# MACROPRUDENTIAL POLICIES, PERSISTENCE OF UNCERTAINTY AND LEVERAGE DYNAMICS
# A STUDY FOR REAL SECTOR IN TURKEY

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# ABSTRACT

MACROPRUDENTIAL POLICIES, PERSISTENCE OF UNCERTAINTY AND LEVERAGE DYNAMICS
A STUDY FOR REAL SECTOR IN TURKEY

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This study consists of three chapters. The first chapter analyses leverage dynamics of Turkish non-financial firms over the last 20 years using a confidential and unique firm-level dataset. Results of panel models reveal that financial development fosters corporate leverage while government indebtedness inhibits it. Both impacts are more pronounced for private firms rather than public firms. Besides, even though improvements in financial development foster long-term debt usage for both SMEs and large firms, this impact seems stronger for SMEs. Conspicuously, results reveal that SMEs suffer much more than large firms in crowding-out periods of government leverage while both SMEs and large firms benefit in crowding-in periods. The second chapter is the first study to explore the impacts of macroprudential policies (MPPs) and uncertainty of economic environment on leverage dynamics based on firm-level data. In this chapter, I construct uncertainty and persistence of uncertainty measures for economic environment in Turkey.

Results reveal that credit market responds persistence of uncertainty rather than the level of uncertainty itself. Moreover, leverage of Turkish non-financial firms decrease significantly when uncertainty increases persistently and when macroprudential policy tools are tightened. Most strikingly, this is the case only for SMEs but not for large firms. In the last chapter, I attempt to unfold the riddle regarding how SMEs do survive in such an economic environment and provide significant evidence in support of the claim that Turkish corporations have some under-the-mattress savings (hidden reserves) that are utilized during the times of persistent stress and tightening of macroprudential policies.

**Keywords:** Leverage dynamics, financial development, macroprudential policy, persistence of uncertainty, hidden reserves

# ÖZ

MAKROİHTİYATİ POLİTİKALAR, SÜREKLİLİK ARZEDEN BELİRSİZLİKLER VE ŞİRKET BORÇLANMA DİNAMİKLERİ TÜRKİYE'DEKİ REEL SEKTÖR ÜZERİNE BİR ÇALIŞMA

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Bu çalışma üç bölümden oluşmaktadır. Birinci bölüm, Türkiye'deki finansal olmayan şirketlerin sermaye yapısı dinamiklerini, kamuya açık olmayan ve emsalsiz bir veri seti kullanarak son yirmi yıl için analiz etmektedir. Panel modelinin sonuçları, finansal gelişmişlik düzeyinin şirket borçluluğunu artırdığını, kamu borçluluğunun ise kısıtladığını göstermektedir. Söz konusu iki etkinin de halka açık firmalardan ziyade halka açık olmayan firmalar için daha geçerli olduğu görülmektedir. Ayrıca, finansal gelişmişlik düzeyindeki artış hem büyük büyük hem de küçük ve orta ölçekli firmaların (KOBİ) uzun vadeli borçlanmalarını üzerinde olumlu bir etkiye sahipken, bu etkinin KOBİ'ler için çok daha güçlü olduğu görülmektedir. Sonuçların dikkat çeken bir diğer boyutu ise, kamu borçluluğunun "dışlama" dönemlerinde sadece KOBİ'lerin olumsuz etkilenmesine karşın "yer açma" dönemlerinde hem büyük firmaların hem de küçük ve orta ölçekli firmaların

olumlu etkilenmesidir. İkinci bölüm, ekonomik ortamın belirsizliğinin ve makro ihtiyati politikaların (MPP) kredi dinamikleri üzerindeki etkilerini firma düzeyinde analiz eden ilk çalışma olma özelliğini taşımaktadır. Bu bölümde, Türkiye'nin ekonomik koşullarının belirsizliği ve bu belirsizliğin sürekliliğine ilişkin endeksler oluşturulmuştur. Sonuçlar, kredi piyasasının belirsizlikten ziyade belirsizliklerin sürekliliğine tepki verdiğini, ayrıca belirsizliklerin sürekli olarak arttığı ve MPP'lerin sıkılaştırıldığı dönemlerde reel sektör firmalarının finansal borç bağlamında olumsuz etkilendiğini göstermektedir. Sonuçları daha da ilginç yapan bulgu ise, bu durumun büyük firmalar için değil sadece KOBİ'ler için geçerli olmasıdır. Son bölümde ise, KOBİ'lerin söz konusu koşullarda nasıl ayakta kalabildikleri sorusuna cevap aranmış ve Türkiye'deki şirketlerin yastık altı tasarruflarının (saklı rezerv) olduğu ve bunları ekonomik stres zamanlarında ve makro ihtiyati politikaların sıkılaştırıldığı dönemlerde kullandıklarına ilişkin iddiaları destekleyen kanıtlar sunulmuştur.

**Anahtar Kelimeler:** Kredi dinamikleri, finansal gelişmişlik, makro ihtiyati politika, belirsizliğin sürekliliği, saklı rezervler

To the Conscience

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| BEEPS | Business Environment and Enterprise Performance Survey |
| BIS | Bank for International Settlements |
| BIST | Borsa Istanbul |
| BRSA | Banking Regulation and Supervision Agency of Turkey |
| CBRT | Central Bank of Turkey |
| CDS | Credit Default Spread |
| CPI | Consumer Price Index |
| CMBT | Capital Markets Board of Turkey |
| EMBI | Emerging Market Bond Index spread |
| FDI | Financial Development Index |
| IMF | International Monetary Fund |
| GDP | Gross Domestic Product |
| MPI | Macroprudential Policy Index |
| MPPs | Macroprudential Policies |
| OLS | Ordinary Least Squares |
| PCA | Principal Component Analysis |
| PFEM | Panel Fixed Effects Model |
| P_UNCI | Persistence of Uncertainty |
| SMEs | Small and medium-sized enterprises |
| UNCI | Uncertainty Index |

# CHAPTER I

# LEVERAGE DYNAMICS: DO FINANCIAL DEVELOPMENT AND GOVERNMENT LEVERAGE MATTER? A STUDY FOR REAL SECTOR IN TURKEY

## 1.1. Introduction

Capital structure theory has been one of the most prominent topics in finance literature and hence extensive empirical research has been carried out on this topic. Majority of these studies are concentrated on advanced countries while there exists limited research for emerging countries. In accordance with the importance of the issue, this study aims to analyze leverage dynamics of non-financial firms over a long period from 1996 to 2015 for Turkey, an important transition economy.

Previous studies present confounding results and no single theory seems to be adequate in explaining leverage dynamics of companies. Although, the issue is clarified for neither the advanced nor the emerging countries, the ambiguity seems to be much more severe for the emerging countries. Even though the legal and institutional environments of developed countries are quite similar, there are significant differences in those of emerging markets. These differences might explain the inconsistencies in findings from emerging countries (Wald, 1999).

One of the main drawbacks of the previous studies for most of the emerging countries and also for Turkey is the problems with the representativeness of their samples which can be attributed to availability of data. Furthermore, available data usually cover a relatively short periods of time. Therefore, a detailed analysis of this issue is especially important for emerging countries. In that sense, the contribution

of this study to the current literature is to provide further evidence to shed some light on this issue for emerging markets.

In addition, Turkey is considered not only as one of most important emerging countries, but also one of the most fragile emerging countries in recent years. Government indebtedness of Turkey, one of the main reasons contributing to this fragility, has decreased by adopting economic stabilization programs following the 2000-2001 financial crisis. However, the corporate debt level of Turkish non-financial firms has increased substantially during this period. In particular, Turkey has the highest increase in corporate debt level as a percentage of GDP over the period from 2008 to 2016 in comparison to her peer countries (Figure 1.1 and 1.2). In IMF Global Financial Stability Report (October 2015), this is emphasized as one of the most important factors that has increased the vulnerability of Turkish economy. Thus, it is essential to analyze the determinants of corporate debt levels since results might have important macroprudential as well as microprudential policy implications.

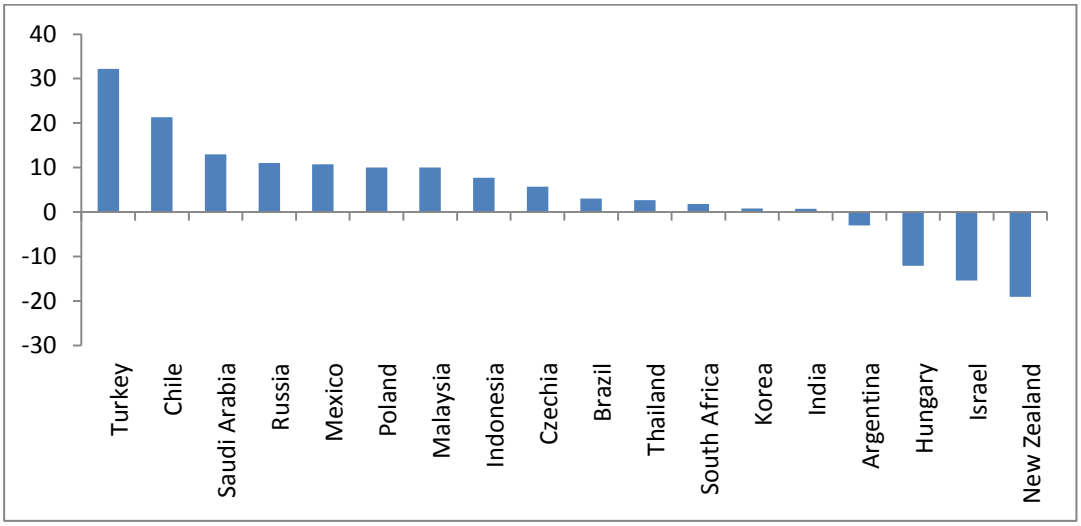


**Figure 1.1 Change in Corporate Debt: 2008-2016 (% of GDP)**
Figure represents the change in annual ratio of non-financial corporate debt to Gross Domestic Product (GDP) over the period, 2008-2016 for each country. Data is obtained from the Bank for International Settlements (BIS) database.

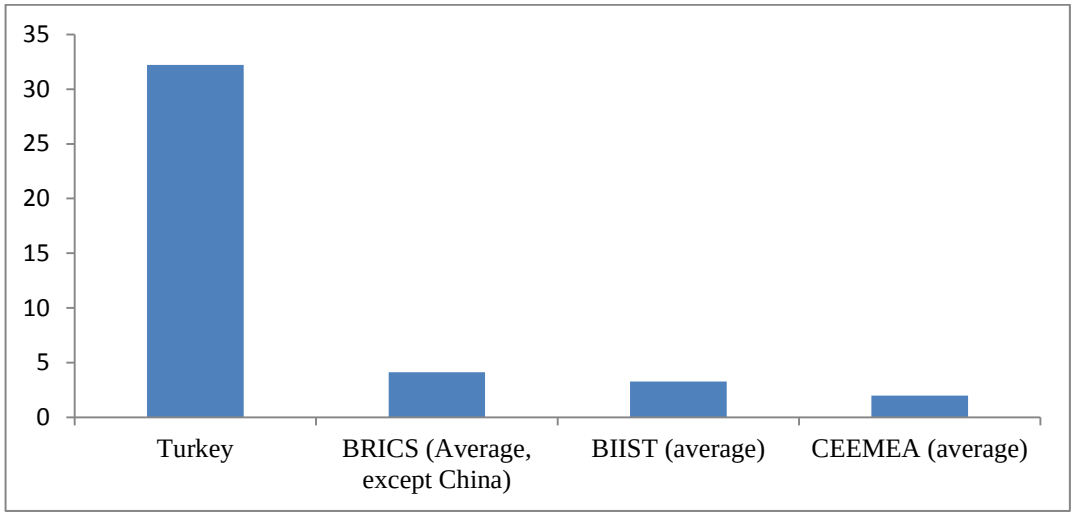


**Figure 1.2 Comparison of Corporate Debt Change: 2008-2016 (% of GDP)**
Figure represents the change in annual ratio of non-financial corporate debt to Gross Domestic Product (GDP) over the period, 2008-2016. BRICS denotes Brazil, Russia, India, China and South Africa; BIIST stands for fragile five countries and it includes Brazil, Indonesia, India, South Africa and Turkey; CEEMEA stands for Central & Eastern Europe, Middle East and Africa, and it includes Czechia, Poland, Hungary, Russia, Turkey, Israel, Saudi Arabia and South Africa. Turkey is excluded in average change calculations of BRICS, BIIST and CEEMEA countries. Data is obtained from the Bank for International Settlements (BIS) database.

Despite the importance of this issue, there exist limited studies for Turkey. They mostly confine their samples to public firms only, hence mostly large firms due to data restrictions. There exist only a few studies analyzing the leverage of privately held Turkish firms and findings of these papers are in conflict with each other. To reconcile these differences in findings of these papers, this study aims to analyze the issue further in detail and present a more complete picture of leverage dynamics in Turkey. Firstly, this study utilizes the most comprehensive and representative database for Turkish non-financial firms. This unique dataset which is one of the novel aspects of this study is confidential firm level data and it is obtained from CBRT. It contains information on about 10,771 firms each year on average and it includes both public and privately held small and large firms from different industries. Besides, this study utilizes the most recent data over the longest period of time (1996-2015) in comparison with other related studies for Turkey.

Moreover, one of the most recent and extensive studies, Graham et al. (2015) find significant evidence that traditional empirical models fall short in explaining capital

structure decisions and changes in economic environment play a prominent role in explaining these decisions in the US rather than firm characteristics. In order to examine whether this is also the case for Turkey, I incorporate economic environment factors to the empirical model namely, financial development, government borrowing and stock market return in addition to firm specific, industry specific and other macroeconomic variables.

According to Bank for International Settlements (BIS) database, government indebtedness of Turkey has substantially decreased from 78 percent to 32.9 percent of GDP over the period from 2001 to 2015 while the trend is reverse for the preceding period. Thus, it is worthwhile to assess the possible crowding out/in effect of government leverage on corporate leverage.

Meanwhile, both financial markets and institutional development in terms of efficiency, depth and access have improved significantly in Turkey over the same time period. Given the vital role played by financial institutions in mitigating problems associated with information asymmetry and agency costs and in easing the access of firms to capital, corporate debt levels are expected to increase with financial development (Leland and Pyle; 1977, Diamond, 1984).

In order to examine whether this is the case for Turkey, I incorporate the most recent financial development index introduced by Svirydzenka (2016). Previous studies used financial development measures which do not take into account the complex multidimensional nature of both financial markets and institutional development whereas the measure developed by Svirydzenka (2016) simply does that.

In the first place, in contrast to Graham et al. (2015) results of the empirical model reveal that not only economic environment factors but also firm specific and industry specific variables account for variation in leverage of Turkish non-financial firms. By utilizing Panel Fixed Effects Model and accounting for a large set of control variables, it is shown that that profitability and industry median leverage are significantly associated with firm leverage in almost all model specifications. The

association is negative for the former while it is positive for the latter. Besides, firm growth and business risk have significant negative associations with both short term and long term leverage and firms with higher tangibility tend to have higher long term but lower short term debt ratios.

Besides, I do find that improvement in financial development has a significant negative impact on short term leverage and a positive impact on long term leverage while the impact is more pronounced for the latter. Besides, it is worthwhile to note that the relationship between financial development and long term leverage appears to be the strongest in magnitude among other explanatory variables. In addition, results indicate that government leverage has a significant negative association with corporate leverage.

Moreover, in order to examine possible differences in leverage dynamics, I reestimate the model for different specifications based on public/private status of firms, alternative time periods and firm size classifications. For robustness, I also use two different alternatives for firm size classification, namely net sale criterion and European and Turkish official criterion based on number of employees.

Conspicuously, results suggest that the negative impact of government leverage and positive impact of financial development on corporate leverage are more pronounced for private rather than public firms. Besides, higher riskiness hinders borrowing capacity of private firms and SMEs, which is not the case for either large firms or public firms.

Moreover, improvement in financial development fosters long term debt usage for both SMEs and large firms while this impact seems to be stronger for SMEs in magnitude. Most strikingly, results suggest that SMEs suffer much more than large firms in crowding out periods of government leverage while both SMEs and large firms benefit in crowding in periods.

The remainder of the study is organized as follows. A brief review of the literature regarding leverage determinants is given in Section 1.2. The dataset is presented in

Section 1.3, while measurements and hypothesis development are discussed in Section 1.4. Methodology is explained in Section 1.5, and results are reported in Section 1.6. Finally, concluding remarks are presented in Section 1.7.

## 1.2. Literature Review

In light of the capital structure theory framework introduced in pioneer works of Modigliani and Miller (1958, 1963), Jensen and Meckling (1976), Myers (1977, 1984, 2001), Myers and Majluf (1984) and Fama and French (2002), extensive empirical research has been carried out to identify and analyze the determinants of firm leverage. However, evidence provided in these studies is at best mixed and no single theory seems to be adequate in explaining leverage dynamics of firms.

Different results from different countries can be attributed to differences in country specific factors as well as variations in firm specific characteristics. Country specific factors are documented in the literature as reliable and significant leverage determinants (Booth et al., 2001; Bancel and Mittoo, 2004; Demirguc-Kunt and Maksimovic, 1999; Antoniou et al., 2008; De Jong et al., 2008; Psillaki and Daskalakis, 2009; Hanousek and Shamshur, 2011; Oztekin and Flannery, 2012; and Fan et al., 2012).

Booth et al. (2001) report a consistent relation between leverage and firm specific factors by using data from 10 developed countries. They also find significant evidence in support of the claim that there exist systematic differences between these countries due to differences in country specific determinants of leverage such as inflation, capital market development and GDP growth.

In line with findings of Booth et al. (2001), De Jong et al. (2008) show that country specific factors have significant impact on leverage by using data from 42 different countries over the period of 1997-2001. They also report the variation in firm specific factors across these 42 countries as determinants of firm leverage.

On the other hand, for the developed countries, firm size, profitability, tangibility and growth opportunities are shown to be factors that reliably explain leverage dynamics of firms as in two pioneering studies, Frank and Goyal (2009) and Rajan and Zingales (1995). Frank and Goyal (2009) investigate the role of a long list of factors analyzed in the related literature in predicting firm leverage. Using a large dataset of publicly traded US firms over the period from 1950 to 2003, they find that six factors namely, industry median leverage, tangibility, profitability, firm size, market to book ratio, and expected inflation account for more than 27% of total variation in firm leverage and the rest of variables add only 2% to the explanatory power of models. The said core factors are identified by using a market based leverage definition. Besides, only three of these said core factors, namely, industry median leverage, tangibility and profitability are found to be robust for all different leverage definitions. Rajan and Zingales (1995), on the other hand, examine the determinants of corporate leverage in the US as well as in Germany, Japan, Canada, France, United Kingdom, and Italy. They point out that firm size, tangibility, profitability and market-to-book ratio are the dominant determinants of leverage in all of these countries.

However, in contrast to aforementioned common findings, one of the most recent and extensive studies, Graham et al. (2015) argue that capital structure decisions are not explained by firm characteristics. They provide convincing evidence that changes in economic environment play a more prominent role in explaining the variation in capital structure decisions of firms in the US over the last one hundred years. Using a large unique dataset over 1920-2010 period from CRSP stock files, S&P Compustat and Moody's industry manuals, Graham et al. (2015) provide a more complete picture of capital structure decisions of non-financial US firms by taking into account both aggregate and cross sectional trends. They report a systematic increase in aggregate leverage ratios of unregulated industries during the last century. It is also found that traditional empirical models fall short in explaining the said trend. Furthermore, economic environment factors account for variation in capital structure of firms rather than firm characteristics. In particular, results prove

that government leverage (federal debt held by public/GDP) is negatively related with corporate leverage. The negative relation between government and corporate leverage is significantly stronger than the relation between corporate leverage and rest of the macroeconomic variables such as inflation, yield spread and GDP growth.

Even though most of the studies are concentrated on advanced countries, there also exists a growing literature focusing on emerging countries, such as Latin American Countries (Espinosa et al., 2012), China (Huang and Song, 2006), Malaysia (Pandey, 2004), Chile (Maquieira et al., 2007), Pakistan (Sheikh and Wang, 2011, Qureshi, 2009), India (Chakraborty, 2010) and Brazil (Correa et al., 2007). However, evidence from these studies are mostly inconclusive and conflicting with those from advanced economies. This contradistinction might be explained by the similarities in the legal and institutional environments of developed countries and significant differences in legal and institutional environments of emerging countries (Wald, 1999). Furthermore, there is limited research on capital structure decisions of firms in emerging countries which can be attributed to data availability. Thus, although the issue is not clarified for both the advanced and the emerging countries, the ambiguity seems to be much more severe for the emerging countries. This ambiguity in findings puts an emphasis on the importance for further investigation of this issue for emerging markets.

Maquieira et al. (2007) study the determinants of firm leverage for Chilean firms using a dataset of 113 public firms over 1990-1998 period. Their results show that only profitability and tangibility have significant relationships with firm leverage. While the former has a negative impact on firm leverage, the latter has a positive one. Findings from this emerging market are partially in line with those in Rajan and Zingales (1995).

