intensive industries such as textile and apparels, petrochemicals, automotive and metal since early 1990s (Koru and Dincer, 2018, 8).

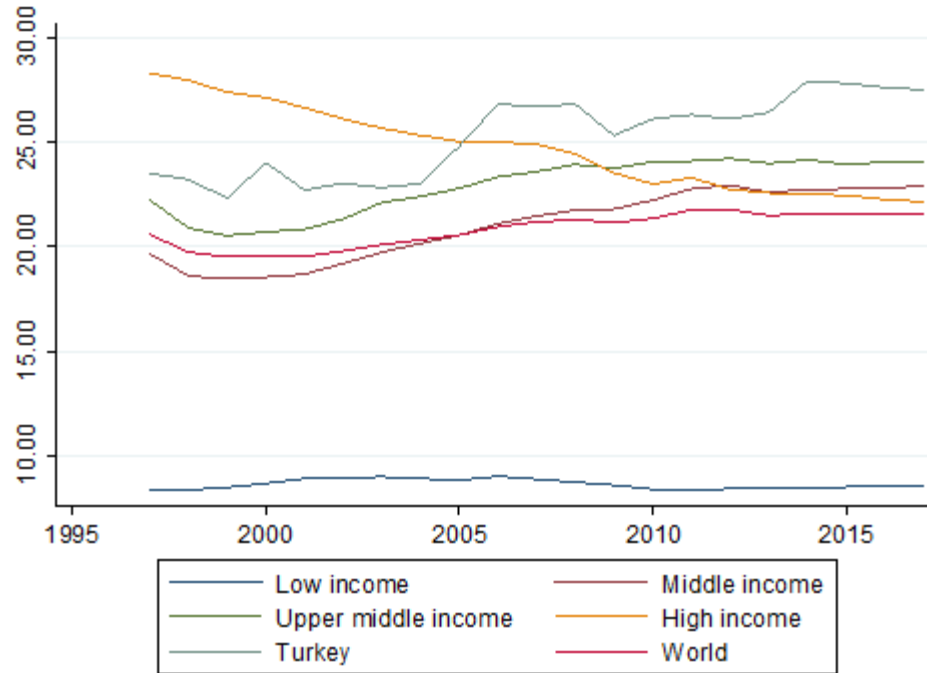


Figure 3. 1: Industrial Employment as Percentage of Total Employment

The World Bank, 2018, World Bank National Accounts Data
<https://data.worldbank.org/indicator/nv.ind.totl.zs>. [29.12.2018].

The risk is not necessarily reduced, and the capital is not always allocated into the most productively in deregulated capital markets as occurred in 2000s (Svilokos and Burin, 2017, 588). Therefore, a review of the change in labour concentration in these industries can provide important data to examine the impact of financialisation on manufacturing industries. To illustrate this case in the textile sector, while 97 percent of the products sold were produced in the US in 1960s, today it accounts only 3 percent (Sidahmet, 2016). The share of the textile employment in the US manufacturing sector decreased from 5 percent in the 1980s to 1.5 percent today while it increased from 5 percent to 15 percent in Turkey during the same period (Koru, Dincer, 2018, 8).

.As argued by Freeman (2010) the risks in markets increased by financial sector through rent-seeking, speculation and leveraging due to regulative failures of financial experts, international agencies and governments to control it. According to Freeman, the costs of these failures mostly appeared on real sectors in terms of economic growth, reductions in public goods and employment. This process is identified by Rowthorn and Ramaswamy

(1998) in terms of deindustrialisation that characterises by faster growth of productivity in services industry compared to manufacturing.

In order to examine this phenomenon more specifically, Table 3.1 compares Turkey's employment in industry as percentage share in total employment with the EU, OECD countries and the world averages between 1997 and 2017. This table figures out that Turkey's industrial employment has gradually reduced by almost 15 percent while the EU's decreased by 22 percent, OECD countries by 13 percent and the world averages by 11 percent during this period. This situation presents the difference in the decline of manufacturing sector employment in the EU region where the impacts of financialisation are more common compared to other classifications included in the Table 3.1.

Table 3. 1: Industrial Employment (% of Total Employment)

	1997	2001	2005	2010	2011	2012	2013	2014	2015	2016	2017
European Union	30.38	29.17	27.58	25.27	25.08	24.76	24.33	24.23	24.15	23.95	23.76
OECD members	18.85	17.27	16.33	15.12	15.12	15.03	14.92	15.11	15.38	15.25	16.15
Turkey	22.32	19.91	19.36	17.18	18.73	17.99	18.54	18.99	18.96	18.83	18.98
World	19.90	18.53	17.99	16.75	16.65	16.49	16.28	16.45	16.58	16.33	17.71

World Bank. 2018. World Bank National Accounts Data
<https://data.worldbank.org/indicator/SL.IND.EMPL.ZS> [12.01.2018].

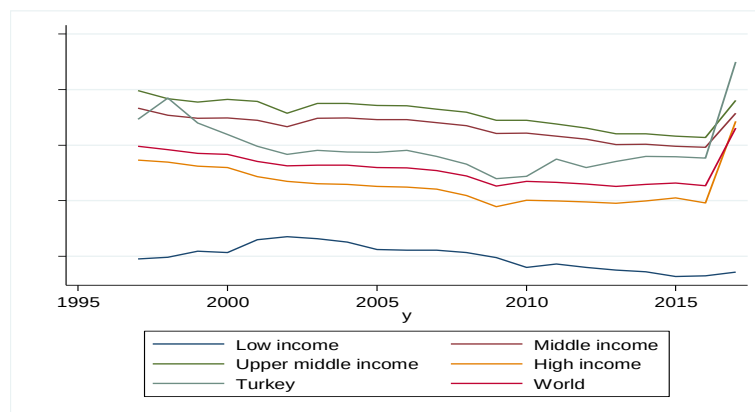
In order to explore the potential causes of such a declining trend, Table 3.2 analyses the value-added share of manufacturing in GDP. The World Bank (2018) defines the value added as the net output of pre-defined manufacturing industries after adding up all outputs and subtracting intermediate inputs. Manufacturing Value Added (MVA) is generally used in order to take into consideration the industrialization levels of the different countries (UNIDO, 2018). The analysis of the value-added share of manufacturing in Turkey's GDP in time sequences demonstrates that this value has dropped from an average of 22 percent at the end of 1990s to approximately 19 percent today. As shown in the graph below, there is a similar downward trend for the EU, OECD countries and the world averages within the given time interval.

Table 3. 2: Manufacturing Value Added % of GDP

	1997	2001	2006	2010	2011	2012	2013	2014	2015	2016
European Union	19.20	18.23	16.81	15.39	15.64	15.43	15.38	15.54	15.96	15.96
OECD members	18.85	17.27	16.33	15.12	15.12	15.03	14.92	15.11	15.38	15.25
Turkey	22.32	19.91	19.52	17.18	18.73	17.99	18.54	18.99	18.96	18.83
World	19.90	18.53	17.95	16.75	16.65	16.49	16.28	16.45	16.58	16.33

World Bank. 2018. Manufacturing, Value Added (% Of GDP), <https://data.worldbank.org/indicator/nv.ind.manf.zs>, [22.11.2018].

Compared to the same data in different countries around the world including different income groups, upper middle-income group of countries where Turkey is classified within it are considered to have the highest percentage in this area. While all these countries in different income groups realise a falling trend in the share of manufacturing value added to GDP in a similar manner, Turkey has become the only economy that shows an increasing trend since 2014. This situation can be explained by two basic phenomena. The first is that the decline in Turkey's real GDP to be higher compared to MVA realized since 2014, and the second is that the improvement of MVA in Turkey's labour-intensive sectors as a result of the intensifying financialization and deindustrialisation in developed economies (Figure 3.2).

**Figure 3. 2: Share of Manufacturing Value Added as Percentage of GDP**

The World Bank. 2018. World Bank National Accounts Data <https://data.worldbank.org/indicator/nv.ind.totl.zs>, [29.12.2018].

To be able to improve this description and address it correctly, the following table exhibits the change in the share of economic sectors in Turkey's GDP between 2006 and 2016 (Table 3.3). In 2016, agriculture contributed 6.93 percent to GDP, while the sum of manufacturing and other industries accounted for 32.36 percent and services for 60.72 percent, respectively. One of the remarkable elements of this table is that the share of manufacturing and agriculture sectors in GDP has decreased during the given time period. Moreover Töngür (2015: 32) argues that decline in the output of agriculture and manufacturing industries are more common between 1980 and 2001. Thus, with regard to the contributions of diverse industries to national output, one can realise a structural change that is in favour of service and manufacturing sector.

Table 3. 3: Share of Economic Sectors in Turkey's GDP (2006-2016)

	Manufacturing	Other Industries	Agriculture	Services	Total
2006	19,52	10,33	9,33	60,82	100,00
2007	18,98	10,88	8,48	61,66	100,00
2008	18,30	11,17	8,41	62,12	100,00
2009	16,99	9,98	9,12	63,91	100,00
2010	17,18	10,8	10,27	61,75	100,00
2011	18,73	11,89	9,36	60,02	100,00
2012	17,99	12,35	8,78	60,88	100,00
2013	18,54	13,07	7,68	60,71	100,00
2014	18,99	12,89	7,45	60,67	100,00
2015	18,97	12,71	7,82	60,5	100,00
2016	18,93	13,42	6,93	60,72	100,00

CBRT. 2016. Financial Accounts Report, http://www.tcmb.gov.tr/wps/wcm/connect/10a77ddc-2993-4b5b-aacc-14b4227f9e1f/fa_2016q3_eng.pdf?mod=ajperes&cacheid=rootworkspace-10a77ddc-2993-4b5b-aacc-14b4227f9e1f-m5lvcbr, [25.02.2018].

When this data and explanations are considered within the framework of two alternative cases suggested above, the effect of the relationship between the increasing financialization of Turkey's economy with MVA rate raises further prominence.

3.3. Literature Review

3.3.1. Financialization in Manufacturing Industries

The last 35 years of modern capitalism is defined as the radical restructuring of the political economy by Argitis and Michopoulou (2011: 139). This view, as acknowledged by many researchers, is based on the fact that the world has undergone a financial centred transformation emerging in the triangle of financialization, globalization and neo-liberalism. In a simple manner, financialization is defined by Bracking (2012: 280) as the process by which the size and importance of financial contracts and tools have increased relative to the economy as a whole. Yet, most of the literature in this field outline the growing importance of financial markets in affecting the governmental policies and those of central banks as well as in changing the behaviour of the non-financial corporations, which has been gradually guided by growth, the market demand, distribution of income and rentier practices and motives.

Similarly, as argued by Giacche (2011: 26) the 2008 financial crisis is the consequence of weak growth for over a thirty year, the immense tendency to interest oriented capital and challenging capital valorisation, and that is, to remedy the circumstances, to financialization. In this sense, the credit and financial abundance has facilitated three functions. It has supplied capital to the manufacturing sector, delayed the burst of an overproduction crisis in the industrial sector and, curtailed the implications of lower wages that enabled it accessing highly profitable investment alternatives while it challenged by a valorisation crisis.

As indicated by Orhangazi (2008) financialization is characterized by the expansion of financial income and investments and increasing financial disbursement ratios in the form of stock buybacks, dividend payments and interest payments. In this sense, profitability of firms is expected to increase as a result of investment decisions to be financialized in manufacturing sector owing to the increasing accessibility and availability of financial investments that allow industrial firms to sustain profit margins. Nevertheless, they face higher levels of risk, declining rates in operating profitability, market rigidities and tightening competition in goods market. Consequently, as argued by Demir (2009) one would assume an asymmetric influence of instability and vagueness on firm profitability

that rely on the share of financial investments in firm portfolios. Hence, while increasing instability and risk tend to shrink operating profits and upsurge liabilities in the short-term, value of short-term financial assets and financial profits may increase.

The initial review of the existing literature suggests that volatility in capital flow, increasing vagueness in an economy and real interest rates create a considerably negative impact on profitability of a manufacturing firm. Conversely, as the same firms increase their financial investments, it is likely to reduce the effects of such negative waves at economically and statistically significant levels as acknowledged by Dore (2008: 1106). To sum up, increasing opportunities in the financial market investments may create positive influences in profitability of manufacturing firms by functioning as an airbag against unforeseen risks in the market and diversifying investment portfolios of manufacturing firms.

The fact is that the pathway to financialization can regionally differ suggests that reductions in firms' real investment and the growth of investments to financial assets may be influenced by diverse mechanisms and factors (Seo et al., 2015: 5). In line with this, the work of Orhangazi, (2008: 865-866) focused on data analysing the non-financial firms in the U.S. since the 1970s, demonstrated that these firms tend to allocate their resources towards financial investments with profit opportunities, in turn the fixed investment previously made by these firms has gradually reduced. Since the post-1980 period when financialization take its contemporary form with globalization, the financializm movement has been observed in the direction of certain indicators (Fasianos et al. 2016: 30).

3.3.2. Indicators of Financialization in Turkey

The period between 1980s and 1990s characterised by increasing subscription of emerging and developing to financial liberalisation as they integrated into global financial systems more closely. This was not only related with the requirements that typically imposed by World Bank and IMF in order to facilitate structural adjustments in line with the financial account liberalisation programs, but also implemented in most of the emerging economies as consequence of mounting foreign-denominated debt burdens and exchange rate pressures and (Karwowski and Stockhammer, 2016: 9). With the emergence of new

financial instruments and the diversification of existing instruments, short-term financial investments of non-financial companies in developing countries have increased while long-term fixed investments have declined (Akkemik and Özen, 2014: 72).