On the other hand, Espinosa et al. (2012) analyze the issue by using a dataset of 133 Latin American firms from Mexico, Argentina and Peru in addition to Chile over the period from 1998 to 2007. They also analyze data for 486 US firms over the

same time period. Their results show that Chile is the only country that has similar leverage determinants as the US, whereas Peru, Mexico and Argentina have not.

Huang and Song (2006) analyze the determinants of leverage for Chinese firms over 1994-2003 period. Based on a dataset consisting of more than 1200 publicly traded firms, their results suggest a positive relation between leverage and fixed assets, firm size and industry mean leverage, a negative relation between leverage and profitability, growth opportunities and non-debt tax shields.

In another study, Chakraborty (2010) examines the leverage determinants of Indian firms over the period from 1995 to 2008 by utilizing a sample of 1169 publicly traded firms. Results of this study show that firm leverage is increasing with tangibility and non-debt tax shields, and decreasing with firm size, profitability, and research and development expenditures. However, industry specific and macroeconomic variables are not included in the models used in this study. This omission might explain the conflict between findings of this paper and other studies in the literature.

Sheikh and Wang (2011) study determinants of capital structure for 160 publicly traded firms from Pakistan over 2003-2007 period. Their results show that tangibility, profitability, earnings volatility and liquidity are negatively related with the firm leverage while firm size is positively related with it. However, no significant relations between firm leverage and growth opportunities and tax shield are documented.

Recently, there is a growing number of articles analyzing the determinants of corporate leverage for Turkey as well. These studies are Güner (2016), Karaşahin and Küçüksaraç (2016), Köksal and Orman (2015), Gülşen and Ülkütaş (2012), Okuyan and Taşçı (2010a, 2010b), Demirhan (2009), Yıldız et al. (2009), Korkmaz et al. (2007), Aydın et al. (2006), Sayılgan et al. (2006), Acaravcı and Doğukanlı (2004), and Gönenç (2003).

Aydın et al. (2006) study the capital structure of Turkish non-financial firms by using the dataset compiled by CBRT for the period 1990-2004. Some stylized facts are reported in the paper. For example, Turkish firms are shown to rely mostly on short term debt and to have high levels of leverage with low level of tangible assets. However, they provide only descriptive statistics and do not conduct any formal tests of the issue.

On the other hand, Sayılgan et al. (2006) examine the determinants of leverage for 123 Turkish manufacturing firms listed on Borsa Istanbul over the period from 1993 to 2002. They show that firm specific factors namely, profitability, firm size, growth opportunities in total assets as well as growth opportunities in plant, property and equipment, tangibility, and non-debt tax shields are all significant determinants of firm leverage. In particular, firm size and growth in total assets are positively related with the leverage while tangibility, profitability, non-debt tax shields, growth in plant, property and equipment are negatively related with it. However, neither economic condition variables nor industry specific factors are accounted for in the models used in this study.

Besides, Yıldız et al. (2009) also investigate the issue by using only firm specific factors for manufacturing firms listed on Borsa Istanbul over 1998-2006 period. They report that profitability is negatively associated with leverage while firm growth and size is positively associated with leverage. Tangibility is found to be significant for only short term leverage whereas tax and non-debt tax shields are found to be insignificant.

Okuyan and Taşçı (2010a) analyze the determinants of capital structure by using a dataset compiled by Istanbul Chamber of Commerce which contains data on 1,000 largest Turkish industrial firms over the period from 1993 to 2007. Their results show that firm leverage is decreasing with firm size and profitability. In another study, Okuyan and Taşçı (2010b) analyze the issue by using a dataset containing a sample of 196 firms trading on Borsa Istanbul. Employing a panel methodology and using quarterly data over the period of 2001-2008, they show that the impacts of

firm specific factors, namely size, tangibility, volatility of return, firm growth and profitability, on leverage depend on whether debt is short term or long term debt. However they did incorporate variables to account for neither the macroeconomic conditions nor the industry specific factors in any of their studies.

On the other hand, Köksal and Orman (2015) also examine the determinants of firm leverage and conduct a comparative test of pecking order and trade off theories for non-financial Turkish firms over 1996-2009 period. Conducting fixed effects panel methodology and using the database compiled by CBRT, they find that firm leverage is decreasing with profitability, GDP growth and business risk, and increasing with firm size, tangibility, potential debt tax shield, inflation and industry mean leverage. Capital inflows do not have a significant effect on leverage decisions of public firms while they have a positive and significant effect on that of non-public firms.

In two recent studies, Güner (2016) and Karaşahin and Küçüksaraç (2016) analyze the issue for non-financial public firms listed on Borsa İstanbul. Güner (2016) focuses on only firm specific variables over the period 2008-2014 while Karaşahin and Küçüksaraç (2016) incorporate firm specific, industry specific and macroeconomic factors over the period 1994-2014. Güner (2016) reports that leverage, which is defined as the ratio of total liabilities to total assets is negatively related with firm size, profitability, growth opportunities and liquidity and not related with non-debt tax shield. On the other hand, Karaşahin and Küçüksaraç (2016) analyze both market leverage and book leverage in their study. Employing a pooled OLS with industry dummies and panel methodologies with firm fixed effects, they show that size, tangibility, industry average leverage are positively related with both market and book leverage whereas profitability and liquidity are negatively related. Growth opportunities are shown to have no impact on book leverage but a negative significant impact on market leverage. Moreover, no significant relationship is found between business risk and firm leverage. In addition, the impacts of corporate tax rate, capital flows and other macroeconomic variables on firm leverage are found to be ambiguous.

Overall the pecking order theory is mostly considered to be a better framework for Turkish firms in studies such as Okuyan and Taşçı (2010a), Yıldız et al. (2009), Korkmaz et al. (2007), Acaravcı and Doğukanlı ( 2004), Güner (2016). On the other hand, the trade off theory is favored in studies such as Karaşahin and Küçüksaraç (2016) and Köksal and Orman (2015).

However, most of findings of these studies for Turkish non-financial firms need to be accepted with some skepticism. One of the main drawbacks of these studies is the lack of representativeness of their samples. They mostly confine their samples to public firms only, hence mostly large firms. Moreover, most of them do not incorporate all relevant leverage determinants in their models. Furthermore, their samples cover relatively short periods of time.

### 1.3. Data

The confidential firm level data utilized in this study is provided by the CBRT. This unique data is the most representative and comprehensive database for Turkish non-financial firms. As a part of the Official Statistics Programme of Turkey, this database which consists of annual balance sheets and income statements of Turkish non-financial firms prepared according to Tax Procedure Law of Turkey is compiled by CBRT. The aggregated reports by sectors and company sizes are released on CBRT`s web site annually while the firm level data is not publicly available for confidentiality reasons.[1]

In contrast to most of other studies, the data utilized in this study does not cover only Turkish publicly traded non-financial firms, but also privately held firms. It is also well diversified in terms of firm size. Of the firms included in the dataset, 14.14 percent are micro sized firms, 37.49 percent are small firms, 33.91 percent are medium firms, and 14.46 percent are large firms on average when the classification is based on number of employees according to European Union (EU) criterion.

[1] Please see the CBRT`s web site for detailed information on the database including data collection process. (*http://www.tcmb.gov.tr/wps/wcm/connect/tcmb+en/tcmb+en/main+menu/statistics/real+sector+statistics/company+accounts*)

Moreover, Small and Medium-Sized Enterprises (SMEs) included in the dataset analyzed in this thesis account for 16.99% of total assets, 12.58% of owners' equity, and 15.92% of total net sales of all Turkish SMEs covered in the database of Republic of Turkey, Ministry of Science, Industry and Technology in 2015. The same ratios for large firms included in the dataset analyzed in this thesis are 35.67%, 40.5%, 31.31%, respectively.

Dataset spans for the last 20 years over the period 1996-2015 which is the longest and most recent period in comparison with other studies for Turkey. It includes about 10,771 firms each year on average, and each of these firms has at least 3 years of consecutive data. Following the common practice, data is winsorized at 0.5% in order to minimize the possible effects of outliers. The end result is an unbalanced panel data with 215,436 firm year observations.

Table 1.1 reports descriptive statistics for the dependent and independent variables used in this thesis for the full sample. Definitions of these variables are given in Section 1.4. In addition, Table 1.2 and Table 1.3 report the descriptive statistics for SMEs and large firms, respectively. Based on European Union and Turkish official criterion, a firm is classified as an ''SME'' if its number of employees is less than 250, and "large" otherwise. Moreover, Panel A of each of these tables reports the descriptive statistics for the full sample period, 1996-2015, while Panels B and C report the descriptive statistics for the subperiods 1996-2002 and 2003-3015, respectively.

The increase in corporate leverage is remarkable between these two subperiods. Total leverage increases by almost 150% from 1996-2002 to 2003-2015 on average. The mean of long term corporate leverage almost triples while short term leverage remains relatively stable between the two subperiods. Hence, this increase in the long term leverage mainly accounts for the increase in total leverage ratios. A similar trend in total leverage and shift in maturity structure can be seen in the median industry leverage numbers. In addition, firm riskiness decreases dramatically from 1996-2002 to 2003-2015, which can be attributed to a more

## Table 1.1 Descriptive statistics, full sample

The sample consists of non-financial firms in the confidential database of CBRT. The table reports the descriptive statistics for the dependent and the independent variables used in this study. Panel A reports the descriptive statistics for the full sample period, 1996-2015, while Panels B and C report the descriptive statistics for the subperiods 1996-2002 and 2003-3015, respectively. Definitions of variables are given in Table 1.4. All variables are expressed as percentages, with the exception of firm size and financial development.

| Variable | Obs | Mean | Sd | 1st Quartile | Median | 3rd Quartile |
|---|---|---|---|---|---|---|
| ***Panel A: Full Sample*** | | | | | | |
| Total leverage | 215,436 | 25.55 | 25.22 | 2.59 | 19.86 | 41.10 |
| Short term leverage | 215,436 | 15.44 | 19.09 | 0.11 | 8.30 | 24.24 |
| Long term leverage | 215,436 | 9.98 | 18.18 | 0.00 | 0.00 | 12.93 |
| Profitability | 215,436 | 5.94 | 15.91 | 0.37 | 4.87 | 11.33 |
| Firm size | 209,172 | 16.16 | 1.99 | 15.14 | 16.29 | 17.34 |
| Firm growth | 175,570 | 24.92 | 89.19 | -0.86 | 20.48 | 48.32 |
| Tangibility | 215,436 | 26.64 | 24.28 | 6.57 | 19.69 | 40.37 |
| Firm business risk | 149,092 | 7.43 | 11.97 | 2.07 | 4.32 | 8.55 |
| Industry median leverage | 400 | 19.05 | 11.67 | 10.32 | 17.88 | 26.50 |
| Industry median leverage short term | 400 | 7.73 | 5.66 | 2.93 | 6.73 | 12.04 |
| Industry median leverage long term | 400 | 3.76 | 7.36 | 0.00 | 0.00 | 5.31 |
| GDP growth | 20 | 4.88 | 4.76 | 4.17 | 6.24 | 7.81 |
| Inflation | 20 | 28.75 | 30.42 | 8.34 | 10.26 | 46.41 |
| Government leverage | 20 | 42.05 | 12.65 | 32.00 | 38.00 | 45.25 |
| Financial development | 20 | 0.44 | 0.05 | 0.40 | 0.43 | 0.49 |
| ***Panel B: 1996-2002*** | | | | | | |
| Total leverage | 62,428 | 18.98 | 25.39 | 0.00 | 8.01 | 29.79 |
| Short term leverage | 62,428 | 14.04 | 20.68 | 0.00 | 4.17 | 20.84 |
| Long term leverage | 62,428 | 4.72 | 14.02 | 0.00 | 0.00 | 0.00 |
| Profitability | 62,428 | 9.11 | 20.40 | 0.65 | 7.55 | 18.43 |
| Firm size | 60,924 | 15.83 | 1.93 | 14.67 | 15.86 | 17.01 |
| Firm growth | 47,573 | 46.17 | 82.35 | 21.77 | 47.54 | 73.08 |
| Tangibility | 62,428 | 24.37 | 23.83 | 5.13 | 16.37 | 37.17 |
| Firm business risk | 37,716 | 10.81 | 14.43 | 3.55 | 7.11 | 12.98 |
| Industry median leverage | 140 | 9.96 | 6.96 | 3.98 | 9.90 | 13.96 |
| Industry median leverage short term | 140 | 5.22 | 4.83 | 0.42 | 4.99 | 7.99 |
| Industry median leverage long term | 140 | 0.22 | 1.50 | 0.00 | 0.00 | 0.00 |
| GDP growth | 7 | 3.00 | 5.58 | -0.54 | 6.43 | 7.01 |
| Inflation | 7 | 64.95 | 23.62 | 53.78 | 68.79 | 74.75 |
| Government leverage | 7 | 44.29 | 17.88 | 32.00 | 37.00 | 53.50 |
| Financial development | 7 | 0.38 | 0.03 | 0.38 | 0.39 | 0.40 |
| ***Panel C: 2003-2015*** | | | | | | |
| Total leverage | 153,008 | 28.23 | 24.65 | 6.34 | 24.46 | 44.00 |
| Short term leverage | 153,008 | 16.01 | 18.37 | 0.50 | 9.91 | 25.30 |
| Long term leverage | 153,008 | 12.12 | 19.22 | 0.00 | 1.31 | 17.88 |
| Profitability | 153,008 | 4.65 | 13.45 | 0.29 | 4.30 | 9.35 |
| Firm size | 148,248 | 16.29 | 2.00 | 15.36 | 16.44 | 17.45 |
| Firm growth | 127,997 | 17.02 | 90.33 | -4.90 | 14.00 | 34.10 |
| Tangibility | 153,008 | 27.57 | 24.40 | 7.37 | 21.03 | 41.54 |
| Firm business risk | 111,376 | 6.28 | 10.77 | 1.82 | 3.69 | 7.08 |
| Industry median leverage | 260 | 23.95 | 10.72 | 16.66 | 23.29 | 30.55 |
| Industry median leverage short term | 260 | 9.08 | 5.62 | 4.03 | 9.25 | 13.14 |
| Industry median leverage long term | 260 | 5.66 | 8.48 | 0.00 | 2.34 | 8.24 |
| GDP growth | 13 | 5.90 | 4.15 | 5.03 | 6.06 | 8.49 |
| Inflation | 13 | 9.25 | 3.13 | 7.40 | 8.81 | 10.06 |
| Government leverage | 13 | 40.85 | 9.43 | 34.00 | 38.00 | 44.00 |
| Financial development | 13 | 0.47 | 0.04 | 0.44 | 0.48 | 0.50 |

**Table 1.2 Descriptive statistics, Small and Medium-Sized Enterprises (SMEs)**

The sample consists of non-financial firms in the confidential database of CBRT. The table reports the descriptive statistics for the dependent and the independent variables used in this study for SMEs. Panel A reports the descriptive statistics for the full sample period, 1996-2015, while Panels B and C report the descriptive statistics for the subperiods 1996-2002 and 2003-3015, respectively. Definitions of variables are given in Table 1.4. Based on European Union as well as Turkish official criterion, a firm is classified as an ''SME'' if its number of employees is less than 250, and "large" otherwise. All variables are expressed as percentages, with the exception of firm size and financial development.

| Variable | Obs | Mean | Std. Dev. | 1st Quartile | Median | 3rd Quartile |
|---|---|---|---|---|---|---|
| ***Panel A: SMEs, full sample*** | | | | | | |
| Total leverage | 184,282 | 25.68 | 25.63 | 2.23 | 19.72 | 41.50 |
| Short term leverage | 184,282 | 15.71 | 19.54 | 0.04 | 8.26 | 24.84 |
| Long term leverage | 184,282 | 9.83 | 18.47 | 0.00 | 0.00 | 12.02 |
| Profitability | 184,282 | 5.77 | 16.01 | 0.25 | 4.70 | 11.05 |
| Firm size | 178,151 | 15.81 | 1.86 | 14.92 | 16.02 | 16.94 |
| Firm growth | 147,810 | 25.02 | 93.70 | -2.35 | 20.85 | 49.89 |
| Tangibility | 184,282 | 26.22 | 24.76 | 5.85 | 18.50 | 39.98 |
| Firm business risk | 124,617 | 7.69 | 12.65 | 2.05 | 4.35 | 8.80 |
| Industry median leverage | 400 | 19.05 | 11.67 | 10.32 | 17.88 | 26.50 |
| Industry median leverage short term | 400 | 7.73 | 5.66 | 2.93 | 6.73 | 12.04 |
| Industry median leverage long term | 400 | 3.76 | 7.36 | 0.00 | 0.00 | 5.31 |
| GDP growth | 20 | 4.88 | 4.76 | 4.17 | 6.24 | 7.81 |
| Inflation | 20 | 28.75 | 30.42 | 8.34 | 10.26 | 46.41 |
| Government leverage | 20 | 42.05 | 12.65 | 32.00 | 38.00 | 45.25 |
| Financial development | 20 | 0.44 | 0.05 | 0.40 | 0.43 | 0.49 |
| ***Panel B: SMEs, 1996-2002*** | | | | | | |
| Total leverage | 54,858 | 18.19 | 25.35 | 0.00 | 6.85 | 27.90 |
| Short term leverage | 54,858 | 13.66 | 20.77 | 0.00 | 3.47 | 19.88 |
| Long term leverage | 54,858 | 4.30 | 13.84 | 0.00 | 0.00 | 0.00 |
| Profitability | 54,858 | 8.98 | 20.53 | 0.56 | 7.34 | 18.23 |
| Firm size | 53,402 | 15.52 | 1.76 | 14.50 | 15.62 | 16.61 |
| Firm growth | 41,347 | 45.30 | 85.28 | 19.55 | 46.86 | 73.58 |
| Tangibility | 54,858 | 23.53 | 24.01 | 4.50 | 14.75 | 35.62 |
| Firm business risk | 32,741 | 11.20 | 15.11 | 3.62 | 7.30 | 13.46 |
| Industry median leverage | 140 | 9.96 | 6.96 | 3.98 | 9.90 | 13.96 |
| Industry median leverage short term | 140 | 5.22 | 4.83 | 0.42 | 4.99 | 7.99 |
| Industry median leverage long term | 140 | 0.22 | 1.50 | 0.00 | 0.00 | 0.00 |
| GDP growth | 7 | 3.00 | 5.58 | -0.54 | 6.43 | 7.01 |
| Inflation | 7 | 64.95 | 23.62 | 53.78 | 68.79 | 74.75 |
| Government leverage | 7 | 44.29 | 17.88 | 32.00 | 37.00 | 53.50 |
| Financial development | 7 | 0.38 | 0.03 | 0.38 | 0.39 | 0.40 |
| ***Panel C: SMEs, 2003-2015*** | | | | | | |
| Total leverage | 129,424 | 28.85 | 25.08 | 6.46 | 25.18 | 44.94 |
| Short term leverage | 129,424 | 16.57 | 18.93 | 0.43 | 10.33 | 26.38 |
| Long term leverage | 129,424 | 12.18 | 19.65 | 0.00 | 0.82 | 17.83 |
| Profitability | 129,424 | 4.41 | 13.42 | 0.16 | 4.12 | 9.03 |
| Firm size | 124,749 | 15.94 | 1.89 | 15.13 | 16.18 | 17.05 |
| Firm growth | 106,463 | 17.14 | 95.63 | -6.62 | 13.96 | 35.76 |
| Tangibility | 129,424 | 27.36 | 24.99 | 6.64 | 20.09 | 41.62 |
| Firm business risk | 91,876 | 6.44 | 11.39 | 1.78 | 3.66 | 7.15 |
| Industry median leverage | 260 | 23.95 | 10.72 | 16.66 | 23.29 | 30.55 |
| Industry median leverage short term | 260 | 9.08 | 5.62 | 4.03 | 9.25 | 13.14 |
| Industry median leverage long term | 260 | 5.66 | 8.48 | 0.00 | 2.34 | 8.24 |
| GDP growth | 13 | 5.90 | 4.15 | 5.03 | 6.06 | 8.49 |
| Inflation | 13 | 9.25 | 3.13 | 7.40 | 8.81 | 10.06 |
| Government leverage | 13 | 40.85 | 9.43 | 34.00 | 38.00 | 44.00 |
| Financial development | 13 | 0.47 | 0.04 | 0.44 | 0.48 | 0.50 |

## Table 1.3 Descriptive statistics, large firms

The sample consists of non-financial firms in the confidential database of CBRT. The table reports the descriptive statistics for the dependent and the independent variables used in this study for large firms. Panel A reports the descriptive statistics for the full sample period, 1996-2015, while Panels B and C report the descriptive statistics for the subperiods 1996-2002 and 2003-3015, respectively. Definitions of variables are given in Table 1.4. Based on European Union as well as Turkish official criterion, a firm is classified as an ''SME'' if its number of employees is less than 250, and "large" otherwise. All variables are expressed as percentages, with the exception of firm size and financial development.