As suggested by Stockhammer (2008) and Demir (2009), financial market liberalization is considered as one of the fundamental reasons that caused to the declining real investment in developed countries. They also point out that the same figure is also valid for emerging countries since the beginning of 1990s. In line with the literature reviewed above, studies investigating the effects of financialization on the manufacturing sector focused on some specific fields that compare the outcomes of manufacturing sector with the development of the finance sector. In addition, many of these studies examined the compatibility between these two data sets in order to find if there is a casual relationship. The following section briefly analyses the financialization of manufacturing industry in Turkey by adopting some characteristics of financialization identified in the relevant literature regarding the manufacturing industries. In this context, drawn from the above studies the effects of financialization on Turkey's manufacturing sector can be identified mainly based on four major indicators.

- a) Increasing manufacturing sector credits and bank assets in response to the falling gross fixed capital formation of financial sector (see Seo et al., 2015; Orhangazi, 2008):

A significant example of the declining share of real investments in Turkish manufacturing industry as suggested in the first assumption is presented in Figure 3.3. This graph shows the divergence between gross fixed capital formation to GDP and bank assets to GDP in Turkey since the financialization have shown its heavy impacts on the overall economy at the end of 1990s. In the period of financialization gross fixed capital formation and equipment investment in Turkish manufacturing industry have decreased. In the graph, it is seen that these two indicators, which stood balanced between the 1970s and the mid-1990s, have been dramatically differentiated since 1997, and this tendency continues to grow.

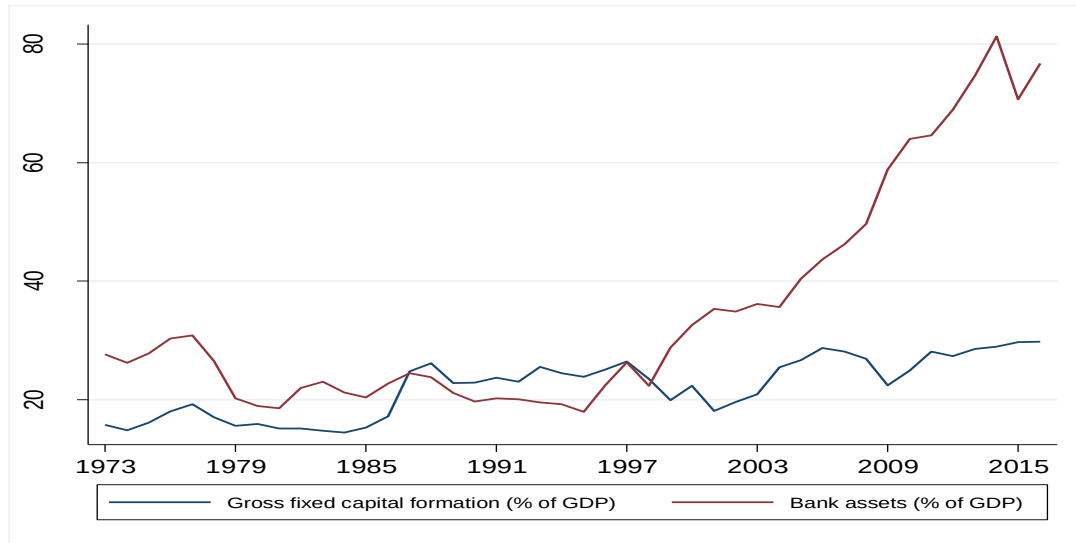


Figure 3. 3: Comparison of Gross Fixed Capital Formation and Bank Assets to Turkey's GDP (1973-2016)

CBRT. 2016. Financial Accounts Report, http://www.tcmb.gov.tr/wps/wcm/connect/10a77ddc-2993-4b5b-aacc-14b4227f9e1f/fa_2016q3_eng.pdf?mod=ajperes&cacheid=rootworkspace-10a77ddc-2993-4b5b-aacc-14b4227f9e1f-m5lvcbr, [25.02.2018].

On the other hand, as an important example of the financing of the manufacturing sector, private sector loans to GDP reached 70 percent today, compared to around 15 percent at the beginning of the 2000s, and has grown faster than countries in different income groups (Figure 3.4). World Bank (2018) classifies Turkey as an upper middle-income country, however the share of domestic credit to private sector in GDP for upper middle countries is far higher than Turkey's. This is mainly due to tight monetary policies and controls on the use of credit in the private sector and restrictive fiscal policies and strict regulations for the banking sector of Turkey within the past 15 years.

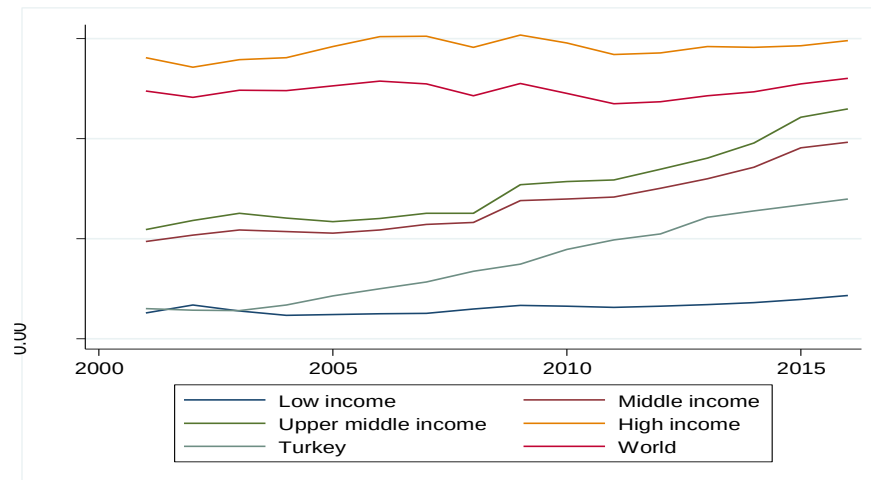


Figure 3. 4: Domestic Credit to Private Sector as Percentage of GDP

The World Bank. 2018. World Bank National Accounts Data <https://data.worldbank.org/indicator/nv.ind.totl.zs>, [29.12.2018].

However, the trend in domestic credits provided to the private sector figured out in the regional context, demonstrates a different perspective as presented in Table 3.4. Domestic credits, which have been on the rise until the 2008 financial crisis, have either declined or remained the same after the crisis for the world averages, EU countries and OECD countries. When taking a look at the situation in Turkey, it is observed that the increase in the aftermath of the credit crisis continued with the same slope and reached to approximately 4-fold by 2016 compared to 2001.

Table 3. 4: Domestic Credit to Private Sector (% of GDP)

	2001	2005	2010	2011	20012	2013	2014	2015	2016
European Union	92.59	101.69	114.41	110.94	108.60	104.69	99.84	97.42	94.78
OECD members	137.80	143.60	145.86	140.60	141.62	144.61	144.02	144.34	147.07
Turkey	15.03	21.43	44.65	49.42	52.23	60.71	63.79	66.83	69.85
World	123.71	126.36	122.46	117.29	118.33	121.33	123.25	127.27	130.12

World Bank. 2018. World Bank National Accounts Data <https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS> [12.01.2018].

Despite growth in the manufacturing sector, the decline in manufacturing investments or the decline in manufacturing fixed investments alone:

As indicated by Akkemik and Özen (2014) and Demir (2009) financialization negatively affects the manufacturing firms' tangible and equipment investments due to attractiveness of financial returns in financialization periods. Figure 3.5, on average, shows the ratio of machinery and transport equipment to value added in manufacturing for the 2003-2009 period is 19.5 percent, whereas that for the 2010-2016 period is 16.5 percent with a continuous declining trend.