| Variable | Obs | Mean | Std. Dev. | 1st Quartile | Median | 3rd Quartile |
|---|---|---|---|---|---|---|
| ***Panel A: Large firms, full sample*** | | | | | | |
| Total leverage | 31,154 | 24.75 | 22.63 | 4.95 | 20.56 | 39.05 |
| Short term leverage | 31,154 | 13.85 | 16.10 | 0.74 | 8.44 | 21.32 |
| Long term leverage | 31,154 | 10.83 | 16.33 | 0.00 | 2.61 | 16.38 |
| Profitability | 31,154 | 6.99 | 15.29 | 1.20 | 5.96 | 12.85 |
| Firm size | 31,021 | 18.16 | 1.44 | 17.31 | 18.11 | 19.04 |
| Firm growth | 27,760 | 24.41 | 59.61 | 4.35 | 19.07 | 40.88 |
| Tangibility | 31,154 | 29.14 | 21.00 | 12.46 | 25.34 | 41.92 |
| Firm business risk | 24,475 | 6.08 | 7.46 | 2.16 | 4.21 | 7.54 |
| Industry median leverage | 400 | 19.05 | 11.67 | 10.32 | 17.88 | 26.50 |
| Industry median leverage short term | 400 | 7.73 | 5.66 | 2.93 | 6.73 | 12.04 |
| Industry median leverage long term | 400 | 3.76 | 7.36 | 0.00 | 0.00 | 5.31 |
| GDP growth | 20 | 4.88 | 4.76 | 4.17 | 6.24 | 7.81 |
| Inflation | 20 | 28.75 | 30.42 | 8.34 | 10.26 | 46.41 |
| Government leverage | 20 | 42.05 | 12.65 | 32.00 | 38.00 | 45.25 |
| Financial development | 20 | 0.44 | 0.05 | 0.40 | 0.43 | 0.49 |
| ***Panel B: Large firms, 1996-2002*** | | | | | | |
| Total leverage | 7,570 | 24.66 | 25.01 | 2.01 | 18.67 | 39.68 |
| Short term leverage | 7,570 | 16.76 | 19.83 | 0.40 | 9.45 | 26.55 |
| Long term leverage | 7,570 | 7.75 | 14.97 | 0.00 | 0.00 | 10.02 |
| Profitability | 7,570 | 10.05 | 19.40 | 1.30 | 9.03 | 19.59 |
| Firm size | 7,522 | 18.08 | 1.49 | 17.28 | 18.08 | 18.98 |
| Firm growth | 6,226 | 51.96 | 58.98 | 32.74 | 50.58 | 70.44 |
| Tangibility | 7,570 | 30.47 | 21.48 | 13.31 | 26.71 | 43.99 |
| Firm business risk | 4,975 | 8.23 | 8.32 | 3.18 | 6.07 | 10.36 |
| Industry median leverage | 140 | 9.96 | 6.96 | 3.98 | 9.90 | 13.96 |
| Industry median leverage short term | 140 | 5.22 | 4.83 | 0.42 | 4.99 | 7.99 |
| Industry median leverage long term | 140 | 0.22 | 1.50 | 0.00 | 0.00 | 0.00 |
| GDP growth | 7 | 3.00 | 5.58 | -0.54 | 6.43 | 7.01 |
| Inflation | 7 | 64.95 | 23.62 | 53.78 | 68.79 | 74.75 |
| Government leverage | 7 | 44.29 | 17.88 | 32.00 | 37.00 | 53.50 |
| Financial development | 7 | 0.38 | 0.03 | 0.38 | 0.39 | 0.40 |
| ***Panel C: Large firms, 2003-2015*** | | | | | | |
| Total leverage | 23,584 | 24.78 | 21.82 | 5.86 | 21.00 | 38.85 |
| Short term leverage | 23,584 | 12.92 | 14.57 | 0.87 | 8.23 | 20.03 |
| Long term leverage | 23,584 | 11.82 | 16.62 | 0.00 | 4.33 | 18.24 |
| Profitability | 23,584 | 6.01 | 13.56 | 1.17 | 5.44 | 11.20 |
| Firm size | 23,499 | 18.18 | 1.42 | 17.31 | 18.12 | 19.06 |
| Firm growth | 21,534 | 16.45 | 57.37 | 1.28 | 14.12 | 28.05 |
| Tangibility | 23,584 | 28.72 | 20.83 | 12.17 | 24.97 | 41.27 |
| Firm business risk | 19,500 | 5.53 | 7.12 | 2.00 | 3.83 | 6.84 |
| Industry median leverage | 260 | 23.95 | 10.72 | 16.66 | 23.29 | 30.55 |
| Industry median leverage short term | 260 | 9.08 | 5.62 | 4.03 | 9.25 | 13.14 |
| Industry median leverage long term | 260 | 5.66 | 8.48 | 0.00 | 2.34 | 8.24 |
| GDP growth | 13 | 5.90 | 4.15 | 5.03 | 6.06 | 8.49 |
| Inflation | 13 | 9.25 | 3.13 | 7.40 | 8.81 | 10.06 |
| Government leverage | 13 | 40.85 | 9.43 | 34.00 | 38.00 | 44.00 |
| Financial development | 13 | 0.47 | 0.04 | 0.44 | 0.48 | 0.50 |

stable economic environment for the latter period. The mean of firm business risk decreases to 6.28% from 10.81% while standard deviation decreases to 10.77% from 14.43%. Moreover, the improvement in financial development and decrease in government leverage are worthwhile to note for the latter period.

On average, total leverage of SMEs is higher than total leverage of large firms. This is also the case for firm riskiness. In contrast to large firms, increase in total leverage is significantly higher for SMEs from the period 1996-2002 to 2003-2015. Total leverage of SMEs increases by almost 158% on average. Besides, maturity structure shift in corporate leverage is considerable for both SMEs and large firms. However, change in the usage of long term debt is significantly higher for SMEs than large firms (283% vs 153%).

Financial development index used in this study is obtained from Svirydzenka (2016). Remaining economic environment and macroeconomic variables are obtained from Electronic Data Delivery System (EDDS) of CBRT, Turkish Statistical Institute and Undersecretariat of Treasury of the Republic of Turkey.

### 1.4. Measurements and Hypothesis Development

In this section, the measurements of the variables and hypothesis development are discussed. Variables which are related with capital structure decision of firms can be classified as economic environment, firm characteristics, industry-specific and macroeconomic variables. Definitions of the variables are presented in Table 1.4.

#### 1.4.1. Leverage

Different definitions of leverage are used in the existing literature. Using book leverage or market leverage stands as the main argument and no consensus is achieved regarding the issue. Myers (1977) claims that debt is more related with assets in place rather than the growth opportunities of the firm, thus book leverage should be used for firms rather than the market leverage. Chava and Roberts (2008) also argue that book leverage is mostly the focus of financing decisions specifically the credit decisions. Moreover, Graham and Harvey (2001) argue that managers

**Table 1.4 Variable definitions**

The table reports the definitions of the dependent and the independent variables used in this study.

| Variables | Definitions |
|---|---|
| Total leverage | Total leverage, calculated as the book value of total financial debt divided by total assets |
| Short term leverage | Short term leverage, calculated as the book value of total short term financial debt divided by total assets |
| Long term leverage | Long term leverage, calculated as the book value of total long term financial debt divided by total assets |
| ***Economic Environment Factors*** | |
| Financial Development | Index created by Svirydzenka (2016) |
| Government Borrowing | Government leverage, calculated as the government debt divided by GDP |
| Stock Market Conditions | Calculated as the return on BIST 100 index |
| ***Firm Characteristics*** | |
| Profitability | Firm profitability, calculated as the operating income divided by total assets |
| Size | Size of the firm, calculated as the log of sales deflated by GDP deflator |
| Growth | Firm growth rate, calculated as the difference in the net sales between current year and previous year divided by the net sales in previous year |
| Tangibility | Firm tangibility ratio, calculated as the total net plant, property and equipment divided by total assets |
| Risk | Firm business risk, calculated as the standard deviation of the ratio of operating income to total assets for the last consecutive three years |
| ***Industry Specific Factors*** | |
| Industy median total leverage | Calculated as the median of related total leverage ratio of all the firms operating in the industry of a firm. Sector classification is based on economic activity classification, NACE Rev.2 which is released by EUROSTAT |
| Industy median short term leverage | Calculated as the median of related short term leverage ratio of all the firms operating in the industry of a firm |
| Industy median long therm leverage | Calculated as the median of related long term leverage ratio of all the firms operating in the industry of a firm |
| ***Macroeconomic Factors*** | |
| GDP growth | GDP growth rate, calculated as the percentage change in annual real GDP |
| Inflation | Inflation rate, calculated as the difference in the Consumer Price Index between current year and previous year divided by the Consumer Price Index in previous year |

mostly do not adjust their capital structure as a result of changes in the equity markets due to the costs associated with adjustments. On the other hand, some researchers such as Welch (2004) argue that market leverage is more relevant and more economically meaningful since market leverage is forward looking while book leverage is backward looking.

Moreover, different definitions of debt based on the maturity of liabilities are used in the literature, as well. Long term debt is considered as financing long term plans and investments of firms, while short term debt is mostly financing the current operations of the firm. Besides, short term debt is considered as having a significant impact on the financial risk of the firm such as maturity risk. It plays a significant role in increasing the vulnerability of the firms to the economic environment fluctuations, which has potential effects on capital structure decisions, financial health of firms and health of the financial system. These effects are considered as more relevant for developing countries (Demirgüç-Kunt and Maksimovic, 1999; Schmukler and Vesperoni, 2006). Thus, in addition to long term debt, it is useful to consider short term debt in this study since short term debt is used much more dominantly than long term for debt by our sample of firms. For robustness, all above mentioned leverage measures with the exception of market leverage, due to data constraints, are used in this study.

### 1.4.2. Economic Environment

#### 1.4.2.1. Financial Development

Information asymmetry and agency costs are the main frictions in theory of capital structure (Jensen and Meckling, 1976, Myers, 1977, and Myers, 1984). In mitigating these frictions as well as in easing the access to capital, financial intermediaries play an important role (Leland and Pyle, 1977; Diamond, 1984). Hence, corporate debt is expected to increase with financial development.

In the literature, it is common to measure financial development as the ratio of domestic credit to private sector to GDP, and the ratio of stock market capitalization

to GDP. On the other hand, in one of the most recent studies, Svirydzenka (2016) argues that the aforementioned measures do not take into account the complex multidimensional nature of financial development. She constructs six lower level sub-indices using a list of indicators to measure how efficient, accessible and deep the financial markets and the financial institutions are. These sub-indices are FMD, FMA, FME, FID, FIA, and FIE. The letters M and I denote markets and institutions, and the letters A, D, and E denote access, depth, and efficiency, respectively. In order to achieve these indices, first the indicators are normalized, and then aggregated by the weights which are obtained by the principal component analysis. Moreover, these sub-indices are aggregated into FM and FI in order to measure development of financial markets and institutions, respectively. Finally, these two indices are aggregated in order to achieve an overall measure of financial development. In this study, this overall measure of financial development is used, and it is obtained from Svirydzenka (2016).

#### 1.4.2.2. Government Leverage

Taggart (1985) states that the interaction between investor demand for securities by firms and supply of securities by firms determines the aggregate level of leverage in the economy. In that sense, Graham et al. (2015) present the illustration of this theoretical concept based on the model of Miller (1977), and point out that an increase in the supply of competing securities such as government bonds leads to a reduction in corporate debt in equilibrium by shifting the demand curve of corporate debt. The existing literature, such as Friedman (1986), Taggart (1985), McDonald (1983) also point out that fluctuations in the supply of government securities shift the demand curve of corporate debt in the opposite direction. Thus, government leverage is expected to have a negative relation with the demand for corporate debt. Following the common practice in the literature, government leverage is measured as the ratio of government debt to GDP in this paper.

#### 1.4.2.3. Stock Market Conditions

Previous literature presents ample evidence regarding the stock market and capital structure decisions of firms (Welch, 2004, Choe et al. 1993; Korajczyk et al. 1990, Bayless and Chaplinksy, 1991 and others). Equity market return is also considered as the cost of a financing source which is an alternative to the corporate debt (Graham et al., 2015). Thus, equity market return is incorporated into the models for public firms as an economic environment variable and measured as the return on the BIST 100 index.

On the other hand, corporate tax rate did not exhibit significant variation in Turkey, especially after 2000. Besides, too many tax advantages as well as tax amnesties unprecedentedly are given to various sectors and these make measurement impossible. Hence, tax incentive is not incorporated into models as an economic environment factor.

### 1.4.3. Firm Characteristics

Firm characteristics which are related with capital structure decision of firms and proxying for frictions regarding imperfect elasticity of supply of debt are identified in previous literature. Therefore, firm specific factors such as profitability, firm size, tangibility, growth and firm business risk are used in this study following Rajan and Zingales (1995), Frank and Goyal (2009) and Graham et al. (2015).

#### 1.4.3.1. Profitability

Profitability reduces financial distress costs of firms and interest tax shields become more valuable for profitable firms. Hence a positive relationship is expected between leverage and profitability according to the trade off theory (TOT). However some studies such as Strebulaev (2007) and Kayhan and Titman (2007) argue that the said relation is not as straightforward as claimed and the relation can be negative due to frictions. Besides, Myers (1977) and Jensen (1986) argue that profitability of firms can increase the free cash flow problem and accordingly, the

discipline provided by debt can mitigate this problem. On the other hand, according to the pecking order theory (POT), firms with more profits are expected to have less debt since internal funds are preferred to external funds considering the adverse selection problem associated with external funding.

In this study, profitability is measured as the ratio of operating income to total assets following Graham et al. (2015), De Jong et al. (2008), Frank and Goyal (2009) and others.

#### 1.4.3.2. Firm Size

Default risk and agency costs are considered as decreasing with the firm size. Besides, retained earnings are expected to increase with the firm size. Hence, corporate leverage is expected to be negatively related with the firm size according to POT while it is expected to be positively related with it according to TOT.

Firm size is measured as the natural log of sales deflated by GDP deflator following Rajan and Zingales (1995), Graham et al. (2015) and Titman and Wessels (1988).

#### 1.4.3.3. Firm Growth

Majority of the growth firms' value comes from the growth opportunities that they have. The value of these growth opportunities declines significantly during times of financial distress. On the other hand, holding profitability constant, growth firms with more investment opportunities need more debt due to insufficiency of their internal funds. Hence, POT predicts a positive relationship between leverage and firm growth while TOT predicts the opposite. In this study, growth is measured as the annual percentage change in sales following Frank and Goyal (2009).

#### 1.4.3.4. Tangibility

Financial distress costs are expected to be decreasing with tangibility of assets since collateralization is easier with tangible assets than intangible assets. Moreover,

asymmetric information can be considered as decreasing with tangibility, which decreases the cost of issuing equity (Harris and Raviv, 1991). Thus, a positive relation is expected between leverage and tangibility according to TOT while the said relation is expected to be negative according to POT.

Tangibility is measured as the ratio of net plant, property and equipment to total assets following Frank and Goyal (2009), Demirgüç-Kunt and Maksimovic (1999), Graham et al. (2015), and others.

#### 1.4.3.5. Risk

Volatility in earnings and cash flows increases expected financial distress costs. Also, adverse selection between firms and creditors is expected to be increasing with the said volatility. Hence, the relationship between leverage and risk is expected to be negative according to both POT and TOT. Following De Jong et al. (2008) and Graham et al. (2015), it is measured as the standard deviation of the ratio of operating income to total assets which is calculated over the last trailing three years.

### 1.4.4. Industry Specific Variables

Previous literature provides ample evidence in support for the claim that leverage ratios significantly differ across industries. Median leverage of the industry is argued to be a benchmark for a firm in an industry, hence, a proxy for target leverage. It is also argued to be a proxy for some omitted common industry factors (Hull, 1999; Hovakimian et al., 2001; Flannery and Rangan, 2006; Frank and Goyal, 2008, 2009). Thus, corporate leverage is expected to be increasing with industry median leverage according to TOT while the said relation is not certain according to POT.

In this study, following the common practice in the literature median leverage for an industry measured as the median of related leverage ratio of all the firms operating in the industry of a firm is used as a proxy for industry conditions. Sector

classification is based on economic activity classification, NACE Rev.2, which is released by EUROSTAT.

### 1.4.5. Macroeconomic Factors

Existing literature provides ample evidence showing significant impact of macroeconomic variables on capital structure decision of firms. Following the literature, key macroeconomic variables, namely GDP growth and expected inflation are incorporated in the analysis.

#### 1.4.5.1. GDP Growth

During economic expansions, expected bankruptcy costs fall while corporate profits and cash increase. Besides, it is more likely that collateral values of firms increase during expansions. Hence, according to TOT leverage is expected to be procyclical. On the other hand, if POT holds corporate leverage is likely to decrease since internal funds of firms increase and agency problem between managers and owners becomes less severe during expansions (Frank and Goyal, 2009). Following Graham et al. (2015) and others, it is measured as the annual percentage change in real GDP.

#### 1.4.5.2. Inflation

Expected inflation is considered to be a less reliable factor, and there is no consensus regarding its impact on firm leverage in the literature. It is also expected to be even less reliable when book based leverage is used since expected inflation is forward looking while book leverage is backward looking. However, it is one of the common variables included only as a macroeconomic factor in order to examine the influence of the economic environment on capital structure decisions (Frank and Goyal, 2009). Following Graham et al. (2015) and others, expected inflation is roughly proxied by realized inflation, and measured as annual percentage change in Consumer Price Index (CPI).

## 1.5. Methodology

Pooled Ordinary Least Squares (OLS) is the most restrictive model that specifies a constant slope and ignores the unobservable fixed effects. Hence, it yields inconsistent and biased results. In order to deal with the issue, Panel Fixed Effects Model (PFEM) is employed. PFEM model is preferred to Random Fixed Effects Model based on Hausman test results. In PFEM model, different intercept terms are allowed for each cross sectional unit and unobserved heterogeneity is incorporated. Moreover, PFEM deals with the biased results caused by unobserved heterogeneity (Li and Prabhala, 2007; Wooldridge, 2010; Roberts and Whited, 2012). The Panel Fixed Effects Model employed in this study is given in equation 1.1 as follows:

$$CL_{it} = \alpha + \sum_{k} \gamma_k F_{k,it-1} + \sum_{l} \beta_l I_{l,it} + \sum_{m} \delta_m EE_{m,it} + \sum_{n} \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \qquad (1.1)$$

where $CL_{it}$ denotes corporate leverage of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables mentioned in Section 1.4. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term.

## 1.6. Results

Table 1.5 presents estimation results of the empirical panel model in equation 1.1 for the full sample over the period 1996-2015. I estimate the model using short term, long term and total financial debt as leverage in the first, second and third columns, respectively. Results reveal following inferences.

### 1.6.1. Economic environment factors

#### 1.6.1.1. Does financial development matter?

In recent decades, both financial markets and institutional development in terms of efficiency, depth and access have improved significantly in Turkey. This can be

## Table 1.5 Leverage dynamics

The sample consists of non-financial firms in the confidential database of CBRT over the period 1996-2015. The table presents full sample results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm $i$ in year $t$; $F$ is the vector of firm characteristics while $I$ is the industry specific components; $EE$ denotes the proxies for economic environment and $X$ is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Short Term Leverage | Long Term Leverage | Total Leverage |
|---|---|---|---|
| ***Firm Characteristics*** | | | |
| Profitability | -0.030*** | -0.035*** | -0.072*** |
| | (0.005) | (0.004) | (0.007) |
| Size | 0.0159*** | 0.0079*** | 0.0234*** |
| | (0.001) | (0.001) | (0.001) |
| Growth | -0.004*** | -0.001 | -0.005*** |
| | (0.000) | (0.000) | (0.000) |
| Tangibility | -0.028*** | 0.0498*** | 0.0211** |
| | (0.005) | (0.006) | (0.008) |
| Business risk | -0.005 | -0.029*** | -0.032*** |
| | (0.008) | (0.008) | (0.011) |
| ***Industry Specific Factor*** | | | |
| Industry median leverage | 0.4653*** | 0.1774*** | 0.2650*** |
| | (0.034) | (0.026) | (0.020) |
| ***Macroeconomic/Economic Environment Factors*** | | | |
| GDP growth | 0.0158 | -0.016* | 0.0117 |
| | (0.010) | (0.009) | (0.012) |
| Inflation | 0.0536*** | 0.0153*** | 0.0652*** |
| | (0.005) | (0.004) | (0.006) |
| FDI | -0.060*** | 0.3151*** | 0.1660*** |
| | (0.023) | (0.020) | (0.030) |
| Government leverage | -0.024*** | 0.0043 | -0.017** |
| | (0.006) | (0.004) | (0.007) |
| Constant | -0.115*** | -0.197*** | -0.269*** |
| | (0.020) | (0.020) | (0.028) |
| Observations | 112,917 | 112,917 | 112,917 |
| Adjusted $R^2$ | 0.0505 | 0.1219 | 0.0682 |

seen through the most recent financial development index (FDI) created by Svirydzenka (2016), which takes into account the complex multidimensional nature of financial development.

According to this index, financial development in Turkey has increased by 26 percent from 2001 to 2015. Similarly, according to BIS data corporate debt in Turkey has increased by 35 percent as of GDP over the same time period (Figure 1.3). Thus, corporate debt is expected to increase with financial development since financial institutions play a vital role in mitigating frictions regarding information asymmetry and agency costs as well as in easing access of firms to capital.