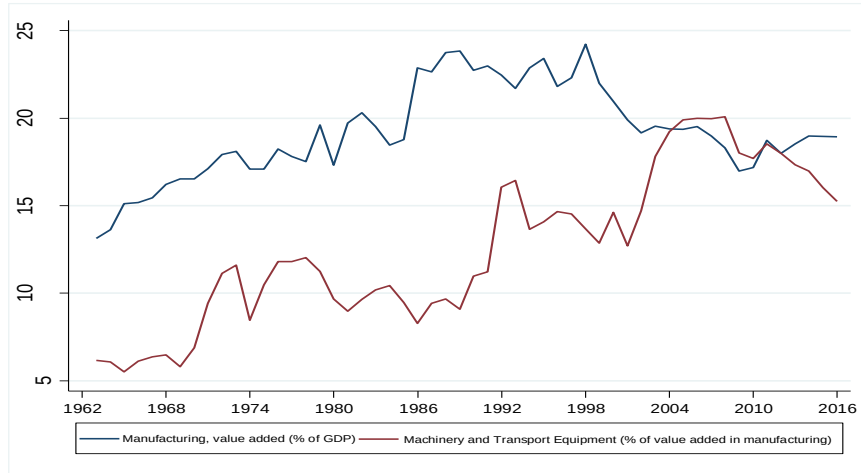


Figure 3. 5: Manufacturing Value Added to GDP vs. Investment in Machinery and Transport Equipment as % of Value Added in Manufacturing

CBRT. 2016. http://www.tcmb.gov.tr/wps/wcm/connect/10a77ddc-2993-4b5b-aacc-14b4227f9e1f/FA_2016Q3_eng.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-10a77ddc-2993-4b5b-aacc-14b4227f9e1f-m5lVcbR [25.02.2018].

Such figure suggests that the share of Turkish manufacturing firms' machinery and transport equipment investments in total value-added manufacturing production after 2010 while manufacturing in Turkey has shown a steady graphic. This is in line with Akkemik and Özen (2014) and Demir (2009)'s assumptions.

According to a dataset by CBRT (2016) for the period between 2010 and 2016, financial net worth of pension funds, insurance companies and financial corporations remained in balance, and households in Turkey and the world averages generated a financial surplus, while Turkish non-financial corporations encountered with a financial deficit (Figure 3.6).

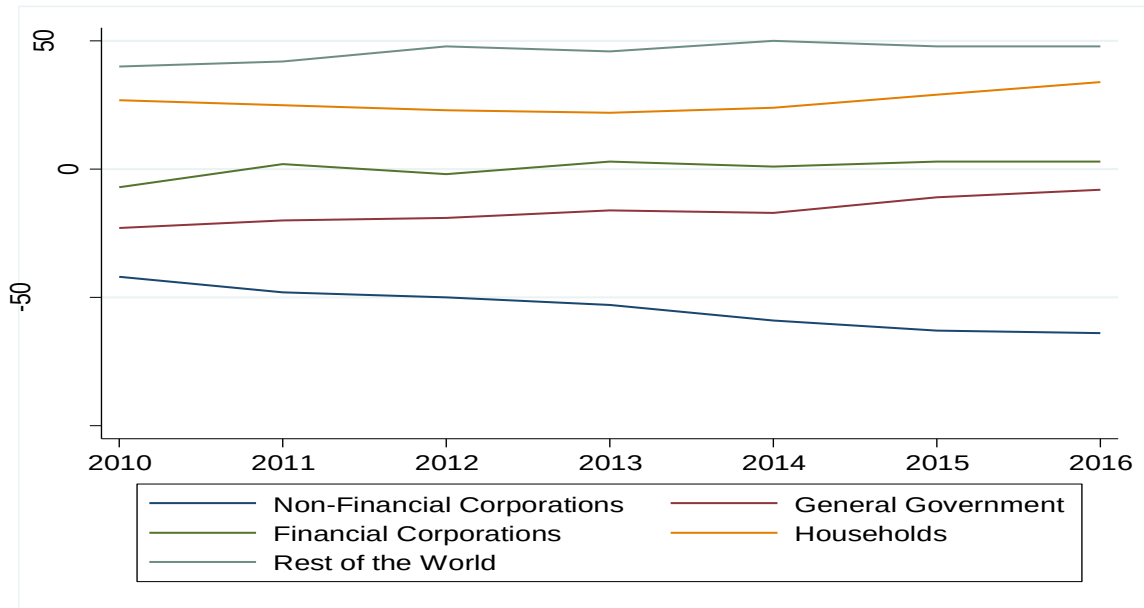


Figure 3. 6: Ratio of Net Financial Worth to GDP, by Sectors

CBRT. 2016. http://www.tcmb.gov.tr/wps/wcm/connect/10a77ddc-2993-4b5b-aacc-14b4227f9e1f/FA_2016Q3_eng.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-10a77ddc-2993-4b5b-aacc-14b4227f9e1f-m5lVcbR [25.02.2018].

As a complementary and detailed data for this analysis, the following table analyses the change in the net financial assets of manufacturing companies on the basis of selected OECD countries (Table 3.5). The most important point that draws attention to this figure is the fact that Turkish manufacturing firms are the least borrowed after German firms in terms of the ratio of financial indebtedness to GDP. Manufacturing firms in the countries most affected by the 2008 crisis, such as France, Germany, UK, USA and Japan, tend to reduce their indebtedness after the crisis, data indicates that Turkish manufacturing firms have increased their financial indebtedness by about 50 percent within the last 6 years.

Table 3. 5: Financial Net Worth of Non-Financial Corporations, as A Percentage of GDP

	2010	2011	2012	2013	2014	2015	2016
France	-97.75	-96.79	-96.22	-100.82	-100.20	-98.66	-95.84
Germany	-62.29	-55.96	-57.05	-61.06	-61.57	-56.33	-56.00
Japan	-98.84	-99.48	-107.54	-115.66	-129.36	-112.88	-119.53
Switzerland	-88.40	-90.26	-103.04	-127.04	-150.12	-149.15	-144.29
United Kingdom	-155.09	-158.84	-160.24	-153.08	-160.54	-150.02	-155.37
United States	-145.60	-142.34	-152.66	-180.49	-190.64	-180.14	-185.11
Turkey	-41.82	-48.23	-48.42	-53.60	-57.09	-62.45	-63.42

The World Bank. 2018. World Bank National Accounts Data, <https://fred.stlouisfed.org/series/TNWMVBSNNCB> [12.01.2018].