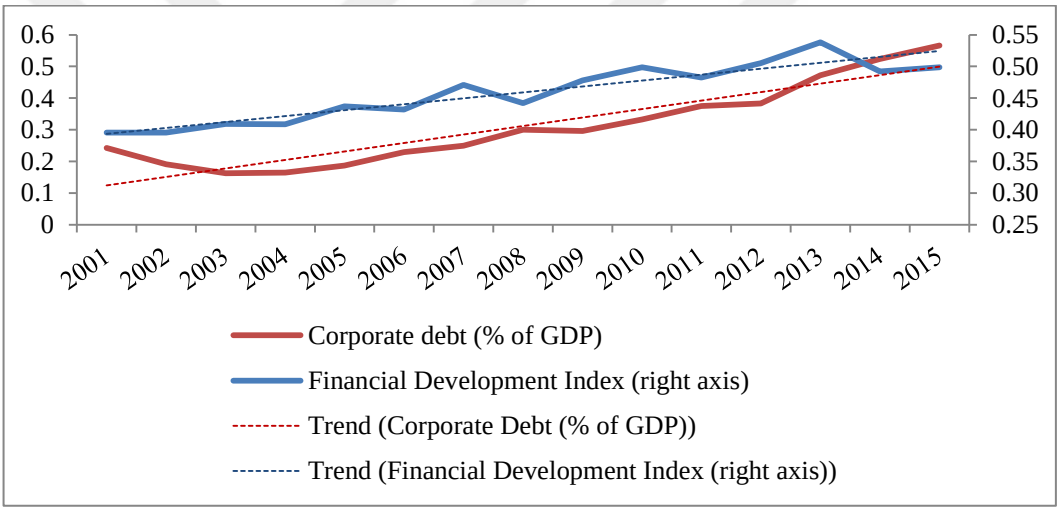


**Figure 1.3 Corporate Debt and Financial Development in Turkey**
The red and dashed red lines represent annual ratio of non-financial corporate debt to Gross Domestic Product (GDP) in Turkey from 2001 to 2015 and its linear trend, respectively. The blue and dashed blue lines represent financial development index for each year from 2001 to 2015 and its linear trend, respectively. Non-financial corporate debt to GDP data is obtained from the Bank for International Settlements (BIS) database, and financial development index is obtained from Svirydzenka (2016).

Panel estimations in Table 1.5 show that there is a significant association between financial development and corporate leverage.[2] The coefficient of FDI is significantly negative for short term leverage (column 1) while it is significantly

[2] Küçükkaya and Soytaş (2011) construct a financial development index for Turkey for the period 1991 to 2005 by using Principal Component Analysis. Using the same methodology I reconstructed the index for the period 1991 to 2015. For robustness, this reconstructed index is also used as an alternative measurement of financial development in addition to the index created by Svirydzenka (2016). Results are in line with those in Table 1.5.

positive for long term and total leverage (column 2 and 3). This suggests that financial development has a significant impact on the maturity structure of corporate debt in Turkey. Results provide evidence that improvement in financial development has significant impact on decreasing short term leverage and increasing long term leverage. Moreover, it is worthwhile to note that FDI is the explanatory variable that has the highest impact on long term leverage in the model. Economically, results suggest that a 10 percent increase in financial development is associated with a 3.2 percentage points increase in long term leverage, which amounts to almost a 32% increase in long term leverage ratios of firms (from 9.98% to 13.18%). On the other hand, the association between this variable and short term leverage is not that high, i.e. only -0.6% decline in short term leverage when FDI increases by 10%.

#### 1.6.1.2. Crowding in/out effect of government leverage

It is well documented in the literature that fluctuations in the supply of government securities shift the demand curve of corporate debt in the opposite direction. Thus, government leverage is expected to have a negative relation with the demand for corporate debt. According to BIS database, government debt in Turkey has substantially decreased from 78 percent to 32.9 percent of GDP while the corporate debt increased from 24 percent to 56 percent of GDP over 2001-2015 period (Figure 1.4).

In order to provide empirical evidence for the aforementioned relationship, corporate leverage is incorporated to the model as an explanatory variable. Results in Table 1.5 reveal that there is a significant relation between corporate leverage and government leverage. In columns 1 and 3, controlling firm specific, industry specific and other related macroeconomic variables, the coefficients of this variable are significant and negative. This indicates that government leverage has a significant adverse impact on short term and total corporate leverage. Results suggest that a one percentage decrease in government leverage is associated with 0.24% and 0.17% increases in short term and total leverage, respectively. In other

words, results provide significant supporting evidence from a firm level data that government debt crowds in/out short term and total corporate debt during the sample period, 1996-2015. This finding is in line with Graham et al. (2015), Friedman (1986), Taggart (1985), McDonald (1983) and Miller (1977).

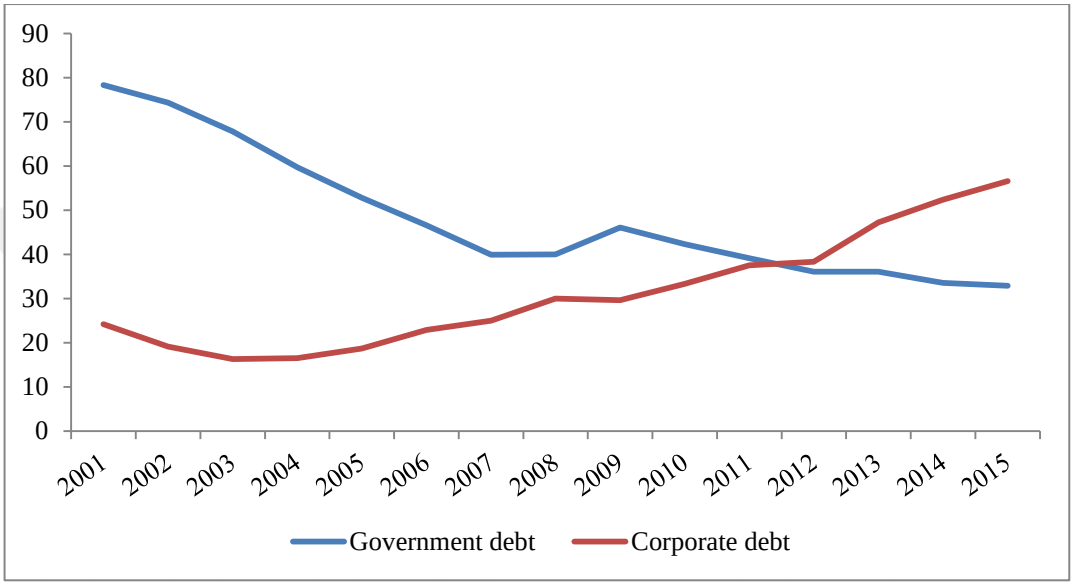


**Figure 1.4 Government Debt and Corporate Debt in Turkey (% of GDP)**
The red line represents ratio of non-financial corporate debt to Gross Domestic Product (GDP) while the blue line represents government leverage to GDP ratio in Turkey for each year from 2001 to 2015. Data is obtained from the Bank for International Settlements (BIS) database.

### 1.6.2. Firm specific and industry specific factors

I do find that profitability, firm size and tangibility have significant associations with leverage regardless of maturity structure. The coefficient is negative and highly significant at 1% level for profitability while it is positive and highly significant at 1% level for firm size in all specifications. On the other hand, the coefficient of tangibility is significantly negative when dependent variable is short term leverage (column 1) and significantly positive when dependent variable is long term and total leverage (column 2 and 3). These suggest that firms with higher profit ratios and smaller size tend to have lower leverage in all maturity terms. Besides, firms with higher tangibility tend to have higher long term debt ratios and

lower short term debt ratios. This reveals that firms tend to match maturities of their assets and liabilities in Turkey. These results are in line with previous studies regarding Turkish non-financial firms. Moreover, although the aim of this study is not a formal testing of the capital structure theories, results regarding profitability are consistent with the pecking order theory while results regarding firm size and tangibility are consistent with the trade off theory.

On the other hand, firm growth and firm business risk have significant negative associations with short term and long term leverage, respectively. This indicates that growth firms with higher expected financial distress tend to have lower short term leverage which is in line with the trade off theory. Besides, riskier firms tend to have difficulty in accessing long term credit due to adverse selection and/or expected higher financial distress costs. These results are consistent with both the pecking order and the trade off theories.

Moreover, results show that industry median leverage is significantly and positively associated with both short term and long term leverage. Moreover, it is the explanatory variable that has the highest impact on short term leverage. Results suggest that a 10 percent increase in industry median leverage is associated with 4.7% and 1.8% increase in short term and long term leverages, respectively. Median leverage of the industry is argued to be a benchmark for a firm in that industry and can be taken as a proxy for target leverage (Hull, 1999, Hovakimian et al. 2001, Flannery and Rangan, 2006, Frank and Goyal, 2008, 2009). In that sense, results seem to be in line with the trade off theory.[3]

### 1.6.3. Macroeconomic factors

Results show that the impact of GDP is significantly negative on long term leverage while the impact of inflation is significantly positive on both short and long term leverages. Frank and Goyal (2009) argues that corporate leverage is likely to be

[3] For robustness, I re-estimate all alternative model spesifications discussed in this chapter excluding industry median leverage. Results are in line with those reported in all tables that has industry median leverage as an explanatory variable.

countercyclical since internal funds of firms increase and agency problems between managers and owners become less severe during expansions. Thus, result on GDP growth seems to be in line with the pecking order theory.

On the other hand, results suggest that firms increase their leverage with inflation. One explanation for this can be that increase in inflation-adjusted nominal interest rates increases the tax advantage of corporate debt which is in line with the trade off theory. However, I argue that following issues regarding the impact of inflation are worthwhile to be noted. Firstly, expected inflation is considered to be a less reliable explanatory variable in the literature when book based leverage is used since expected inflation is forward looking while book leverage is backward looking. However, book based leverage is used in this study due to the data constraints. Secondly, predictions of expected inflation in Turkey have always been problematic because of high inflation environment with both structural and cyclical issues. Thus, following Graham et al. (2015) and others, expected inflation is roughly proxied by realized inflation in this study. In that sense, I argue that results on inflation should be taken with skepticism. Nevertheless, following the literature it is included only as a macroeconomic factor in order to examine the influence of the economic environment on capital structure decisions (Frank and Goyal, 2009).

Moreover, in order to control for the possible bias induced by firm entry or exit, I re-estimate all model specifications for the firms that have at least T years of consecutive data, where $T \in [4, 20]$. T= 3 represents the full sample since the sample of this study consists of firms that has at least 3 years of consecutive data. No bias due to exit or entry of firms is evident in results.[4]

### 1.6.4. Does ownership status of firms matter?

There are several studies in the literature showing the impact of firm ownership status on main frictions such as information asymmetry and agency costs. Furthermore, ample evidence is provided regarding the relationship between stock

[4] To conserve space, these results are not reported in the thesis. However, they are available from the author of thesis upon request.

## Table 1.6 Leverage dynamics, private versus public firms

The sample consists of non-financial firms in the confidential database of CBRT over the period 1996-2015. The table presents full sample results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Results for private and public firms are given in Panel A and B, respectively. Results with an additional economic environment variable, equity market return measured as the return on *BIST 100 (BIST_Return*) index for public firms are given in Panel C. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Leverage | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Panel A: Private firms | | | Panel B: Publicly traded firms | | | Panel C: Publicly traded firms (BIST_Return) | | |
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| ***Firm Characteristics*** | | | | | | | | | |
| Profitability | -0.029*** | -0.034*** | -0.068*** | -0.135*** | -0.116*** | -0.239*** | -0.122*** | -0.115*** | -0.227*** |
| | (0.006) | (0.004) | (0.007) | (0.047) | (0.036) | (0.056) | (0.047) | (0.036) | (0.056) |
| Size | 0.0156*** | 0.0079*** | 0.0232*** | 0.0278** | 0.0098 | 0.0333*** | 0.0269** | 0.0097 | 0.0326*** |
| | (0.001) | (0.001) | (0.001) | (0.011) | (0.007) | (0.010) | (0.011) | (0.007) | (0.010) |
| Growth | -0.004*** | -0.001 | -0.005*** | -0.017* | -0.009 | -0.020* | -0.016* | -0.009 | -0.019* |
| | (0.001) | (0.001) | (0.000) | (0.009) | (0.006) | (0.010) | (0.009) | (0.006) | (0.010) |
| Tangibility | -0.031*** | 0.0493*** | 0.0178** | 0.0145 | 0.0596* | 0.0797** | 0.0226 | 0.0603* | 0.0866** |
| | (0.006) | (0.007) | (0.008) | (0.036) | (0.033) | (0.039) | (0.036) | (0.033) | (0.040) |
| Business risk | -0.007 | -0.029*** | -0.033*** | 0.1105 | -0.053 | -0.009 | 0.116 | -0.053 | -0.005 |
| | (0.009) | (0.008) | (0.012) | (0.084) | (0.069) | (0.090) | (0.084) | (0.069) | (0.090) |
| ***Industry Specific Factor*** | | | | | | | | | |
| Industry median leverage | 0.4816*** | 0.1728*** | 0.2615*** | -0.096 | 0.3775*** | 0.2859*** | -0.085 | 0.3718*** | 0.2421** |
| | (0.035) | (0.027) | (0.020) | (0.178) | (0.139) | (0.104) | (0.178) | (0.14) | (0.105) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | | |
| GDP growth | 0.016 | -0.014 | 0.0132 | 0.0279 | -0.053 | 0.0011 | -0.05 | -0.061 | -0.077 |
| | (0.01) | (0.01) | (0.013) | (0.047) | (0.047) | (0.056) | (0.048) | (0.05) | (0.062) |
| Inflation | 0.0488*** | 0.0162*** | 0.0604*** | 0.1862*** | -0.008 | 0.1932*** | 0.2123*** | -0.005 | 0.2185*** |
| | (0.005) | (0.004) | (0.006) | (0.023) | (0.022) | (0.026) | (0.024) | (0.024) | (0.026) |
| FDI | -0.062*** | 0.325*** | 0.1794*** | 0.2995*** | -0.014 | 0.1398 | 0.2478** | -0.015 | 0.1392 |
| | (0.024) | (0.021) | (0.031) | (0.11) | (0.108) | (0.153) | (0.108) | (0.107) | (0.152) |
| Government leverage | -0.029*** | 0.0033 | -0.024*** | 0.0555 | 0.0399* | 0.1409*** | 0.012 | 0.0352 | 0.0879* |
| | (0.006) | (0.004) | (0.007) | (0.036) | (0.021) | (0.044) | (0.036) | (0.022) | (0.045) |
| BIST_RETURN | | | | | | | -0.011*** | -0.001 | -0.011*** |
| | | | | | | | (0.002) | (0.002) | (0.002) |
| Constant | -0.107*** | -0.201*** | -0.26*** | -0.566*** | -0.105 | -0.606*** | -0.509** | -0.101 | -0.561*** |
| | (0.021) | (0.02) | (0.016) | (0.207) | (0.151) | (0.205) | (0.206) | (0.15) | (0.206) |
| Observations | 109,719 | 109,719 | 109,719 | 3,198 | 3,198 | 3,198 | 3,198 | 3,198 | 3,198 |
| Adjusted $R^2$ | 0.0553 | 0.125 | 0.0736 | 0.0176 | 0.048 | 0.0348 | 0.0344 | 0.0203 | 0.048 |

**Table 1.7 Leverage dynamics, SMEs versus large firms (Size classification based on net sales criterion)**

The sample consists of non-financial firms in the confidential database of CBRT over the period 1996-2015. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm $i$ in year $t$; $F$ is the vector of firm characteristics while $I$ is the industry specific components; $EE$ denotes the proxies for economic environment and $X$ is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Leverage | | | | | |
|---|---|---|---|---|---|---|
| | SMEs | | | Large firms | | |
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.015*** | -0.025*** | -0.048*** | -0.08*** | -0.08*** | -0.157*** |
| | (0.006) | (0.004) | (0.008) | (0.012) | (0.009) | (0.015) |
| Size | 0.0144*** | 0.0068*** | 0.0209*** | 0.0218*** | 0.017*** | 0.0371*** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) | (0.003) |
| Growth | -0.004*** | -0.000 | -0.004*** | -0.005*** | -0.002 | -0.007*** |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | (0.002) |
| Tangibility | -0.023*** | 0.0329*** | 0.0110 | -0.035*** | 0.085*** | 0.0492*** |
| | (0.006) | (0.007) | (0.010) | (0.011) | (0.013) | (0.017) |
| Business risk | -0.004 | -0.028*** | -0.031** | 0.0094 | -0.007 | -0.005 |
| | (0.009) | (0.009) | (0.013) | (0.021) | (0.017) | (0.027) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.4937*** | 0.1761*** | 0.2439*** | 0.4011*** | 0.194*** | 0.3000*** |
| | (0.043) | (0.034) | (0.024) | (0.056) | (0.045) | (0.036) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | 0.0189 | -0.008 | 0.0225 | 0.0082 | -0.022 | -0.003 |
| | (0.012) | (0.012) | (0.016) | (0.017) | (0.015) | (0.020) |
| Inflation | 0.0365*** | 0.0166*** | 0.0481*** | 0.0927*** | 0.019*** | 0.1104*** |
| | (0.006) | (0.005) | (0.008) | (0.008) | (0.007) | (0.010) |
| Government leverage | -0.034*** | -0.003 | -0.041*** | -0.004 | 0.0148* | 0.0247* |
| | (0.007) | (0.004) | (0.008) | (0.011) | (0.008) | (0.013) |
| FDI | -0.064** | 0.3342*** | 0.1952*** | -0.052 | 0.226*** | 0.0576 |
| | (0.028) | (0.025) | (0.037) | (0.038) | (0.034) | (0.048) |
| Constant | -0.07*** | -0.179*** | -0.212*** | -0.253*** | -0.34*** | -0.534*** |
| | (0.023) | (0.022) | (0.030) | (0.048) | (0.045) | (0.065) |
| Observations | 78,644 | 78,644 | 78,644 | 34,273 | 34,273 | 34,273 |
| Adjusted $R^2$ | 0.0622 | 0.1529 | 0.1028 | 0.03 | 0.0679 | 0.0179 |

**Table 1.8 Leverage dynamics, SMEs versus large firms (Size classification based on number of employees, EU criterion)**

The sample consists of non-financial firms in the confidential database of CBRT over the period 1996-2015. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Based on European Union as well as Turkish official criterion, a firm is classified as an ''SME'' if its number of employees is less than 250, and "large" otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Leverage | | | | | |
|---|---|---|---|---|---|---|
| | SMEs | | | Large firms | | |
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.023*** | -0.026*** | -0.08*** | -0.01*** | -0.08*** | -0.169*** |
| | (0.005) | (0.004) | (0.007) | (0.015) | (0.011) | (0.018) |
| Size | 0.0163*** | 0.0064*** | 0.022*** | 0.017*** | 0.0061** | 0.0214*** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.003) | (0.004) |
| Growth | -0.004*** | -0.000 | -0.005*** | -0.004** | 0.0018 | -0.001 |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.002) | (0.002) |
| Tangibility | -0.028*** | 0.0455*** | 0.0175* | -0.05*** | 0.0578*** | 0.0040 |
| | (0.006) | (0.007) | (0.009) | (0.013) | (0.016) | (0.020) |
| Business risk | -0.010 | -0.026*** | -0.04*** | 0.0168 | -0.016 | -0.008 |
| | (0.009) | (0.008) | (0.012) | (0.030) | (0.020) | (0.035) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.4942*** | 0.1212*** | 0.2458*** | 0.2506*** | 0.3178*** | 0.3328*** |
| | (0.038) | (0.031) | (0.022) | (0.075) | (0.051) | (0.045) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | 0.0231* | -0.012 | 0.0181 | 0.0019 | -0.029 | -0.013 |
| | (0.012) | (0.011) | (0.015) | (0.018) | (0.018) | (0.024) |
| Inflation | 0.0416*** | 0.0174*** | 0.0507*** | 0.1204*** | 0.0062 | 0.1365*** |
| | (0.006) | (0.004) | (0.007) | (0.011) | (0.010) | (0.013) |
| Government leverage | -0.028*** | -0.001 | -0.030*** | -0.024 | 0.0292** | 0.0362* |
| | (0.006) | (0.004) | (0.008) | (0.015) | (0.011) | (0.018) |
| FDI | -0.035 | 0.3312*** | 0.2065*** | -0.066 | 0.2167*** | 0.0477 |
| | (0.026) | (0.023) | (0.035) | (0.043) | (0.041) | (0.057) |
| Constant | -0.12*** | -0.177*** | -0.250*** | -0.151*** | -0.135** | -0.258*** |
| | (0.023) | (0.021) | (0.029) | (0.058) | (0.058) | (0.082) |
| Observations | 92,224 | 92,224 | 92,224 | 20,693 | 20,693 | 20,693 |
| Adjusted $R^2$ | 0.0653 | 0.1294 | 0.0898 | 0.0329 | 0.0915 | 0.0337 |

market return and capital structure decisions of firms (Welch, 2004; Choe et al., 1993; Korajczyk et al., 1990; Bayless and Chaplinksy, 1991 and others).

In that sense, in this section I reestimate the panel model in equation 1.1 for private and public firms separately in order to assess the potential differential impact of ownership status on capital structure. Results are reported in Panel A and Panel B of Table 1.6 for private firms and public firms, respectively.

Furthermore, Graham et al. (2015) and others argue that equity market return should also be considered as the cost of an alternative financing source. Thus, equity market return measured as the return on BIST 100 (*BIST_Return*) is also incorporated into the model for public firms as an additional explanatory variable. Results are reported in Panel C of Table 1.6 and they reveal following inferences.

In the first place, results for private firms (Panel A) are in line with those presented in Table 1.5. This is expected due to the dominant share of private firms in the sample. On the other hand, there is a remarkable difference between public and private firms regarding the impact of economic environment factors on total leverage.

The coefficient of financial development is positive and highly significant for total leverage of private firms while it turns out to be insignificant for public firms (columns 3 and 6). This relation is robust since the coefficient of this variable remains insignificant even when controlling for *BIST_return* in addition to all other related variables (column 9). For public firms, financial development appears to have a positive effect on short term leverage only (columns 4 and 7). For private firms, on the other hand, it has a negative impact on short term and a positive impact on long term leverages, respectively (columns 1 and 2). These results are consistent with findings reported in Table 1.5 for all firms.

Similarly, the significant negative association between government leverage and total corporate leverage for private firms becomes positive for public firms (columns 3 and 6). However, this positive relation for public firms reported in

column 6 is not robust. Both significance and magnitude of the coefficient decrease dramatically when *BIST_return* is controlled for in the model (column 9). Besides, the positive impact of this variable on long term leverage of public firms turns out to be insignificant after controlling for *BIST_return* (columns 5 and 8).

These results suggest that crowding out/in effect of government leverage and significant positive impact of financial development on corporate leverage are more pronounced for private firms than public firms. In light of the fact that private firms are expected to have higher asymmetric information compared to public firms, results also mark the important role of financial markets and institutional development in mitigating frictions and easing the access of firms to capital. Moreover, Table 1.6 exhibits similar results regarding impacts of industry specific, other macroeconomic and firm specific factors on capital structure of public and private firms with the exception of business risk. Conspicuously, the impact of business risk on capital structure is significantly negative for private firms while it is insignificant for public firms. This result suggests that higher business risk level inhibits borrowing capacity of private firms but not public firms. This finding may not be surprising since publically held firms have to disclose a lot more information to the public and this higher information disclosure help reduce the information asymmetry between the creditors and the firm and make it easier for public firms to access capital.

### 1.6.5. SMEs versus large firms

Prior literature provides ample evidence that leverage determinants differ among firms with different sizes. Besides, in Turkey, financial constraints and difficulty in accessing credit markets have been considered as the main problems for SMEs in contrast to large firms. In order to examine this issue, I reestimate the panel model in equation 1.1 for large firms and SMEs separately.

For robustness, two different approaches are used to determine the size classification. In the first approach, following the common practice in the literature, firms are divided into quartiles by the value of their net sales, and a firm is

classified as “large” if it is in the highest net sales quartile and an ‘‘SME’’ otherwise. In the second approach, I use the criterion of the European Union based on number of employees. This is also the official classification used by related Turkish public regulators. Based on this criterion, a firm is classified as an ‘‘SME’’ if its number of employees is less than 250, and “large” otherwise. Results based on the first and the second approaches are reported in Table 1.7 and Table 1.8, respectively.

The most remarkable difference between SMEs and large firms is in terms of the impact of economic environment variables. With the exception of business risk and government leverage, the impacts of other macroeconomic, industry and firm specific factors do not change among different firm size classes.

Results in Table 1.7 show that financial development is significantly associated with both short term and long term leverages of SMEs while it is significantly associated with only long term leverage of large firms. The relation is positive for long term leverage of both SMEs and large firms. On the other hand, the negative relationship between financial development and SMEs` short term leverage seems to be small in magnitude and low in significance (column 1). Besides, this relation is not robust since it turns out to be insignificant when firm size classification is based on number of employees (Table 1.8).

Thus, robust results suggest that improvement in financial development fosters long term debt usage for both SMEs and large firms. Most strikingly, this impact seems to be stronger for SMEs in magnitude. In column 2 of both Table 1.7 and Table 1.8, the coefficient of FDI is highly significant at 1% level and it is around 0.33, which is the highest among other explanatory variables. This implies a 10 percentage point increase in financial development increases long term leverage of SMEs by 3.3 percentage points. This increase amounts to a 33.57% increase in average long term leverage ratios of SMEs from 9.83% to 13.13% which is economically significant as well.

## Table 1.9 Leverage dynamics, alternative time periods

The sample consists of non-financial firms in the confidential database of CBRT. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Results for subperiods 1996-2002 and 2003-2015 are given in Panel A and B, respectively. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

[a] There is not a significant variation in the financial development index during the period 1996-2002. Thus, the coefficient for financial development could not be estimated.

| | Panel A: 1996-2002 | | | Panel B: 2003-2015 | | |
|---|---|---|---|---|---|---|
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.021** | -0.015** | -0.039*** | -0.037*** | -0.040*** | -0.08*** |
| | (0.008) | (0.006) | (0.010) | (0.006) | (0.005) | (0.009) |
| Size | 0.0095*** | 0.0008 | 0.0081*** | 0.0133*** | 0.0057*** | 0.019*** |
| | (0.002) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Growth | -0.002* | -0.000 | -0.002 | -0.003*** | 0.0001 | -0.003*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) | (0.001) |
| Tangibility | -0.027** | 0.0277*** | -0.003 | -0.022*** | 0.0466*** | 0.0261*** |
| | (0.012) | (0.010) | (0.014) | (0.005) | (0.006) | (0.008) |
| Business risk | -0.021 | -0.018 | -0.045* | -0.008 | -0.018** | -0.028** |
| | (0.019) | (0.013) | (0.027) | (0.009) | (0.009) | (0.012) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.4628*** | -0.009 | 0.3377*** | 0.4187*** | 0.1279*** | 0.2097*** |
| | (0.065) | (0.296) | (0.052) | (0.041) | (0.027) | (0.025) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | 0.0529 | 0.0218 | -0.221 | -0.020* | -0.030*** | -0.038*** |
| | (0.411) | (0.284) | (0.428) | (0.010) | (0.009) | (0.012) |
| Inflation | 0.0424 | 0.0109 | -0.042 | 0.1043*** | 0.1147*** | 0.2091*** |
| | (0.131) | (0.091) | (0.136) | (0.018) | (0.015) | (0.022) |
| Government leverage | -0.026 | 0.0167 | -0.029 | -0.010 | -0.075*** | -0.081*** |
| | (0.039) | (0.026) | (0.040) | (0.012) | (0.010) | (0.018) |
| FDI | -[a] | -[a] | -[a] | 0.0423* | 0.2729*** | 0.2553*** |
| | | | | (0.023) | (0.022) | (0.029) |
| Constant | -0.03 | 0.0185 | 0.081 | -0.124*** | -0.109*** | -0.203*** |
| | (0.097) | (0.070) | (0.101) | (0.025) | (0.023) | (0.032) |
| Observations | 26,091 | 26,091 | 26,091 | 86,826 | 86,826 | 86,826 |
| Adjusted $R^2$ | 0.0451 | 0.0306 | 0.0478 | 0.0028 | 0.1282 | 0.0696 |

**Table 1.10 Leverage dynamics, SMEs versus large firms, 1996-2002 (Size classification based on net sales criterion)**

The sample consists of non-financial firms in the confidential database of CBRT over the subperiod 1996-2002. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial total debt to assets) of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

[a] There is not a significant variation in the financial development index during the period 1996-2002. Thus, the coefficient for financial development could not be estimated.

| | SMEs | | | Large firms | | |
|---|---|---|---|---|---|---|
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.006 | -0.009 | -0.019 | -0.065*** | -0.030** | -0.094*** |
| | (0.010) | (0.007) | (0.012) | (0.021) | (0.013) | (0.023) |
| Size | 0.0084*** | 0.0000 | 0.0057* | 0.0057 | -0.002 | 0.0036 |
| | (0.002) | (0.002) | (0.003) | (0.006) | (0.004) | (0.006) |
| Growth | -0.002 | 0.0001 | -0.001 | 0.0027 | 0.0025 | 0.0056 |
| | (0.001) | (0.001) | (0.001) | (0.004) | (0.003) | (0.004) |
| Tangibility | -0.044*** | 0.0221* | -0.026 | 0.0168 | 0.0421* | 0.0587** |
| | (0.014) | (0.011) | (0.017) | (0.022) | (0.023) | (0.028) |
| Business risk | -0.018 | -0.015 | -0.037 | 0.0076 | -0.013 | -0.024 |
| | (0.022) | (0.011) | (0.031) | (0.043) | (0.038) | (0.052) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.3932*** | 0.3016 | 0.3045*** | 0.5834*** | -0.468 | 0.3484*** |
| | (0.081) | (0.459) | (0.066) | (0.117) | (0.342) | (0.090) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | -0.601 | 0.4319 | -0.300 | 1.5450** | -0.629 | 0.3375 |
| | (0.499) | (0.331) | (0.531) | (0.763) | (0.571) | (0.784) |
| Inflation | -0.169 | 0.1424 | -0.068 | 0.5252** | -0.201 | 0.1341 |
| | (0.159) | (0.106) | (0.169) | (0.243) | (0.182) | (0.249) |
| Government leverage | -0.108** | 0.0392 | -0.072 | 0.1538** | -0.006 | 0.0916 |
| | (0.047) | (0.030) | (0.049) | (0.074) | (0.053) | (0.076) |
| FDI | -[a] | -[a] | -[a] | -[a] | -[a] | -[a] |
| Constant | 0.143 | -0.061 | 0.1452 | -0.337* | 0.2286 | 0.0181 |
| | (0.117) | (0.080) | (0.123) | (0.185) | (0.148) | (0.198) |
| Observations | 18,410 | 18,410 | 18,410 | 7,681 | 7,681 | 7,681 |
| Adjusted $R^2$ | 0.03 | 0.0201 | 0.0253 | 0.0412 | 0.0236 | 0.0284 |

**Table 1.11 Leverage dynamics, SMEs versus large firms, 2003-2015 (Size classification based on net sales criterion)**

The sample consists of non-financial firms in the confidential database of CBRT over the subperiod 2003-2015. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | SMEs | | | Large firms | | |
|---|---|---|---|---|---|---|
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.022*** | -0.023*** | -0.049*** | -0.099*** | -0.095*** | -0.198*** |
| | (0.007) | (0.006) | (0.010) | (0.014) | (0.012) | (0.018) |
| Size | 0.0123*** | 0.0048*** | 0.0170*** | 0.0165*** | 0.0118*** | 0.0281*** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) | (0.003) |
| Growth | -0.003*** | 0.0002 | -0.002** | -0.006*** | 0.0013 | -0.004* |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | (0.002) |
| Tangibility | -0.014** | 0.0270*** | 0.0159 | -0.036*** | 0.0988*** | 0.0631*** |
| | (0.006) | (0.007) | (0.009) | (0.012) | (0.014) | (0.017) |
| Business risk | -0.006 | -0.018* | -0.025* | 0.0028 | 0.0189 | 0.0128 |
| | (0.010) | (0.010) | (0.014) | (0.018) | (0.017) | (0.024) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.3979*** | 0.1374*** | 0.1989*** | 0.4191*** | 0.1342*** | 0.2422*** |
| | (0.052) | (0.035) | (0.031) | (0.065) | (0.045) | (0.045) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | -0.005 | -0.018 | -0.012 | -0.061*** | -0.058*** | -0.106*** |
| | (0.013) | (0.012) | (0.016) | (0.017) | (0.016) | (0.020) |
| Inflation | 0.0769*** | 0.0761*** | 0.1465*** | 0.1808*** | 0.1950*** | 0.3541*** |
| | (0.022) | (0.019) | (0.027) | (0.031) | (0.029) | (0.040) |
| Government leverage | -0.024 | -0.064*** | -0.088*** | 0.0198 | -0.100*** | -0.059* |
| | (0.016) | (0.012) | (0.023) | (0.022) | (0.019) | (0.033) |
| FDI | 0.0029 | 0.2850*** | 0.2263*** | 0.1089*** | 0.2127*** | 0.2570*** |
| | (0.029) | (0.027) | (0.036) | (0.040) | (0.036) | (0.047) |
| Constant | -0.07*** | -0.094*** | -0.136*** | -0.246*** | -0.209*** | -0.430*** |
| | (0.028) | (0.026) | (0.036) | (0.057) | (0.058) | (0.074) |
| Observations | 60,234 | 60,234 | 60,234 | 26,592 | 26,592 | 26,592 |
| Adjusted $R^2$ | 0.0666 | 0.1547 | 0.1065 | 0.0485 | 0.0893 | 0.0298 |

Another striking result is that the government leverage has significantly negative impact on short term and total leverages of SMEs only. Similarly, business risk has a significant negative impact on only SMEs` long term leverage. These findings are robust to alternative definitions of size classification (Table 1.7 and Table 1.8). These suggest that increase in government borrowing as well as higher riskiness hinder SMEs borrowing capacity. Accordingly, results highlight significant financial constraints on SMEs and difficulty these firms have in accessing credit in Turkey, and the important role played by financial development in easing the access of these firms to capital.

### 1.6.6. Analyzing subsamples: Is there any structural break?

In last decades, Turkey has experienced financial turmoils which had severe effects on all economic agents such as crises in 1994, 1998-1999 and 2000-2001. After the last and most influential crisis in 2000-2001, Turkey has adopted economic stabilization programs as well as structural regulations in financial system. The period following this crisis can be considered as a relatively more stable period in terms of general economic conditions. Besides, that is the period that corporate debt level of Turkish non-financial firms has substantially increased while government indebtedness has decreased. Financial development has gained momentum during this period as well.

Previous studies such as Reinhart and Rogoff (2009) and IMF (2009) showed that such financial crisis typically prompt a sharp recession that last approximately 2 years. Besides, IMF (2002) stated that Turkish economy exhibited strong signs of recovery by the end of 2002. Accordingly, in order to analyze whether this financial crisis creates a structural break that causes a difference in impacts of leverage determinants after the break, I divide the whole sample into two subperiods as 1996-2002 and 2003-2015. I reestimate the empirical model in equation 1.1 for these subperiods separately. Results are presented in Table 1.9. Furthermore, all the models for short term and long term leverages and different firm sizes based on net

sales (Tables 1.10 and 1.11), and based on number of employees (Tables 1.12 and 1.13) are re-estimated for these two subperiods.[5]

Prominent difference is that government leverage is negatively associated with short term leverage of only SMEs in the period 1996-2002 (column 1 of Table 1.10) while it is negatively associated with long term leverage of both SMEs and large firms in 2003-2015 period (columns 2 and 5 in Table 1.11). These coefficients are highly significant at 1% level and these results are robust to different firm size classifications (Table 1.12 and Table 1.13). These suggest that the adverse impact of government leverage inhibits long term leverage of both SMEs and large firms in 2003-2015 while it is pronounced for only short term leverage of SMEs in 1996-2002. The interpretation is as follows. Opposite impact of government leverage on firm leverage in these two subperiods can be explained by the difference in behavior of government leverage during these two subperiods. In the second subperiod, government indebtedness has a downward trend whereas the trend is reverse in the first subperiod. Hence, in general, 2003-2015 period can be considered as "crowding in" period of government leverage while the preceding one as "crowding out" period. Thus, results in this chapter indicate that only SMEs suffer in crowding out periods while both SMEs and large firms benefit in crowding in periods. Furthermore, significant impact of government leverage only on short term leverage of SMEs in the first subperiod is not surprising given the dominant share of short term borrowing in firms' capital structure during this time period. Debt maturities of Turkish firms have significantly prolonged in last decade which can be attributed to more stable economic environment and improvements in financial development.

Besides, results show that in 2003-2015 period, financial development has a significant positive impact on both short and long term leverage of large firms but only on long term leverage of SMEs. These relations are highly significant at 1% level. The coefficient of financial development is the highest in magnitude for

[5] All the models for short term and long term leverages and different firm sizes based on net sales, and based on number of employees are re-estimated for the subperiod 2002-2015 as well. Results are in line with those for the subperiod 2003-2015.

**Table 1.12 Leverage dynamics, SMEs versus large firms, 1996-2002 (Size classification based on number of employees, EU criterion)**

The sample consists of non-financial firms in the confidential database of CBRT over the subperiod 1996-2002. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to total assets) of firm i in year t; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Based on European Union as well as Turkish official criterion, a firm is classified as an ''SME'' if its number of employees is less than 250, and "large" otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

[a] There is not a significant variation in the financial development index during the period 1996-2002. Thus, the coefficient for financial development could not be estimated.

| | SMEs | | | Large firms | | |
|---|---|---|---|---|---|---|
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.011 | -0.010 | -0.026** | -0.089*** | -0.052*** | -0.129*** |
| | (0.009) | (0.006) | (0.011) | (0.029) | (0.020) | (0.030) |
| Size | 0.009*** | 0.0008 | 0.0075** | 0.0105 | -0.006 | -0.000 |
| | (0.002) | (0.001) | (0.003) | (0.010) | (0.008) | (0.010) |
| Growth | -0.003** | -0.000 | -0.002 | 0.0065 | -0.001 | 0.0065 |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.004) | (0.006) |
| Tangibility | -0.029** | 0.0226** | -0.010 | -0.010 | 0.0723** | 0.0549 |
| | (0.013) | (0.011) | (0.016) | (0.034) | (0.033) | (0.037) |
| Business risk | -0.026 | -0.019 | -0.048* | 0.0551 | 0.0244 | 0.0362 |
| | (0.020) | (0.013) | (0.028) | (0.065) | (0.048) | (0.068) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.4485*** | 0.0749 | 0.3357*** | 0.6196*** | -0.278 | 0.4895*** |
| | (0.073) | (0.373) | (0.059) | (0.162) | (0.212) | (0.128) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | -0.458 | 0.3061 | -0.409 | 2.9524*** | -2.221** | 0.4922 |
| | (0.455) | (0.301) | (0.476) | (1.064) | (0.872) | (1.076) |
| Inflation | -0.125 | 0.1053 | -0.103 | 0.9988*** | -0.725*** | 0.1922 |
| | (0.145) | (0.096) | (0.151) | (0.340) | (0.278) | (0.343) |
| Government leverage | -0.080* | 0.0344 | -0.060 | 0.2786*** | -0.135* | 0.1311 |
| | (0.043) | (0.028) | (0.045) | (0.104) | (0.081) | (0.107) |
| FDI | -[a] | -[a] | -[a] | -[a] | -[a] | -[a] |
| Constant | 0.092 | -0.045 | 0.1330 | -0.749*** | 0.6562*** | 0.0294 |
| | (0.106) | (0.074) | (0.111) | (0.290) | (0.250) | (0.282) |
| Observations | 22,389 | 22,389 | 22,389 | 3,702 | 3,702 | 3,702 |
| Adjusted $R^2$ | 0.037 | 0.0256 | 0.0357 | 0.0535 | 0.0133 | 0.021 |

**Table 1.13 Leverage dynamics, SMEs versus large firms, 2003-2015 (Size classification based on number of employees, EU criterion)**

The sample consists of non-financial firms in the confidential database of CBRT over the subperiod 2003-2015. The table presents results from the estimation of fixed effects panel model in Eq. (1.1); $CL_{it} = \alpha + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $CL_{it}$ denotes corporate leverage (financial debt to assets) of firm *i* in year *t*; *F* is the vector of firm characteristics while *I* is the industry specific components; *EE* denotes the proxies for economic environment and *X* is the macroeconomic variables. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Definitions of variables are given in Table 1.4. Based on European Union as well as Turkish official criterion, a firm is classified as an ''SME'' if its number of employees is less than 250, and "large" otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | SMEs | | | Large firms | | |
|---|---|---|---|---|---|---|
| | Short Term | Long Term | Total Leverage | Short Term | Long Term | Total Leverage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Firm Characteristics*** | | | | | | |
| Profitability | -0.028*** | -0.028*** | -0.060*** | -0.096*** | -0.093*** | -0.193*** |
| | (0.007) | (0.005) | (0.009) | (0.014) | (0.015) | (0.022) |
| Size | 0.0137*** | 0.0050*** | 0.0186*** | 0.0090*** | 0.0024 | 0.0116** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.003) | (0.005) |
| Growth | -0.003*** | -0.000 | -0.003*** | -0.002 | 0.0054** | 0.0035 |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.002) | (0.002) |
| Tangibility | -0.021*** | 0.0425*** | 0.0237*** | -0.033*** | 0.0545*** | 0.0182 |
| | (0.006) | (0.007) | (0.009) | (0.012) | (0.016) | (0.020) |
| Business risk | -0.009 | -0.016* | -0.027** | -0.019 | 0.0050 | -0.014 |
| | (0.010) | (0.009) | (0.013) | (0.022) | (0.022) | (0.030) |
| ***Industry Specific Factor*** | | | | | | |
| Industry median leverage | 0.4284*** | 0.0670** | 0.1694*** | 0.3899*** | 0.2587*** | 0.3058*** |
| | (0.048) | (0.032) | (0.029) | (0.075) | (0.053) | (0.052) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | |
| GDP growth | -0.000 | -0.024** | -0.013 | -0.090*** | -0.061*** | -0.138*** |
| | (0.012) | (0.011) | (0.014) | (0.018) | (0.018) | (0.024) |
| Inflation | 0.0842*** | 0.1029*** | 0.1729*** | 0.2342*** | 0.1810*** | 0.4093*** |
| | (0.020) | (0.017) | (0.025) | (0.038) | (0.038) | (0.051) |
| Government leverage | -0.018 | -0.082*** | -0.108*** | 0.0232 | -0.071*** | -0.010 |
| | (0.015) | (0.011) | (0.022) | (0.024) | (0.024) | (0.037) |
| FDI | 0.0286 | 0.2699*** | 0.2428*** | 0.1123** | 0.2299*** | 0.2909*** |
| | (0.028) | (0.025) | (0.034) | (0.046) | (0.046) | (0.058) |
| Constant | -0.11*** | -0.089*** | -0.158*** | -0.132* | -0.042 | -0.188* |
| | (0.028) | (0.024) | (0.035) | (0.068) | (0.069) | (0.097) |
| Observations | 69,835 | 69,835 | 69,835 | 16,991 | 16,991 | 16,991 |
| Adjusted $R^2$ | 0.0714 | 0.1286 | 0.0903 | 0.0579 | 0.0953 | 0.0551 |

SMEs compared to that of other explanatory variables. On the other hand, since there is not a significant variation in financial development index during the period 1996-2002, a coefficient for financial development could not be estimated for that period.