- b) An increasing gap between the share of the manufacturing sector and the share of the financial sector in GDP

A private firm may encounter a trade-off between profits and investment, this association noticeably cannot be applied to all firms at the macroeconomic level (van Treeck, 2009: 471). In the literature of financialization, there are many studies analysing the gradual increase in the difference between the dimensions of the financial sector and the production of the manufacturing sector in the process of financialization. In the case of Turkey, probably the most potential and observable determinants of the growth of financial sector are growth in bank assets and GDP ratio of bank deposits. Figure 3.7 comparatively describes the gradual difference between the ratio of financial system deposits to GDP and the share of manufacturing in Turkey's GDP. Difference between these variables have is seen that intensively started to increase since the mid-1990s where the financialization have made significant impact on both financial and non-financial firms.

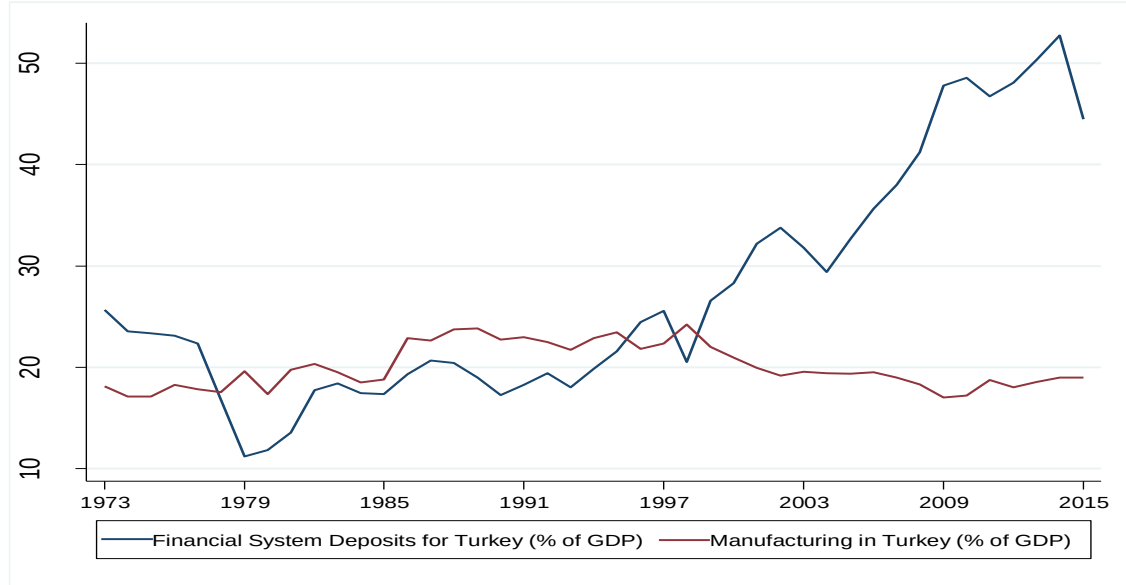


Figure 3.7: Financial System Deposits to GDP vs. Revenues from Manufacturing to GDP

CBRT (2016), http://www.tcmb.gov.tr/wps/wcm/connect/10a77ddc-2993-4b5b-aacc-14b4227f9e1f/FA_2016Q3_eng.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-10a77ddc-2993-4b5b-aacc-14b4227f9e1f-m5lVcbR [25.09.2018].

3.4. Data and Stylized Facts

For empirical analysis, we have two samples of firms. One is data for 56 manufacturing companies listed in the Istanbul Stock Exchange for the period 1998–2016. It was obtained through the data collection of a private company named “Finnet” located in Istanbul. However, in this first sample, we do not have interest payments for any firm at all, which is a critical shortcoming to observe the effect of financialization. Hence we need another sample to include this variable. This data set belongs to 107 manufacturing companies listed in the Istanbul Stock Exchange for the period 2010–2016. It was taken from the Public Disclosure Platform, which is open to the public. This data set also includes all the firms in the first sample. But the second sample is unfortunately of relatively a shorter period because the data related to the interest payments is not available for almost all firms before 2010. In both samples, the main activities of these firms vary from textile to chemical products. All data is yearly. The nominal values of all the variables are deflated in order to obtain real values by GDP implicit price deflator.

Table 3.6 gives the descriptive statistics for both samples. Notice that we do not have data of interest payments for the first sample belonging to the period 1998-2016. We also can not estimate the value of volatility variable for the second sample due to shortness of time period.

Table 3. 6: Descriptive Statistics For 56 Firms, Yearly

Variable	Obs	Mean	Std. Dev.	Min	Max
$(I/K)_{t-1}$	1008	.3684907	1.329609	-.3929906	40.4226
$(S/K)_{t-1}$	1008	8.539262	13.90384	.3424463	180.9487
π_{t-1}	1008	2.059675	3.865363	-.4627878	64.88673
i_{t-1}^{dep}	1008	2.611746	5.896435	-24.37085	70.03017
$(M/A)_{t-1}$	1008	.4182173	.1687645	.0498599	.9123588
$(D/A)_{t-1}$	1008	.4680739	.2467186	-.3436516	2.939812
$(V)_{t-1}$	840	.3699792	.2299731	.0222099	1.915262

It is possible to see the descriptive statistics for different firm group and periods in Table 3.6 as well as Table 3.7. The investment rate is associated with capital expenditures that are also connected to the capital stock. This investment rate involves domestic investment. Capacity utilization is described as sales that are related to the capital stock.

Table 3. 7: Descriptive Statistics for 107 Firms, Yearly

Variable	Obs	Mean	Std. Dev.	Min	Max
$(I/K)_{t-1}$	642	.1778127	.2932775	-.3929906	6.127273
$(S/K)_{t-1}$	642	4.488086	7.379353	.1843958	0.94649
π_{t-1}	642	1.045871	2.739094	-1.494784	31.93311
i_{t-1}^{dep}	642	.2691102	.2939351	.0027261	2.634287
i_{t-1}^{debt}	642	.0430408	.0708851	-.0309069	1.003515
$(M/A)_{t-1}$	642	.3566829	.1547272	.0498599	.9372392
$(D/A)_{t-1}$	642	.4938884	.2309876	.0638487	1.707334

Since capacity at the firm level does not contain any analog, the capacity utilization is dependent on the firm-level data (Fazzari and Mott, 1986; Orhangazi, 2008). The profit rate is described as gross operating income that have association with the capital stock. Similarly, the financial profit rate refers to the non-operating income that are associated with the financial assets. The cost of borrowing refers to the firm's interest payments that have a relationship with total debt. There is an inflation adjustment for the financial profit rate and the cost of borrowing. Lastly, the variable of volatility is calculated as the coefficient of variation.

As pointed out by Lapavitsas (2013, 794), financialization reveals an increasing asymmetry between circulation and production, in particular to the financial component during the last three decades. As defined by Ehrhardt and Brigham (2011, 72), non-operating income is a part of gross income of a business which comes from the non-business activities. Therefore, the share of non-operating income in total income is one of the measures to track the degree of asymmetry between production and circulation in an economy. Figure 3.8. is composed of the financial data of Turkish manufacturing sector companies listed on Istanbul Stock Exchange (BIST) between 1998 and 2016. This chart shows that the long-term perspective of non-operating income / total income is on a flat course and that it has started to rise during the 2001 and 2008 crises. In addition, the financial assets / total assets ratio has also fluctuated during the same crisis processes, but it is in general followed a downward path.