The impacts of other variables for 2003-2015 period are mostly in line with the whole sample period while results regarding firm specific and macro economic factors are mostly mixed and not significant in all specifications for the period from 1996 to 2002. Furthermore, there are fewer significant factors and prediction power of the model is also lower. This is not surprising since the first subperiod is a relatively less stable period in terms of general economic conditions.

Nonetheless, it is worthwhile to note that as in the following period, in 1996-2002 firm size is significantly positively associated with short term leverage, but only for SMEs. Besides, profitability is significantly negatively associated with both short and long term leverages of only large firms. The positive association between industry median leverage and corporate leverage as well as the fostering impact of tangibility on long term leverage seem consistent in both subperiods.

### 1.7. Concluding Remarks

Capital structure theory has been one of the most prominent topics in finance literature and extensive empirical research has been carried out on this topic. However, evidence provided in these studies is confounding and no single theory seems to be adequate in explaining leverage dynamics. In addition, despite the importance of the issue, there exists limited research on capital structure decisions of firms in emerging countries, because of problems associated with data availability. Although the issue is not clarified for both the advanced and the emerging countries, ambiguity in findings seems to be much more severe for the latter. Thus, in order to shed some light on the issue, this study aims to analyze leverage dynamics of non-financial firms in Turkey, one of the most important transition economies.

The study utilizes a confidential and unique firm level dataset which is the most comprehensive and representative database for Turkish non-financial firms. Results of the empirical panel model which includes a large number of control variables, provide significant evidence that not only economic environment factors but also firm and industry specific variables account for the variation in corporate indebtedness of Turkish non-financial firms.

Results reveal that firms with higher profit ratios and lower size tend to have lower short term and long term leverages. On the other hand, firms with higher tangible assets tend to have higher long term debt ratios and lower short term debt ratios. Besides, industry median leverage is significantly positively associated with both short term and long term leverages. Furthermore, higher riskiness hinders borrowing capacity of private firms and SMEs but that of not large firms and public firms.

Moreover, results suggest that significant positive impact of financial development and inhibiting impact of government indebtedness on corporate leverage are more pronounced for private firms rather than public firms. Conspicuously, even though improvements in financial development are positively associated with higher long term debt usage of both SMEs and large firms, this association seems to be stronger for SMEs. Thus, results put emphasis on the important role of financial institutions, financial markets and institutional development in mitigating frictions regarding information asymmetry and agency costs, and easing the access of firms to capital.

Most strikingly, results reveal that SMEs suffer much more than large firms in crowding out periods of government leverage while both SMEs and large firms benefit in crowding in periods. In that sense, results shed light on the financial constraints on SMEs and difficulties these firms have in accessing credit in Turkey contrary to their potentials in the economy and puts emphasis on the importance of appropriate policy designs to address the difficulties of SMEs in accessing capital.

# CHAPTER II

# MACROPRUDENTIAL POLICIES, PERSISTENCE OF UNCERTAINTY AND LEVERAGE DYNAMICS A STUDY FOR REAL SECTOR IN TURKEY

## 2.1. Introduction

Economic activity is shaped by the decisions of the economic agents, namely government, households, financial intermediaries and firms. These agents take actions in an uncertain environment due to the nature of decision making process. In that sense, it should be expected that uncertainty has profound impacts on these decisions and thus, the whole economy.

First, uncertainty is expected to have a negative impact on information asymmetry between borrowers and lenders. Furthermore, the probability of bankruptcy increases with uncertainty. As a result, banks tend to delay lending to firms during times of uncertainty and this decline in bank lending to firms slows down the business expansion (Greenwald and Stiglitz, 1990). Prior empirical research has examined the impact of uncertainty on the economic environment and the required return on future cash flows (Bhattacharya et al., 2017; Wang et al., 2014), business decisions (Bernanke, 1983; Bloom et al., 2007), IPO activities (Colak et al., 2013), asset prices (Pastor and Veronesi, 2013; Brogaard and Detzel, 2012), corporate investment decisions (Chen et al., 2016; Gulen and Ion, 2016; Bloom, 2009, 2014; Julio and Yook, 2012), capital expenditures or hiring decisions (Bloom et al., 2007; Ghosal and Ye, 2015), and corporate R&D investments (Wang et al 2017; Czarnitzki and Toole 2007, 2011). However, the impact of uncertainty on corporate leverage dynamics has rarely been discussed in the literature. Besides, there is no

study analyzing this issue for Turkish non-financial firms even though both domestic and geopolitical uncertainties have played vital roles in Turkey.

This study is the first to investigate the impact of uncertainty on leverage dynamics of Turkish non-financial firms. Accordingly, I construct a measure of uncertainty for Turkey by using Principal Component Analysis. In addition, I argue that decision making process of both borrowers and creditors, hence the leverage dynamics depend on the nature of uncertainty, whether it is short-lived or not. Moreover, it is reasonable to expect economic agents to get used to uncertainties in a country such as Turkey, where they confront both domestic and geopolitical uncertainties frequently. Thus, I argue that persistence of uncertainty should be a more appropriate factor to take into account when analyzing leverage dynamics than uncertainty itself. In order to test this argument, I construct an index for persistence of uncertainty as well.

Additionally, in recent years macroprudential policies (MPPs) have been extensively used by both developed and developing countries. In particular, after the global financial crisis of 2008-2009, regulators and central bank governors all around the world agreed on the importance of macroprudential policies for both domestic and global financial stability. As an example, central bank governors and finance ministers of the Group of Twenty (G20) agreed to cooperate more on MPP framework in October 2010.

MPP framework is considered as essential by policy makers to mitigate the adverse impact of shocks and systematic risks of the financial system, which can induce severe negative consequences for real economic activity. These policies are aimed to increase financial stability by increasing the resilience of the financial intermediaries to adverse shocks by building buffers and reducing procyclical feedback between credit and asset prices, and containing unsustainable increases in leverage and volatile funding (IMF, 2013).

Turkey, as one of the most fragile emerging countries, has been using macroprudential policies increasingly and explicitly since 2011. Accordingly, the

Central Bank of Turkey (CBRT) modified its inflation targeting framework by incorporating financial stability. Besides, Financial Stability Committee was founded in Turkey to respond to financial risks more effectively (Please see Kara, 2016 for the details of the implementation of MPPs in Turkey).

In accordance with the importance of the issue, a growing literature has explored the impact of MPPs across countries on credit growth, such as Brunnermeier et al. (2009), Lim et al. (2011, 2013), Ostry et al. (2012), Tovar et al. (2012), Claessens and Ghosh (2013), Galati and Moessner (2013, 2014), Freixas et al. (2015), Bruno and Shin (2015), Claessens (2015), Cerutti et al. (2016, 2017) and Fendoğlu (2017). The results of these studies provide significant evidence on the negative impact of MPPs on credit growth.

In one of the most recent and extensive studies, by utilizing a dataset covering 119 countries, Cerutti et al. (2017) show that MPPs are associated with lower credit growth especially in emerging markets. In line with this finding, Fendoğlu (2017) report that an overall tightening in MPP stance helps contain credit cycles in 18 major emerging countries including Turkey.

This literature mainly focused on credit growth in aggregate level by using data mostly from advanced countries. Conversely, this thesis aims to analyze the impact of MPPs on corporate leverage dynamics in Turkey, an important transition economy which has increasingly implemented MPPs in recent years. Moreover, this study is the first to explore the impact of MPPs on leverage dynamics by using a firm-level data.

Another novel aspect of this study is that I combine MPPs, uncertainty and persistence of uncertainty in the same model and analyze the simultaneous impact of all these important factors on financial debt of firms. Besides, I utilize a confidential firm-level database which is the comprehensive and representative database for Turkish non-financial firms.

In order to assess the impact of aforementioned factors on financial debt, I utilize the Panel Fixed Effects Model with a large set of control variables. I reestimate the model for SMEs and large firms separately to examine whether the impact of these variables on firm debt changes depending on firm size. For robustness, I use two different approaches for size classification, namely net sale criterion, and European and Turkish official criterion based on number of employees.

First, results provide significant evidence in support of the argument that persistence of uncertainty is a more appropriate factor in determining the share of financial debt in total liabilities rather than uncertainty. Besides, results show that for Turkish non-financial firms, share of financial debt is adversely affected when uncertainty is increasing persistently and when macroprudential policy is tightened during the sample period. Most strikingly, I do find that this is the case for SMEs but not for the large firms.

Moreover, for robustness, in order to assess impacts of MPPs and persistence of uncertainty on financial debt ratios, I reestimate the model by taking financial debt to total assets as the dependent variable instead of financial debt to total liabilities. Results are consistent with those obtained when the dependent variable is the ratio of financial debt to total liabilities. As before, both persistence of uncertainty and MPPs have a significant negative impact on financial debt ratios of SMEs only.

The remainder of this chapter is organized as follows. The dataset and measurements are explained in Section 2.2. Empirical model and results are reported in Section 2.3. Finally, concluding remarks are presented in Section 2.4.

## 2.2. Data and Measurements

The confidential firm-level data utilized in this study is provided by the CBRT. Detailed information on this data is provided in Section 1.3. Furthermore, measurements of firm specific, industry specific, macroeconomic and economic environment factors are explained in Section 1.4. Therefore, in this section, only the information on additional variables used in the analyses of this chapter is provided.

### 2.2.1. Measurements

#### 2.2.1.1. Uncertainty

Due to the fact that uncertainty is not observable, a true measure of uncertainty does not exist. In that sense, researchers have used various proxies to measure uncertainty. Bloom (2009) uses implied volatility (VXO index) constructed by the Chicago Board of Option Exchange. Bachmann et al. (2013) create a proxy for business level uncertainty based on the cross-sectional dispersion of survey-based forecasts from the Business Outlook Survey and IFO Business Climate Survey for the U.S. and Germany, respectively. Bekaert et al. (2013) take the variance risk premium decomposed from the VIX as the uncertainty measure. Jurado et al. (2015) uses the common variation of the unforecastable component of the future value of a large number of variables in econometric models. Scotti (2016) uses forecasting errors by employing real-time statistical models.

Recently, a growing literature has focused on news-based measures of economic uncertainty. The well-known index, Economic Policy Uncertainty Index created by Baker et al. (2016) has been commonly used in the literature in recent years. By using a computer based search, Baker et al. (2016) construct Economic Policy Uncertainty Index by quantifying frequencies of newspaper articles, which simultaneously contain terms having to do with economic policy, economy and uncertainty. Using the same methodology, they have developed indices as proxies for economic policy uncertainty for the major economies and some emerging countries including China, Brazil, Chile, Korea, Russia and India.

However, in Turkey there exist only a few newspapers that have archives available online for the sampling period. An index created as a proxy for uncertainty based on articles in only a few newspapers might lead to biased results. In that sense, I attempt to generate an index of uncertainty for Turkey (UNCI) by using financial variables related with uncertainty. The rationale behind the financial variables used in constructing the UNCI is explained below.

Firstly, one can argue that creating an uncertainty index using only financial variables may not be appropriate for general economic environment uncertainty. However, the recent study by Caldara et al. (2016) show that the financial channel is the key in the transmission of uncertainty shocks. This finding provides significant support for the UNCI created in this study.

Besides, Stock and Watson (2012) explicitly point out the significant positive and high correlation between economic uncertainty proxies and credit spreads. They come to a conclusion that these two indicators seem to be identifying the same shocks. Caldara et al. (2016) find that volatility in financial markets, which is widely used as a proxy for macroeconomic uncertainty has significant association with credit spreads. In addition, bond premiums are considered as a measure of financial market strain (Gilchrist and Zakrajsek, 2012). Moreover, it is well known that in Turkey volatility in the exchange rate market is an important indicator for financial markets, and it is highly correlated with the confidence levels of both consumers and the real sector.

In that sense, in this study Credit Default Spread (CDS), spreads in bond market and implied volatilities of foreign exchange market are considered in creating a proxy of uncertainty in Turkey. For CDS, 5 Year Credit Default Spread in USD for Turkey which has the highest trading volume; for bond market spread, the commonly used Emerging Market Bond Index spread (EMBI) for Turkey; for implied volatilities in FX market, 1 month and 1 year implied volatilities of both USD/TL and EUR/TL are used. All data is obtained from Bloomberg on a daily basis to increase the sample size over 2005-2017 period due to the data availability.

Principal Component Analysis (PCA) is employed to create a single daily uncertainty index. Based on the results of PCA one single factor is extracted. The eigenvalue of this factor is 5.055, and it explains 84.25% variance of all the variables, which is relatively high. The firm level data of this study is annual, thus for each year, the average of daily UNCI values are calculated in order to convert daily data into annual data.

#### 2.2.1.2. Persistence of Uncertainty

I argue that reactions of economic agents to uncertainty may depend on the nature of it. If it is perceived as short-lived, future perspective of firms or creditors, which has an important effect on leverage dynamics may not change. In that sense, I argue that nature of the uncertainty, whether it is persistent or not, seems to be an appropriate factor taken into account in financial debt decisions of firms. To this aim, I adopt the methodology used by Herrera et al. (2011) and Davis and Haltiwanger (1992) in order to measure the persistence of uncertainty. The process is as follow:

$$PUNCI_{i,t} = \alpha \; x \; min\left\{1, max\left(0, \frac{percentage\ change\ in\ UNCI\ between\ t\ and\ t-2}{percentage\ change\ in\ UNCI\ between\ \ t\ and\ t-1}\right)\right\} \qquad (2.1)$$

$PUNCI_{it}$ denotes the persistence of uncertainty index *(UNCI)* where $\alpha$ is *-1* if $UNCI_{it}$ - $UNCI_{i,t-1}$ < 0 and *1* otherwise. $PUNCI_{it}$ takes on the values in the interval of $[-1,1]$. It takes the minimum value of *0* when uncertainty change at time *t* (increase or decrease) which can be interpreted as no persistence and the change is temporary. On the other hand, positive and negative persistence is increasing when $PUNCI_{it}$ gets closer to *1* and *-1*, respectively.

#### 2.2.1.3. Macroprudential Policies

One of the most challenging issues in assessing the performance of MPP framework is the lack of information and database due to the nature of policy implementation. It involves a wide range of tools implemented by various policy makers. However, in a recent study, Cerutti et al. (2016) compiled a unique and detailed dataset of widely used MPP tools for 64 countries including Turkey over the period 2000-2014 on a quarterly basis. They also created an index, which reflects the direction and intensity of MPPs` usage (loosening or tightening) over time. Using a combination of primary and secondary sources, they aggregated commonly used MPP tools under five main categories: (i) capital buffers, (ii) loan-to-value (LTV) ratio limits, (iii) concentration limits, (iv) interbank exposure limits, and (v) reserve requirements. The primary information is provided directly by national authorities

through the IMF or International Banking Research Network (IBRN). As primary sources, they use Global Macroprudential Policy Instruments (GMPI) which is constructed by IMF (2014) and national authorities' webpages. As secondary sources to complement the database, they use earlier dataset complied by Reinhart and Sowerbutts (2015), Akıncı and Olmstead-Rumsey (2015), Kuttner and Shim (2013), and Lim et al. (2011). After compiling this large and unique dataset, they construct an index for the direction of MPPs`usage for each country where -1 stands for loosening, 0 stands for no change, and 1 stands for tightening in MPPs in a given quarter.

In this study, this index (MPI) is used as a proxy for MPP framework usage in Turkey and it is obtained from Cerutti et al. (2016). The firm level data of this study is on a yearly basis, thus for each year the average of quarterly MPI`s are calculated in order to create an annual MPI series. However, this index does not exist for 2015. For that year, I obtained the information from related national authorities such as the CBRT, Banking Regulation and Supervision Agency (BRSA), and Capital Markets Board of Turkey (CMBT), and their related press and webpages. For robustness and to check the accuracy of own work, I also collected data for 2013 and 2014, and achieved the same results with Cerutti et al. (2016) for these years. This validated the process I used to calculate the MPI values for 2015.

## 2.3. Empirical Model and Results

### 2.3.1. Empirical Model

In order to examine impacts of macroprudential policy, uncertainty and persistence of uncertainty on leverage dynamics of Turkish non-financial firms, a Panel Fixed Effects Model (PFEM) is employed rather than the Pooled Ordinary Least Squares (OLS). OLS is a restrictive model that specifies a constant slope and ignores the unobservable fixed effects. Hence, it yields inconsistent and biased estimates. In PFEM, different intercept terms are allowed for each cross sectional unit and unobserved heterogeneity is accounted for. Moreover, PFEM deals with biased

results caused by unobserved heterogeneity (Li and Prabhala, 2007; Wooldridge, 2010; Roberts and Whited, 2012). Furthermore, PFEM model is preferred to Random Fixed Effects Model based on Hausman test results. The PFEM models employed in this study are given in equations 2.2 to 2.5:

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \tag{2.2}$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \alpha_2 \, x \, P_UNCI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \tag{2.3}$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \alpha_2 \, x \, P_UNCI_t + \alpha_3 \, x \, MPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \tag{2.4}$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \alpha_2 \, x \, P_UNCI_t + \alpha_3 \, x \, MPI_t + \alpha_4 \, x \, UNCIxSIZE + \alpha_5 \, x \, P_UNCIxSIZE + \alpha_6 \, x \, MPIxSIZE + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \tag{2.5}$$

where $Y_{it}$ denotes the dependent variable for firm *i* in year *t*. Two different dependent variables, namely, financial debt/total liabilities – a measure of share of financial debt in total liabilities, and financial debt/total assets ratios – a measure of corporate leverage are defined. *UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively. I also incorporate *UNCIxSIZE*, *P_UNCIxSIZE* and *MPIxSIZE* terms to examine interactions between firm size and uncertainty, persistence of uncertainty and macroprudential policy, respectively. *F* is the vector of firm characteristics while *I* is the industry specific control variables. *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables mentioned in Section 1.4. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term.

### 2.3.2. Results

First, I estimate empirical models in equations 2.2 to 2.5 by using total financial debt/total liabilities ratio as the dependent variable in order to investigate impacts of aforementioned factors on share of financial debt in total liabilities of Turkish non-financial firms. Table 2.1 represents results for the full sample No significant relationship between uncertainty index and financial debt share is observed after controlling for a large set of variables consisting of firm specific, industry specific and other related macroeconomic variables (Column 1). On the other hand, there is a significantly negative association between persistence of uncertainty index and financial debt share (Column 2). These relations are robust since the coefficient of *P_UNCI* remains highly significant at 1% level while the coefficient of *UNCI* remains insignificant in all alternative model specifications. This suggests that financial debt share is decreasing when uncertainty is persistently increasing. Hence, results provide significant support for the argument that persistence of uncertainty is the more relevant factor in leverage decisions rather than uncertainty itself.

Besides, macroprudential policy index is negatively associated with financial debt share (Column 7). The coefficient of *MPI* is highly significant at 1% level. This relation is robust to alternative specifications as well. This suggests that financial debt shares of Turkish non-financial firms are decreasing when macroprudential policy tools are tightened. In addition, coefficients of both interaction terms, *MPIxSIZE* and *P_UNCIxSIZE* are significant and positive in all specifications. These robust relations suggest that adverse impacts of both macroprudential policy and persistence of uncertainty are mitigated by increase in firm size.

For robustness, and in order to examine whether there is any difference in impacts of macroprudential policy and persistence of uncertainty for firms in different size classifications, I reestimate panel regressions for SMEs and large firms separately. Two different approaches, as explained in Section 1.6.5, are used to classify sample firms into these groups.

## Table 2.1 Corporate financial debt shares, macroprudential policies and uncertainty

The sample consists of non-financial firms in the confidential database of CBRT over the period 2007-2015. The table presents results for the full sample from alternative model specifications of fixed effects panel model in Eq. (2.5); $Y_{it} = \alpha + UNCI_t + P_UNCI_t + MPI_t + UNCIxSIZE + P_UNCIxSIZE + MPIxSIZE + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + +\mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes financial debt to total liabilities of firm *i* in year *t;UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively and *UNCIxSIZE*, *P_UNCIxSIZE* and *MPIxSIZE* terms are their interactions with the firm size. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Financial Debt / Total Liabilities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| UNCI | -0.001 | | 0.0001 | -0.006 | | 0.0123 | | -0.012 |
| | (0.003) | | (0.003) | (0.012) | | (0.016) | | (0.018) |
| UNCI X SIZE | | | | 0.0003 | | -0.001 | | 0.0007 |
| | | | | (0.000) | | (0.000) | | (0.001) |
| P_UNCI | | -0.011*** | -0.011*** | | -0.046*** | -0.055*** | -0.119*** | -0.122*** |
| | | (0.002) | (0.002) | | (0.014) | (0.018) | (0.028) | (0.028) |
| P_UNCI X SIZE | | | | | 0.0022*** | 0.0027** | 0.0056*** | 0.0058*** |
| | | | | | (0.000) | (0.001) | (0.001) | (0.001) |
| MPI | | | | | | | -0.108*** | -0.124*** |
| | | | | | | | (0.033) | (0.037) |
| MPI X SIZE | | | | | | | 0.0054*** | 0.0064*** |
| | | | | | | | (0.001) | (0.002) |
| ***Firm Characteristics*** | | | | | | | | |
| Profitability | -0.041*** | -0.04*** | -0.04*** | -0.042*** | -0.041*** | -0.041*** | -0.041*** | -0.041*** |
| | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) |
| Size | 0.0147*** | 0.0146*** | 0.0146*** | 0.0147*** | 0.0145*** | 0.0144*** | 0.0143*** | 0.0144*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Growth | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0015 | 0.0014 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Tangibility | 0.0654*** | 0.0645*** | 0.0645*** | 0.0646*** | 0.0644*** | 0.0647*** | 0.0648*** | 0.0646*** |
| | (0.012) | (0.013) | (0.013) | (0.012) | (0.012) | (0.013) | (0.012) | (0.012) |
| Business risk | 0.0065 | 0.0065 | 0.0065 | 0.0139 | 0.0136 | 0.0135 | 0.0137 | 0.0139 |
| | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) |
| ***Industry Specific Factor*** | | | | | | | | |
| Industry median leverage | 0.2169*** | 0.245*** | 0.2449*** | 0.2184*** | 0.2486*** | 0.2492*** | 0.2775*** | 0.2789*** |
| | (0.039) | (0.040) | (0.040) | (0.039) | (0.040) | (0.040) | (0.048) | (0.049) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | |
| GDP growth | 0.0515 | 0.0195 | 0.0206 | 0.0507 | 0.0188 | 0.0187 | 0.0976* | 0.0883 |
| | (0.042) | (0.026) | (0.044) | (0.042) | (0.026) | (0.044) | (0.058) | (0.059) |
| Inflation | -0.068 | -0.102 | -0.104 | -0.063 | -0.095 | -0.095 | -0.425* | -0.406* |
| | (0.106) | (0.068) | (0.105) | (0.106) | (0.068) | (0.105) | (0.225) | (0.216) |
| Government leverage | 0.1731*** | 0.1053** | 0.1049** | 0.1707*** | 0.107** | 0.1091** | 0.0277 | 0.0292 |
| | (0.045) | (0.044) | (0.045) | (0.045) | (0.044) | (0.045) | (0.059) | (0.057) |
| FDI | -0.012 | -0.194** | -0.193** | -0.006 | -0.192** | -0.197** | -0.492** | -0.5004** |
| | (0.061) | (0.079) | (0.081) | (0.061) | (0.079) | (0.081) | (0.211) | (0.224) |
| Constant | 0.0644 | 0.1751*** | 0.1753*** | 0.0625 | 0.1737*** | 0.1772*** | 0.3709*** | 0.3719*** |
| | (0.050) | (0.057) | (0.057) | (0.050) | (0.058) | (0.057) | (0.131) | (0.133) |
| Observations | 59,132 | 59,132 | 59,132 | 58,791 | 58,791 | 58,791 | 58,791 | 58,791 |
| Adjusted $R^2$ | 0.0438 | 0.0445 | 0.0445 | 0.0425 | 0.0427 | 0.0423 | 0.0413 | 0.0413 |

Table 2.2 represents panel regression estimations using firm size classification based on net sales criterion while Table 2.3 represents panel estimations using European Union and Turkish official firm size criterion based on number of employees. Panel A and Panel B of these tables presents results for SMEs and large firms, respectively.

In Panel A of Table 2.2, macroprudential policy and persistence of uncertainty indices are significantly negatively associated with financial debt share of SMEs while uncertainty has no effect on this variable. These results are in in line with those reported in Table 2.1.

Strikingly, results are significantly different for large firms. Coefficient of *UNCI* is positive and significant at 10% level while neither *MPI* nor *P_UNCI* is significant for large firms. Results are robust to alternative model specifications. This suggests that financial debt ratios of SMEs decrease when uncertainty is increasing persistently and also when macroprudential policy is tightened during the sample period, which is not the case for large firms.

Table 2.3 presents estimations using an alternative firm size classification based on number of employees instead of net sales criterion. Results are in line with those presented in Table 2.2. Therefore, we can conclude that results are robust to alternative firm size classifications, as well.

Moreover, one can argue that the negative impact of macroprudential policy tightening and increase in persistence of uncertainty on financial debt to total liabilities ratio of SMEs can be attributed to trend changes in liabilities of SMEs compared to large firms over time. However, as seen in Figure 2.1, which presents the time series of yearly aggregated assets to liabilities ratio for SMEs (blue line) and large firms (red line), there is not a systematic difference between assets to liabilities ratio trends of SMEs and large firms during the sample period.

## Table 2.2 SMEs versus large firms (Size classification based on net sales criterion)

The sample consists of non-financial firms in the confidential database of CBRT over the period 2007-2015. The table presents results from alternative model specifications of fixed effects panel model in Eq. (2.4); $Y_{it} = \alpha + UNCI_t + P_UNCI_t + MPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes financial debt to total liabilities of firm *i* in year *t;UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Total Financial Debt / Total Liabilities | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SMEs (size based net sales criterion) | | | | | Large firms (size based net sales criterion) | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| UNCI | -0.005 | | -0.004 | | -0.007 | 0.0091* | | 0.0094* | | 0.009* |
| | (0.004) | | (0.004) | | (0.004) | (0.005) | | (0.005) | | (0.005) |
| P_UNCI | | -0.014*** | -0.014*** | -0.037*** | -0.04*** | | -0.002 | -0.003 | -0.012 | -0.01 |
| | | (0.003) | (0.003) | (0.012) | (0.013) | | (0.003) | (0.003) | (0.014) | (0.015) |
| MPI | | | | -0.028* | -0.031** | | | | -0.011 | -0.009 |
| | | | | (0.014) | (0.015) | | | | (0.016) | (0.016) |
| ***Firm Characteristics*** | | | | | | | | | | |
| Profitability | -0.007 | -0.005 | -0.006 | -0.006 | -0.006 | -0.122*** | -0.123*** | -0.122*** | -0.123*** | -0.122*** |
| | (0.014) | (0.014) | (0.014) | (0.014) | (0.014) | (0.023) | (0.024) | (0.023) | (0.024) | (0.023) |
| Size | 0.0132*** | 0.0131*** | 0.0131*** | 0.0132*** | 0.0133*** | 0.0251*** | 0.0256*** | 0.0251*** | 0.0256*** | 0.0252*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| Growth | 0.0018 | 0.0019 | 0.0019 | 0.0018 | 0.0017 | -0.001 | -0.002 | -0.001 | -0.002 | -0.001 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Tangibility | 0.0492*** | 0.0485*** | 0.0486*** | 0.0483*** | 0.0483*** | 0.1142*** | 0.1141*** | 0.1138*** | 0.1139*** | 0.1137*** |
| | (0.015) | (0.015) | (0.015) | (0.015) | (0.015) | (0.024) | (0.024) | (0.024) | (0.024) | (0.024) |
| Business risk | 0.0173 | 0.0172 | 0.0171 | 0.0164 | 0.0162 | 0.0269 | 0.0262 | 0.0268 | 0.0258 | 0.0265 |
| | (0.020) | (0.020) | (0.020) | (0.020) | (0.020) | (0.031) | (0.031) | (0.031) | (0.031) | (0.031) |
| ***Industry Specific Factor*** | | | | | | | | | | |
| Industry median leverage | 0.2065*** | 0.2428*** | 0.2477*** | 0.2869*** | 0.3*** | 0.2634*** | 0.2785*** | 0.2707*** | 0.2974*** | 0.2862*** |
| | (0.050) | (0.051) | (0.051) | (0.061) | (0.063) | (0.063) | (0.065) | (0.065) | (0.078) | (0.079) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | | | |
| GDP growth | 0.0487 | 0.0538 | 0.0036 | 0.1789** | 0.1206 | 0.0907 | -0.017 | 0.0826 | 0.0324 | 0.1185 |
| | (0.056) | (0.036) | (0.059) | (0.078) | (0.079) | (0.065) | (0.040) | (0.068) | (0.086) | (0.091) |
| Inflation | -0.037 | -0.216** | -0.093 | -0.749** | -0.635** | -0.244 | -0.013 | -0.252 | -0.227 | -0.414 |
| | (0.144) | (0.093) | (0.142) | (0.302) | (0.292) | (0.162) | (0.100) | (0.161) | (0.340) | (0.331) |
| Government leverage | 0.253*** | 0.1381** | 0.16*** | 0.0096 | 0.0254 | 0.0621 | 0.0879 | 0.0427 | 0.0336 | 0.0009 |
| | (0.060) | (0.060) | (0.061) | (0.080) | (0.078) | (0.072) | (0.070) | (0.072) | (0.089) | (0.087) |
| FDI | -0.112 | -0.36*** | -0.374*** | -0.828*** | -0.909*** | 0.046 | -0.041 | -0.004 | -0.231 | -0.158 |
| | (0.081) | (0.103) | (0.105) | (0.277) | (0.298) | (0.092) | (0.127) | (0.130) | (0.331) | (0.344) |
| Constant | 0.1211** | 0.2904*** | 0.2803*** | 0.5926*** | 0.6169*** | -0.147 | -0.14 | -0.117 | -0.017 | -0.019 |
| | (0.061) | (0.072) | (0.072) | (0.172) | (0.177) | (0.102) | (0.110) | (0.110) | (0.215) | (0.215) |
| Number of observations | 39,928 | 39,928 | 39,928 | 39,928 | 39,928 | 19,204 | 19,204 | 19,204 | 19,204 | 19,204 |
| Adjusted $R^2$ | 0.0636 | 0.0632 | 0.0627 | 0.0639 | 0.0632 | 0.0218 | 0.0216 | 0.0219 | 0.022 | 0.0223 |

## Table 2.3 SMEs versus large firms (Size classification based on number of employees, EU criterion)

The sample consists of non-financial firms in the confidential database of CBRT over the period 2007-2015. The table presents results from alternative model specifications of fixed effects panel model in Eq. (2.4); $Y_{it} = \alpha + UNCI_t + P_UNCI_t + MPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes financial debt to total liabilities of firm *i* in year *t*; *UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. Based on European Union as well as Turkish official criterion, a firm is classified as an ''*SME*'' if its number of employees is less than 250, and "large" otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Total Financial Debt / Total Liabilities | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SMEs (size based number of employees) | | | | | Large firms (size based number of employees) | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| UNCI | -0.005 | | -0.005 | | -0.006 | 0.0148** | | 0.0157*** | | 0.0152** |
| | (0.003) | | (0.003) | | (0.003) | (0.005) | | (0.005) | | (0.006) |
| P_UNCI | | -0.011*** | -0.011*** | -0.028** | -0.03*** | | -0.009* | -0.01** | -0.022 | -0.018 |
| | | (0.003) | (0.003) | (0.011) | (0.011) | | (0.004) | (0.004) | (0.018) | (0.018) |
| MPI | | | | -0.021* | -0.024* | | | | -0.016 | -0.010 |
| | | | | (0.012) | (0.013) | | | | (0.020) | (0.021) |
| ***Firm Characteristics*** | | | | | | | | | | |
| Profitability | -0.019 | -0.019 | -0.019 | -0.019 | -0.019 | -0.111*** | -0.112*** | -0.111*** | -0.112*** | -0.111*** |
| | (0.013) | (0.013) | (0.013) | (0.013) | (0.013) | (0.025) | (0.025) | (0.025) | (0.025) | (0.025) |
| Size | 0.0149*** | 0.0147*** | 0.0148*** | 0.0148*** | 0.0149*** | 0.005 | 0.0057 | 0.0051 | 0.0057 | 0.0051 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) |
| Growth | 0.0006 | 0.0008 | 0.0007 | 0.0007 | 0.0006 | 0.0078** | 0.0075** | 0.008** | 0.0073** | 0.0079** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| Tangibility | 0.0564*** | 0.0559*** | 0.0559*** | 0.0558*** | 0.0558*** | 0.1034*** | 0.1006*** | 0.1006*** | 0.1004*** | 0.1004*** |
| | (0.014) | (0.014) | (0.014) | (0.014) | (0.014) | (0.029) | (0.029) | (0.029) | (0.029) | (0.029) |
| Business risk | 0.0087 | 0.0089 | 0.0088 | 0.0082 | 0.0081 | -0.002 | -0.006 | -0.003 | -0.006 | -0.004 |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.019) | (0.046) | (0.046) | (0.046) | (0.046) | (0.046) |
| ***Industry Specific Factor*** | | | | | | | | | | |
| Industry median leverage | 0.1524*** | 0.179*** | 0.1839*** | 0.2123*** | 0.223*** | 0.3743*** | 0.414*** | 0.3961*** | 0.4417*** | 0.4146*** |
| | (0.046) | (0.047) | (0.048) | (0.056) | (0.057) | (0.074) | (0.074) | (0.075) | (0.092) | (0.095) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | | | |
| GDP growth | 0.0325 | 0.0505 | -0.002 | 0.1461** | 0.0897 | 0.0861 | -0.112** | 0.0583 | -0.042 | 0.0968 |
| | (0.050) | (0.032) | (0.053) | (0.068) | (0.070) | (0.076) | (0.049) | (0.080) | (0.109) | (0.109) |
| Inflation | 0.035 | -0.129 | -0.002 | -0.535** | -0.42 | -0.3 | 0.076 | -0.332* | -0.223 | -0.51 |
| | (0.128) | (0.082) | (0.126) | (0.265) | (0.257) | (0.194) | (0.123) | (0.193) | (0.426) | (0.405) |
| Government leverage | 0.1983*** | 0.1076** | 0.1303** | 0.0079 | 0.025 | 0.0655 | 0.0725 | -0.008 | -0.002 | -0.053 |
| | (0.054) | (0.053) | (0.054) | (0.071) | (0.069) | (0.085) | (0.083) | (0.086) | (0.105) | (0.101) |
| FDI | -0.043 | -0.223** | -0.239** | -0.582** | -0.65** | 0.0945 | -0.135 | -0.075 | -0.398 | -0.246 |
| | (0.073) | (0.095) | (0.097) | (0.249) | (0.264) | (0.114) | (0.148) | (0.152) | (0.405) | (0.429) |
| Constant | 0.0907 | 0.2181*** | 0.2083*** | 0.4505*** | 0.4675*** | 0.1558 | 0.2236* | 0.2627* | 0.3948 | 0.3715 |
| | (0.056) | (0.066) | (0.065) | (0.154) | (0.157) | (0.125) | (0.133) | (0.134) | (0.265) | (0.268) |
| Number of observations | 46,675 | 46,675 | 46,675 | 46,675 | 46,675 | 12,457 | 12,457 | 12,457 | 12,457 | 12,457 |
| Adjusted $R^2$ | 0.0399 | 0.0406 | 0.0403 | 0.0416 | 0.0413 | 0.0785 | 0.0792 | 0.0794 | 0.0796 | 0.0797 |

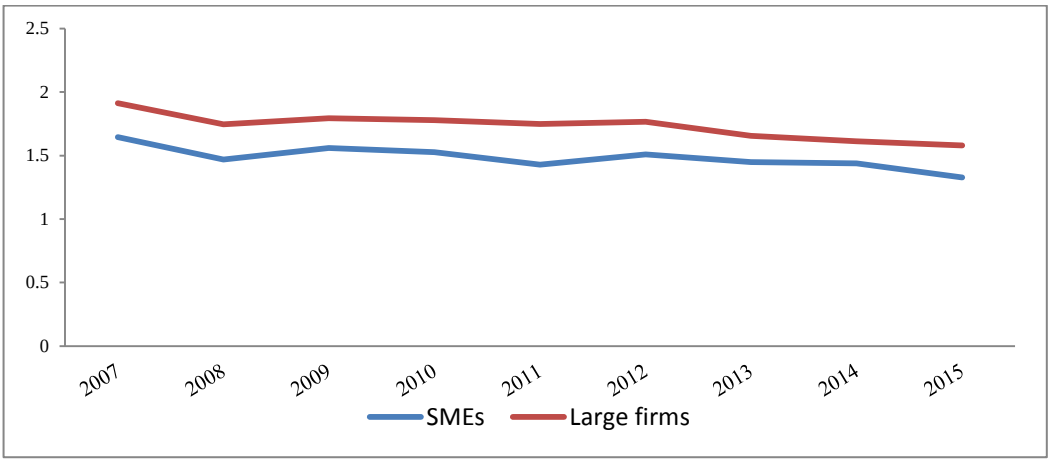


**Figure 2.1 Assets to liabilities ratio**
The blue line and the red line represent yearly aggregated assets to liabilities ratios of non-financial firms in CBRT database from 2007 to 2015 for SMEs and large firms, respectively. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise.

To reconcile similar trends in assets to liabilities ratio in Figure 2.1 for SMEs and large firms, and asymmetric impacts of macroprudential policy and persistence of uncertainty on the share of financial debt in total liabilities of SMEs and large firms reported in Tables 2.2 and 2.3, I reestimate the models with financial debt to total assets as the dependent variable instead of financial debt to total liabilities ratio. This analysis enables us to assess the impact of macroprudential policy and persistence of uncertainty on corporate financial debt ratio. Estimations for firm size classification based on net sales criterion and number of employees are reported in Panel A and Panel B of Table 2.4, respectively.

In column 4 of Panel A, I do find that uncertainty index is negatively associated with financial debt ratio of SMEs. The coefficient of UNCI is significant at 5% level. However, it is not a robust relationship since it turns out to be insignificant in column 8 of Panel B.