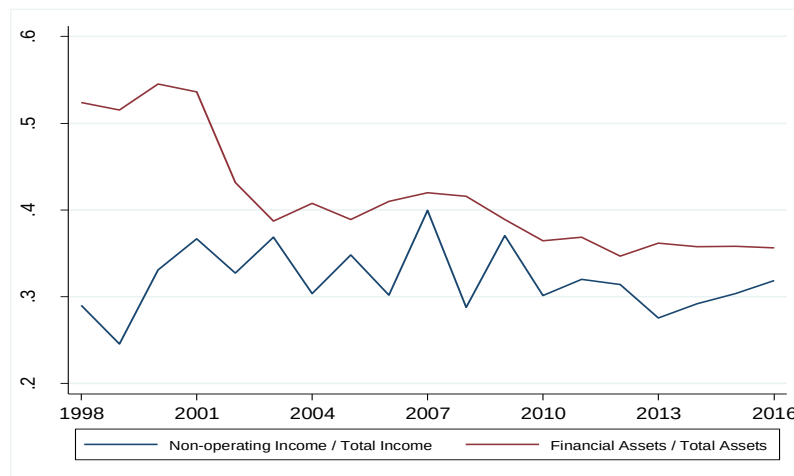


Figure 3. 8: Financialization Indicators For 1998 - 2016

A shorter perspective that focuses the period after financial crisis shows that there is a relationship between these two data. While the negative effects of the global financial crisis have still been experienced in Turkish manufacturing firm, the ratio of non-operating income in total incomes decreased in the period of 2010-2013 as shown in the following chart. However, with the increase in financial assets to total assets, the ratio of non-operating income started to rise again over 0.3 level.

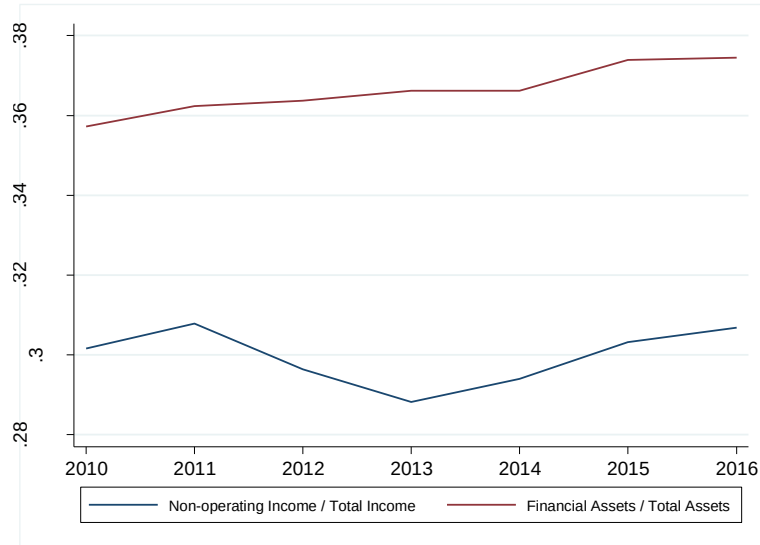


Figure 3. 9: Financialization Indicators for 2010 - 2016

This situation in Figure 3.9 is focusing on the period between 2010 and 2016 for the Turkish manufacturing firms shows similarities with the outcomes of previous research by Orhangazi (2008), van Treek (2008) and Stockhammer (2004) that estimate the impacts of financialization on investment and the effects of firms' financial incomes on shareholder value orientation in terms of slowdown in accumulation.

In the Figure 3.10, the change in the share of interest payments within the total debts of Turkish manufacturing firms is presented between the years 2008-2016. In the chart, it is observed that this ratio, which declined in the first years of the global economic crisis, showed signs of reversal as global financial markets showed signs of correction in the first periods of 2012 but it continued its downward trend in the aftermath. Finally, this trend tends to change in 2015 in the direction of a new increase.

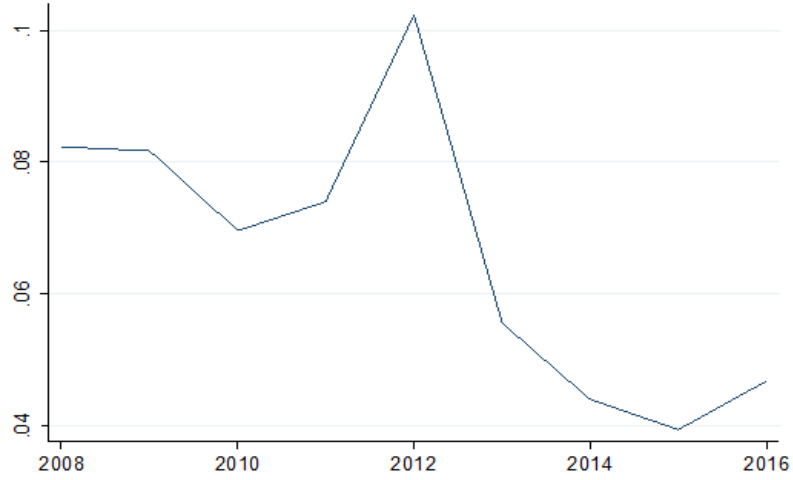


Figure 3. 10: Interest Payments / Total Debt

3.5. Methodology

3.5.1. Statistical Specification

The empirical specification generally follows Davis (2003):

$$\begin{aligned} \left(\frac{I}{K}\right)_{it} = & \beta_0 + \beta_1\left(\frac{I}{K}\right)_{i,t-1} + \beta_2u_{i,t-1} + \beta_3\pi_{i,t-1} + \beta_4i_{i,t-1}^{dep} + \beta_5i_{i,t-1}^{debt} + \beta_6\left(\frac{M}{A}\right)_{i,t-1} \\ & + \beta_7\left(\frac{D}{A}\right)_{i,t-1} + \beta_8V_{i,t-1} + \varepsilon_{it} \end{aligned}$$

where “A” indicates total assets, the subscripts i and t indicates the firm and the year respectively.

The desired stock of capital is enhanced by a higher expected rate of profit. As a result of this, investment is encouraged, and both the profit rate (π) and the utilization rate (u) have a positive relationship with investment rate. According to Kopcke and Brauman (2001) and Eberly et al (2012), a lagged dependent variable plays a significant role in describing investment behavior. Utilization (S/K) also has an accelerator effect and this effect is that when there is an increase in demand, in increased utilization, the investment made by the firm convinces the firm to recreate its level of excess capacity. However, there is a negative relationship between the financial profit rate (i^{dep}) and investment rate. Thanks to the financial profit rate, the chance for obtaining cost is maintained. This shows

consistency with the role of the portfolio decisions in monetary economy as discussed by Tobin in 1965. In the same way, there is a relationship between higher cost of borrowing (i^{debt}) and lower investment rate. Since internal and external funds are used to support capital investment, there is an increase in the cost of external funds that falls the demand for investment.

In the literature, there are opposite thoughts about the relationship between the stock of financial asset (M) and the investment rate. In one side, there is a positive relationship because the financial assets provide support for investment. Managers also take control of financial assets and do not necessitate any cash payment commitment. When the stock of financial assets owned by the firm is more than the desired stock of financial assets, resources will be distributed to capital investments, and there will be an increase in investment. The association between financial assets and capital represents a portfolio readjustment process. This situation also shows consistency with Tobin's argument (1965). In other side, an increase in the stock of financial asset leaves less room for physical investment so there is a negative relationship. As a result, the relationship between the stock of financial assets and the investment rate is depend on the firm characteristics and its investment plan.

Also, there is a negative relationship between the stock of debt (D) and the investment rate. In contrast to financial assets, debt requires future cash payment commitments. As a result of the large stock of debt, lenders and borrowers face a greater deal of risk and also, the firm's investment demand is decreased (Keynes, 1936; Minsky, 1975). In terms of management, the firm's margin of safety is decreased significantly because of the larger stock of debt (Kalecki, 1971), and as a result, managerial eagerness is also declined. In terms of creditors, a large stock of debt is associated with the potential solvency problems and increases agency problems in the lending relationship. For this reason, the firm's capacity to acquire external funds is hindered by the large stock of debt.

Also, it should be noted that the firm's environment has an important role in the firm's desired stocks of capital, financial assets and debt. We incorporate uncertainty to the model, which is critical on investment decisions of firms regarding the future. The variable of uncertainty is used to define firm's environment which has an important role in the

firm's desired stocks of capital, financial assets and debt. Managers of firms that are exposed to a high level of volatility are expected to show a lower level of willingness to benefit from funds in long-term fixed investment projects, and they show more willingness to benefit from short term financial assets. This implies that there is a negative relationship between the increased level of volatility and fixed investment. In the model, volatility is estimated as the coefficient of variation in firm-level sales to capital ratio based on a five-year moving average. As a result of volatility (V), financial decisions made by firms tend to change. Since the level of uncertainty tends to increase when the level of volatility is high, the manager who has a high level of volatility abstain from making investment in fixed capital. Managers who work in firms that are exposed to a high level of volatility are expected to show a lower level of willingness to benefit from funds in long-term fixed investment projects, and they show more willingness to benefit from financial assets. Therefore, it is understood that there is a negative relationship between the increased level of volatility and fixed investment.

3.5.2. Estimation Strategy

The empirical specification has fixed effects as time and firm level. These fixed effects represent unobservable year and specific factors for the firms that have relevance in terms of outlining a firm's behavior, but it is not possible to explicitly control in the regression. For estimations the Arellano-Bond Generalized Method of Moments (GMM) are utilized and this explains potential endogeneity that originates from the adding of lagged dependent variable and fixed effects in a panel setting.

The specification contains a lagged dependent variable to integrate dynamic effects in terms of adjusting the capital stock. These dynamic effects represent persistence and path dependencies in investment that originates from the long-term nature of capital investments, irreversibility in investments, and adjustment costs that play a significant role in acquiring and implementing new capital. Furthermore, the estimations also contain additional lags of the explanatory variables (Fazzari et al, 1988; Fazzari and Mott, 1986; Ndikumana, 1999). Since managers are exposed to uncertainty and unsound information, investment decisions depend on expectations that are related to the future. These expectations represent lags of the explanatory variables. Results are explained in terms of

the three lags of the explanatory variables. Estimations with two lags have similarity but they represent evidence for the second order autocorrelation in the errors. Since volatility is created based on a five-year moving average and, thus, includes multiple years of information. The interrelationship between portfolio and financing decisions is associated with potential endogeneity that is created between the financing variables and the investment decision. According to Orhangazi (2008) and Stockhammer (2004), the investment rate is described as a function of lagged explanatory variables. Additionally, the Arellano-Bond methodology has a relationship with the other potentially endogenous variables. In this regard, the variables that are related to the firm's finance constraint are also implemented with their own lags using GMM.

3.6. Empirical Analysis

The following table presents the regression results for the full samples and for size quartiles.

Table 3. 8: Estimation Results; Dependent Variable I/K

	Yearly 1	Yearly 2	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
$(I/K)_{t-1}$	0.213*** (0.0889)	0.870*** (0.161)	0.375** (0.162)	0.683*** (0.230)	0.432** (0.189)	0.812*** (0.193)
$(I/K)_{t-2}$	-0.0297 (0.068)	0.519*** (0.148)	0.327 (0.238)	0.477* (0.278)	-0.471** (0.209)	0.0187 (0.174)
$(I/K)_{t-3}$	0.0358 (0.0221)	0.296*** (0.0760)	0.110 (0.0913)	0.183** (0.0811)	0.804** (0.317)	-0.0603 (0.195)
$(S/K)_{t-1}$	0.0238*** (0.00565)	0.0434*** (0.00953)	0.00639 (0.0184)	0.0407* (0.0244)	-0.108*** (0.0411)	0.0632*** (0.0200)
$(S/K)_{t-2}$	-0.0149*** (0.00495)	0.0722** (0.0289)	-0.0490** (0.0245)	0.138*** (0.0311)	-0.111*** (0.0304)	-0.0295 (0.0202)
$(S/K)_{t-3}$	0.00142 (0.00278)	-0.114*** (0.0261)	0.0295 (0.0183)	-0.183*** (0.0451)	0.183*** (0.0437)	-0.0247 (0.0276)
π_{t-1}	0.0139** (0.00721)	0.0893* (0.0511)	0.0194 (0.0536)	0.0645 (0.0492)	0.553** (0.215)	0.0221 (0.105)
π_{t-2}	-0.022*** (0.00785)	-0.270*** (0.0894)	0.0669 (0.0881)	-0.264*** (0.0751)	0.216* (0.111)	-0.0500 (0.0850)
π_{t-3}	0.0335*** (0.0116)	0.101** (0.0441)	-0.0751 (0.0623)	0.143** (0.0561)	-0.804*** (0.192)	0.0198 (0.111)
i_{t-1}^{dep}	0.0447*** (0.0188)	-0.0257 (0.0429)	0.148* (0.0878)	0.0281 (0.0342)	0.0661 (0.141)	-0.204 (0.186)
i_{t-2}^{dep}	-0.00368 (0.00656)	0.0563 (0.0436)	0.256*** (0.0897)	-0.0198 (0.0448)	0.161 (0.154)	-0.0122 (0.0878)

i_{t-3}^{dep}	-0.00619 (0.0041)	0.00800 (0.0474)	-0.261** (0.102)	-0.00796 (0.0861)	-0.271 (0.186)	0.00185 (0.0599)
i_{t-1}^{debt}		0.00782 (0.504)	-1.389* (0.738)	0.902** (0.374)	-1.241 (1.046)	-0.110 (1.574)
i_{t-2}^{debt}		-0.137 (0.658)	-0.0579 (0.802)	-1.569** (0.633)	0.524 (1.882)	0.357 (0.513)
i_{t-3}^{debt}		-0.0577 (0.158)	-0.146 (0.133)	-0.0263 (0.309)	0.797 (0.899)	0.608 (1.012)
$(M/A)_{t-1}$	-0.151 (0.261)	0.121 (0.175)	0.395 (0.323)	-0.0522 (0.389)	0.738** (0.330)	-0.275 (0.329)
$(M/A)_{t-2}$	0.320* (0.199)	0.174 (0.170)	0.636** (0.248)	-0.344 (0.492)	-0.299 (0.311)	0.921** (0.404)
$(M/A)_{t-3}$	-0.0081 (0.155)	-0.380** (0.166)	-0.763** (0.315)	0.543 (0.420)	0.190 (0.226)	-0.632** (0.322)
$(D/A)_{t-1}$	0.454** (0.201)	-0.419** (0.205)	-0.145 (0.169)	-0.0199 (0.273)	-0.0716 (0.408)	1.176*** (0.333)
$(D/A)_{t-2}$	-0.294** (0.1202)	-0.222 (0.269)	-0.171 (0.247)	-0.195 (0.529)	-0.370 (0.668)	-1.365*** (0.397)
$(D/A)_{t-3}$	-0.0209 (0.1021)	0.592*** (0.166)	0.278** (0.137)	0.152 (0.445)	0.386 (0.378)	0.264 (0.206)
$(V)_{t-1}$	-0.3235** (0.1397)					
Observations	728	214	52	52	52	56
Number of firms	56	107	26	26	26	28
Sargan (p value)	0.042	0.000	0.031	0.002	0.005	0.377
2nd order auto.	0.546	0.851	0.276	0.389	0.139	0.414

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. The quartile regressions are made, by using the second full sample, according to total assets of the firms in ascending sort. The p values for the Hansen-Sargan test of overidentifying restrictions and for the second order autocorrelation in the errors are obtained from two-step estimations.

Determinants of investment that are not financial which include the lagged dependent variable, capacity utilization and the profit rate are a sign of the robustness of the model. In regard to the full samples of firms (yearly 1 and 2), the coefficient of $(I/K)_{t-1}$ seems to be positive and crucial. This coefficient is also positive and has significance for all size sub-samples, and the intensity of the effect is strengthened as the size of the firm enhances. The factors related to capacity utilization and profitability are also associated with the expected signs in most specifications. Factors on the first lag for capacity utilization are positive and play a significant role in both full samples of firms and the second and forth size quartiles. The factor related to the profit rate also has the expected sign in all specifications, and the estimate plays an important role in the full samples and the third sub-sample firm size. An insignificant factor related to the profit

rate is, however, not surprising considering that other explanatory variables represent trends that have empirical similarity with profits and, especially, capacity utilization may incorporate with the impact of the profit rate.

In regard to the results, it is seen that changes have a significant role in financial behavior of manufacturing firms since 1998 and 2010 in terms of fixed investment. It is also seen that the factors related to the second and third lags for the first full sample (yearly 1) of firms are negative as expected. It is important yet negative in the first lag. The factor related to the first lag for the second full sample (yearly 2) of firms are negative as expected, even though it has no statistical significance. In addition to this, in regard to the financial profit rate, it is seen that the firm size results are quite interesting. Although the factors related to the first lag of the financial profit rate for the fourth quartile of firms are negative as expected, others seem to be positive but only the quartile is significant.

Based on the positive relationship between the financial profit rate and investment it is understood that the complementarities are created by firms between their business' financial profits and the non-financial components. The financial assets' diverse structure made of size of firm and the positive factor in relation with the financial profit rate for somewhat smaller firms give sign to diverse motives for gathering financial advantages for firms in various sizes. Although the liquid assets that big firms acquire might limit the volatility and risk levels, the 'other' financial assets smaller NFCs have might be in line with the direction towards financial services' provision.

It is also discovered that the factor related to the first lag of the effective interest burden is negative in most of the specifications. Orhangazi (2008), on the other hand, refers to a negative, yet crucial relationship between the first lag of NFC payments to the financial sector and fixed investment. It is also seen that there is a direct connection between the stock of financial assets and fixed investment in half of the specifications. The positive result has no relationship with the proposition in the literature related to the finance which states that financial assets leave no place for physical investment. However, the first full sample (yearly 1) which confirms the theoretical framework has a negative but insignificant result.

Regarding the second full sample and all size sub-samples other than the fourth one, it is found that there is an increase in the stock of debt and this increase restricts investment based on the first lag of the variable. Considering the second lag, it is seen that all specifications refer to the negative relationship between the stock of debt and fixed investment. The consequences have consistency with the literature especially the leading researches which concentrate on a strong inverse connection between the rate of investment and stock of debts of a firm (Ndikumana, 1999; Orhangazi, 2008). It is also interesting to state that when large firms in Turkish manufacturing industry are taken into consideration, a positive and significant relationship is observed. When the whole firms following 2010 are considered, it seems that there is a negative effect. As a matter of fact, larger firms make more investment in the fixed assets with debts.

The results also draw special attention to the significance of increasing volatility in encouraging changes in the investment behavior of the firms. The increased level of volatility has a negative and significant effect on fixed investment rates for first the full sample (yearly 1) and this supports the claim that as a result of the increase in firm-level volatility there has been a decline in investment rates. Volatility has not been increased in the present literature focusing on financialization and investment, but according to these results, the increase in plays a significant role in expressing changes in firm investment behavior. Since it is predicted that volatility has an impact on the decisions to acquire financial assets and debt, it has a substantial role in discussing the financialization of NFCs.

3.7. Conclusions

Based on the changes in the portfolio composition and external financing behavior of firms in the Turkish manufacturing industry, questions related to the fixed investment and accumulation in the economy of the manufacturing industry come into prominence.

After analyzing the stylized facts of the selected industry which is the manufacturing, the financialization indicators were discussed by the help of data and graphical representation.

This study depends on a literature that highlights the relationship between fixed investment and financial profits, payments to the financial sector, and firms' behavior.

These factors which are related to financialization derive from the individual firm's investment decision and other changes play a significant role in promoting these factors. In this regard, this study also focused on examining the role of increased firm-level volatility in prompting the sustained changes in the financial behaviors of manufacturing firms that are observed in over different two time periods.

This study includes descriptive and econometric analysis and the results of the analysis focus on the differences by firm size and refer to two different periods. The analysis in this article is basically based on the firm level. There is no certain result from quartile regression that large firms have an important role in the industry, vice versa. There is no specific result about the financialization of Turkish manufacturing industry, however the stylized facts which are derived from the collected data show that there is no significant effect of financialization on the sector and it also supported by the econometric results. Nevertheless, it might be concluded from the analysis, the financial parameters which can be considered as financialization indicators are slightly important in the basis of the manufacturing industry. Furthermore, as a result of the econometric results more specific questions come into prominence. It is also understood that it is crucial to investigate financialization and nonfinancial corporations more carefully. Since there is ambiguity related to the definitions of 'other' financial assets in the firm level data, it is also important to focus on case studies to make a more detailed research of financialization and nonfinancial firms in other sectors besides manufacturing industry. Besides the difficulties of the collecting data, especially the interest payment, there are missing ones which affect the results.

3.8. References

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