In columns 1 and 2 of Panel A, I do find that both macroprudential policy and persistence of uncertainty indices are significantly negatively associated with financial debt ratio for the full sample. Furthermore, it is shown that these

## Table 2.4 Corporate leverage, macroprudential policies and uncertainty

The sample consists of non-financial firms in the confidential database of CBRT over the period 2007-2015. The table presents results from alternative model specifications of fixed effects panel model in Eq. (2.4); $Y_{it} = \alpha + UNCI_t + P_UNCI_t + MPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes corporate leverage (debt to assets) of firm *i* in year *t*; *UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. Estimations for firm size classification based on net sales criterion and number of employees are reported in Panel A and Panel B, respectively. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively

| | Financial Debt / Total Assets | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Full sample | | Panel A : Size based net sales criterion | | | | Panel B: Size based number of employees | | | |
| | | | SMEs | | Large firms | | SMEs | | Large firms | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| UNCI | | 0.0011 | | -0.007** | | 0.0142*** | | -0.004 | | 0.0195*** |
| | | (0.002) | | (0.003) | | (0.003) | | (0.002) | | (0.004) |
| P_UNCI | -0.017** | -0.016** | -0.031*** | -0.034*** | -0.004 | -0.002 | -0.02** | -0.021** | -0.014 | -0.009 |
| | (0.008) | (0.007) | (0.01) | (0.010) | (0.011) | (0.011) | (0.009) | (0.009) | (0.014) | (0.014) |
| MPI | -0.019** | -0.018** | -0.036*** | -0.039*** | -0.004 | -0.001 | -0.024** | -0.025** | -0.013 | -0.005 |
| | (0.008) | (0.008) | (0.012) | (0.012) | (0.012) | (0.012) | (0.01) | (0.010) | (0.015) | (0.016) |
| ***Firm Characteristics*** | | | | | | | | | | |
| Profitability | -0.101*** | -0.101*** | -0.066*** | -0.067*** | -0.185*** | -0.185*** | -0.082*** | -0.082*** | -0.168*** | -0.166*** |
| | (0.012) | (0.012) | (0.015) | (0.014) | (0.023) | (0.022) | (0.014) | (0.013) | (0.027) | (0.027) |
| Size | 0.0097*** | 0.0097*** | 0.0086*** | 0.0087*** | 0.0163*** | 0.0156*** | 0.0096*** | 0.0097*** | 0.0065 | 0.0057 |
| | (0.002) | (0.001) | (0.002) | (0.001) | (0.004) | (0.003) | (0.002) | (0.001) | (0.008) | (0.007) |
| Growth | 0.0029** | 0.0029** | 0.003** | 0.0029** | 0.0018 | 0.0025 | 0.0022* | 0.0021* | 0.0096*** | 0.0103*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) | (0.001) | (0.001) | (0.003) | (0.003) |
| Tangibility | 0.0325*** | 0.0325*** | 0.01 | 0.01 | 0.091*** | 0.0906*** | 0.0236* | 0.0237* | 0.062*** | 0.062*** |
| | (0.011) | (0.011) | (0.014) | (0.013) | (0.02) | (0.019) | (0.013) | (0.012) | (0.024) | (0.023) |
| Business risk | -0.013 | -0.013 | -0.005 | -0.005 | -0.003 | -0.002 | -0.014 | -0.014 | -0.008 | -0.004 |
| | (0.017) | (0.016) | (0.02) | (0.019) | (0.03) | (0.029) | (0.019) | (0.018) | (0.041) | (0.040) |
| ***Industry Specific Factor*** | | | | | | | | | | |
| Industry median leverage | 0.2681*** | 0.2663*** | 0.2679*** | 0.2809*** | 0.3206*** | 0.303*** | 0.2034*** | 0.21*** | 0.4215*** | 0.3866*** |
| | (0.038) | (0.039) | (0.048) | (0.049) | (0.064) | (0.064) | (0.045) | (0.046) | (0.073) | (0.075) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | | | |
| GDP growth | 0.0699 | 0.0798* | 0.1978*** | 0.1398** | -0.066 | 0.0702 | 0.1324** | 0.0974* | -0.107 | 0.0714 |
| | (0.045) | (0.045) | (0.062) | (0.062) | (0.065) | (0.067) | (0.054) | (0.054) | (0.081) | (0.080) |
| Inflation | -0.072 | -0.093 | -0.528** | -0.415* | 0.3234 | 0.0285 | -0.214 | -0.143 | 0.2818 | -0.086 |
| | (0.175) | (0.167) | (0.241) | (0.231) | (0.254) | (0.246) | (0.21) | (0.201) | (0.315) | (0.299) |
| Government leverage | -0.05 | -0.053 | -0.113* | -0.097* | 0.0022 | -0.049 | -0.085 | -0.075 | -0.007 | -0.072 |
| | (0.043) | (0.041) | (0.059) | (0.057) | (0.064) | (0.062) | (0.052) | (0.050) | (0.078) | (0.075) |
| FDI | -0.138 | -0.127 | -0.52** | -0.601** | 0.1269 | 0.2418 | -0.232 | -0.274 | 0.061 | 0.2564 |
| | (0.167) | (0.176) | (0.222) | (0.238) | (0.252) | (0.262) | (0.198) | (0.210) | (0.305) | (0.322) |
| Constant | 0.1473 | 0.1448 | 0.4222*** | 0.4464*** | -0.196 | -0.2 | 0.2475** | 0.2581** | -0.017 | -0.047 |
| | (0.102) | (0.103) | (0.135) | (0.139) | (0.163) | (0.162) | (0.12) | (0.122) | (0.229) | (0.230) |
| Number of observations | 59,141 | 59,141 | 39,937 | 39,937 | 19,204 | 19,204 | 46,684 | 46,684 | 12,457 | 12,457 |
| Adjusted $R^2$ | 0.0666 | 0.0667 | 0.0917 | 0.0901 | 0.039 | 0.0399 | 0.0724 | 0.0718 | 0.0734 | 0.0739 |

relationships are valid for SMEs (columns 3 and 4 in Panel A, and 7 and 8 in Panel B) but not for large firms (column 5 and 6 in Panel A, and 9 and 10 in Panel B). These relationships are robust to alternative specifications of the model and firm size classifications. Therefore, it can be concluded that only the financial debt ratios of SMEs not large firms are decreasing with the tightening of macroprudential policy and the increase in uncertainty persistence.

Moreover, in order to control for the possible bias induced by firm entry or exit, I re-estimate all model specifications for the firms that have at least T years of consecutive data, where $T \in [4, 9]$. T= 3 represents the full sample since the sample of this study consists of firms that has at least 3 years of consecutive data. No bias due to exit or entry of firms is evident in results.[6]

Overall, results reveal the differential impact of persistence in uncertainty and usage of macroprudential policy tools on SMEs and large firms. Only SMEs are shown to suffer when uncertainty increases persistently and when macroprudential policy tools are tightened by regulators during the sample period but not the large firms. Increase in uncertainty persistence and tightening of macroprudential policies, both, induce reductions in both financial debt to total liabilities and financial debt to total assets ratios of SMEs under alternative model specifications and firms size classification schemes.

### 2.4. Concluding Remarks

In recent years, macroprudential policies have been extensively used by both developed and developing countries to increase the financial stability by improving the resilience of the financial system to adverse shocks. In particular, after the 2008-2009 global financial crisis, the issue has attracted increased attention from academics as well as practitioners. Similarly, Turkey, which is an important transition economy, has increasingly implemented MPPs in recent years. In accordance with the importance of the issue, there exists a growing literature

[6] To conserve space, these results are not reported in the thesis. However, they are available from the author of thesis upon request.

investigating the impact of MPPs mostly on credit growth in aggregate level. This study is the first one to explore the impact of MPPs on leverage dynamics by using firm-level data.

In addition, both domestic and geopolitical uncertainties have played vital roles in Turkey and this study is the first one to investigate the impact of uncertainty on leverage dynamics of Turkish non-financial firms. To analyze this issue, an uncertainty index based on financial variables by using Principal Component Analysis is constructed for Turkey. In addition, it is reasonable to expect economic agents to get used to uncertainties in a country such as Turkey since they face both domestic and geopolitical uncertainties frequently. Thus, it is argued that persistence of uncertainty should be a more appropriate factor affecting leverage decisions of firms than uncertainty itself. In order to assess the validity of this argument, an index for persistence of uncertainty is also constructed by adopting the approaches in Herrera et al. (2011) and Davis and Haltiwanger (1992). Another novel aspect of this study is to simultaneously analyze impacts of MPPs, uncertainty and persistence of uncertainty on financial debt.

A confidential and unique firm level dataset which is the comprehensive and representative database for Turkish non-financial firms is utilized in empirical analyses of this thesis. Results from the empirical panel model, which has a large set of control variables in addition to variables of interest provide significant evidence in support of the argument that firms' leverage decisions are affected from the persistence of uncertainty rather than the uncertainty itself. In addition, results reveal that both MPPs and persistence of uncertainty have significant adverse impacts on financial leverage ratio as well as share of the financial debt in total liabilities of only SMEs but not large firms. This suggests that financial debt ratios of Turkish non-financial SMEs decrease when uncertainty increases persistently and when macroprudential policy tools are tightened by regulators during the sample period.

Findings of this study also provide support for the previous research regarding the financial constraints on SMEs, which limits their potentials in the economy. Kurul and Tiryaki (2016) report that the credit constraint problem is more severe when firm size is smaller in Turkey by using Business Environment and Enterprise Performance Survey, jointly conducted by the European Bank for Reconstruction and Development and the World Bank. Moreover, Şeker and Correa (2010) point out the smaller growth rate of SMEs in Turkey compared to Central Asia and Eastern Europe, which highlights their unrealized potentials in Turkish economy. Results of this study highlight the cruciality of appropriate macroprudential policy designs which help SMEs realize their full potential in the country.

# CHAPTER III

# HOW DO SMALL AND MEDIUM-SIZE ENTERPRISES (SMEs) SURVIVE? HIDDEN RESERVES?

*"Many Turkish households and corporates have some hidden reserves that are utilized during time of stress. This is one of the reasons why companies are still showing resilience…"*

*(Standard & Poor's, July 17, 2017)*

## 3.1. Introduction

In recent years, Small and Medium-Sized Enterprises (SMEs) have received much more attention owing to their significant contributions to economies of both developed and emerging countries. In Turkey, SMEs contribute 73% of total employment, 62% of total sales, 55% of total investments and 53.5% of total value added. Despite their crucial role in Turkish economy, credit constraints and difficulty in accessing capital have been considered as the two major problems faced by SMEs.

In one of most recent studies, Kurul and Tiryaki (2016) show that the credit constraint problem is more severe when firm size is smaller in Turkey by using Business Environment and Enterprise Performance Survey (BEEPS), jointly conducted by the European Bank for Reconstruction and Development and the World Bank. Previous chapter provides significant evidence in line with Kurul and Tiryaki (2016). One of the novel findings of previous chapter is that SMEs' financial debt ratios decreases when uncertainty of economic environment increases

persistently and when macroprudential policies (MPPs) are tightened during the sample period but not that of large firms.

Considering the fact that Turkey has extensively used macroprudential policies explicitly and economic agents have confronted with financial turmoils, domestic and geopolitical uncertainties frequently in the last decade, how SMEs do survive in such an economic environment remains to be puzzling. This study is the first to explore the issue. In this study, I aim to provide insights, and I attempt to unfold the riddle.

The lack of savings in Turkish financial system has been one of the most important issues in Turkey for a long time. On the other hand, common belief is that there exists significant under-the-mattress savings that are kept out of the financial system, which is mostly attributed to social and demographic factors. This can also be related to residents` risk assessments and precautionary motives against uncertainties.

Accordingly, in their recent "Banking Industry Country Risk Assessment" report, S&P argues that many Turkish households and corporates have some hidden reserves that are utilized during times of stress. They claim that this is one of the reasons why companies are still showing resilience in such an environment.

Besides, in another study based on BEEPS survey covering 1,152 businesses over the period April 2008-January 2009, Kurul and Tiryaki (2014) reports that in contrast to large firms, collateral requirements in granting loans are significantly high for SMEs. Collateral to loan ratio is 121% for micro-sized, 92% for small, 95% for medium and 67% for large firms. Most interesting aspect of their findings is twofold. First, collateral requirements become more severe right after the 2008-2009 financial crisis. Second, following tangible assets, personal wealth of owners is the most frequently requested collateral by banks, and this is much more relevant for SMEs than large firms.

Reconciling these with the findings from the previous chapter, I argue that these two issues are expected to be even more prominent when uncertainties in economic environment increase persistently and when MPPs are tightened by regulators. Considering relatively higher collateral to loan ratios requested from SMEs and lower tangible assets of these firms, it is reasonable to expect the owners of SMEs to collateralize their personal and/or their relatives` wealth to obtain loans in order to satisfy their financing needs and in order to survive during such economic environments mentioned above.

At that point, the question arises: Why does an owner of a firm not use her personal wealth directly instead of using it as a collateral? Considering additional costs and red tape associated with loans and collateralization, I argue that owners of firms might prefer the former during time of persistent stress and/or MPPs tightening. If so, in accordance with the usage of personal and/or relatives` personal wealth, some fluctuations are expected in balance sheet components of these firms, namely owners' equity and/or non-financial debt liabilities during such economic environments.

In order to investigate the issue, first I examine trends in balance sheet components of sample firms in detail. Most strikingly, trend analyses of aggregated time series reveal that only other non-financial liability item in the balance sheet exhibits upward fluctuations during such economic conditions, which is observed only for SMEs but not for the large firms. This component mainly consists of amounts owed to partners and the miscellaneous items, which are neither financial nor trade debt. This suggests that SMEs tend to finance themselves by increasing their other non-financial liabilities, which I argue that these are the under-the-mattress savings (hidden reserves). Anecdotal evidence provided from certified public accountants is also consistent with this argument.

Moreover, in order to achieve formal evidence, I conduct Panel Fixed Effects Model over the sample period 2007-2015 by utilizing a confidential and unique firm-level dataset which is the most comprehensive and representative database for

Turkish non-financial firms. I estimate the panel model by using alternative firm size classification, namely European and Turkish official criterion based on number of employees and net sales criterion.

Results reveal that reactions of firms to uncertainties depend on the nature of it and they increase their other non-financial liability components only when uncertainty is persistently increasing rather than when the uncertainty itself is increasing, which is in line with findings of the previous chapter. Furthermore, firms increase their other non-financial liability components when macroprudential policy tools are tightened by regulators as well. Most strikingly, this is the case for only SMEs but not the large firms, which provide significant supporting evidence for the argument.

The remainder of this part of the thesis is organized as follows. The dataset and measurements are explained in Section 3.2, and trend analyses are presented in Section 3.3. Empirical model and results are reported in Section 3.4. Finally, concluding remarks are presented in Section 3.5.

### 3.2. Data and Measurements

The confidential firm level data utilized in this study is provided by the CBRT. Detailed information on this data is given in Section 1.3 of this thesis. Besides measurements of firm specific, industry specific, macroeconomic and economic environment factors are explained in Section 1.4. Similarly, Section 2.2 explains measurements of macroprudential policy, uncertainty and persistence of uncertainty indices used in the empirical analyses of this thesis.

### 3.3. Analysis of Trends in Aggregated Data

In order to provide insights for the argument introduced in the introduction, in this section I examine trends in aggregated balance sheet components in detail. Most strikingly, neither the non-financial liability components with the exception of other non-financial liabilities nor the owners' equity of Turkish non-financial firms exhibit fluctuations during the times of stress and/or the times of macroprudential policy tightening by regulators. In order to illustrate, time series of yearly

aggregated owners' equity to assets ratio and aggregated trade debt to assets ratio, which is the major non-financial debt liability component, are presented in Figure 3.1 and Figure 3.2, respectively.

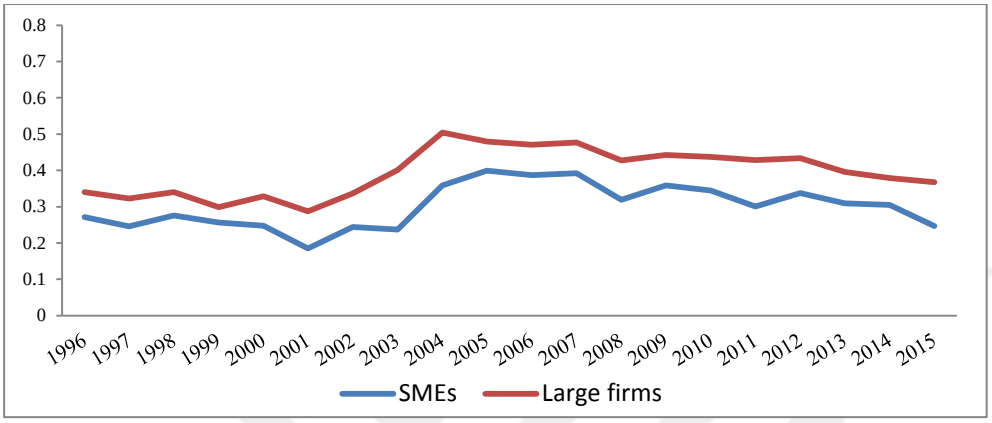


**Figure 3.1 Owners' equity to total assets**
The blue line and the red line represent yearly aggregated owners' equity to total assets ratios of non-financial firms in CBRT database from 1996 to 2015 for SMEs and large firms, respectively. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise.

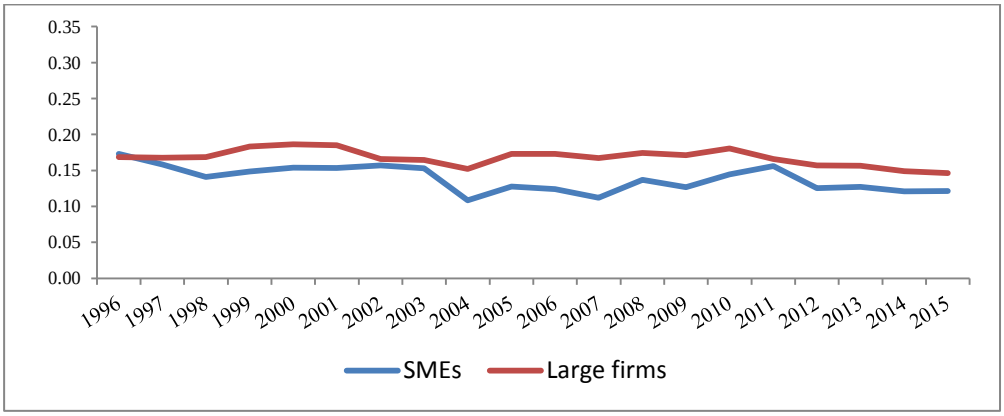


**Figure 3.2 Non-financial trade debt to total assets**
The blue line and the red line represent yearly aggregated total non-financial trade debt to total assets ratios of non-financial firms in CBRT database from 1996 to 2015 for SMEs and large firms, respectively. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise.

In these figures, the blue and the red lines show the ratios for SMEs and large firms, respectively. In Figure 3.1, owners' equity to assets ratio exhibits improvement between 2002-2007 for both SMEs and large firms, which is attributable to high growth period of Turkey. However, no fluctuations appear during times of persistence stress or MPPs tightening. This is also the case for trade debt to assets ratio depicted in Figure 3.2.

On the other hand, the only non-financial liability that exhibits fluctuations during such economic environment is the other non-financial liability component. Figure 3.3 present time series of aggregated other non-financial liabilities to assets ratio for SMEs (the blue line) and large firms (the red line), respectively. The figure reveals two significant peaks for SMEs in which the ratio nearly doubles. The first peak appears during 2001-2002 financial crisis, and the second appears during 2008-2009 financial turmoil. Besides, the ratio has an upward trend starting in 2011, which is the period of MPP tightening.

At this point, it is worthwhile to explain this balance sheet component. According to the Turkish accounting system, other non-financial liability component consists of following items: (i) Amounts Owed to Partnerships/Shareholders, (ii) Amounts Owed to Participations, (iii) Amounts Owed to Affiliated Enterprises, (iv) Amounts Owed to Affiliated Employees, and (v) Miscellaneous. The miscellaneous items are the accounting entries, which are neither financial debt nor trade debt, and not related with the first four other liability items. Examining these individual components in detail, I discover that the first and the fifth items of other non-financial liability component, namely amounts owed to partnerships and miscellaneous account for the observed fluctuations in this item.

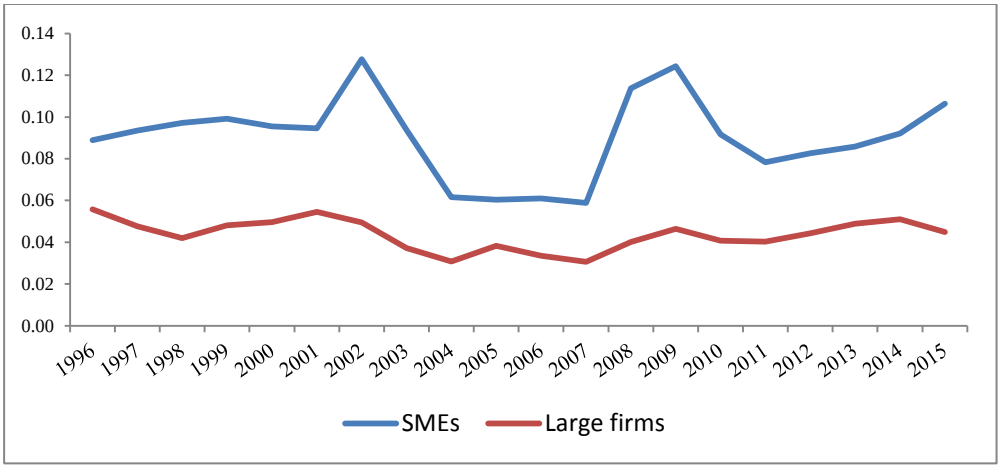


**Figure 3.3 Other non-financial liabilities to total assets**

The blue line and the red line represent yearly aggregated other non-financial liabilities to total assets ratios of non-financial firms in CBRT database from 1996 to 2015 for SMEs and large firms, respectively. In according with Turkish accounting system, other non-financial liability component consists of following items: (i) Amounts Owed to Partnerships/Shareholders, (ii) Amounts Owed to Participations, (iii) Amounts Owed to Affiliated Enterprises, (iv) Amounts Owed to Affiliated Employees, and (v) Miscellaneous. The last miscellaneous items are the accounting entries, which are neither financial debt nor trade debt, and not related with first four other liabilities items. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise.

One can argue that other non-financial liability component might be negligible or might not be a significant source of financing despite aforementioned increases. In order to analyze this issue, I calculate time series of aggregated other non-financial liabilities to total liabilities and other non-financial liabilities to financial debt ratios, which are presented in Figure 3.4 and Figure 3.5, respectively. Figures reveal that other non-financial liabilities reach nearly 20% of total liabilities and above half of total financial debt, indicating that other non-financial liabilities is not a negligible amount and it is a significant source of financing for firm during such economic conditions.

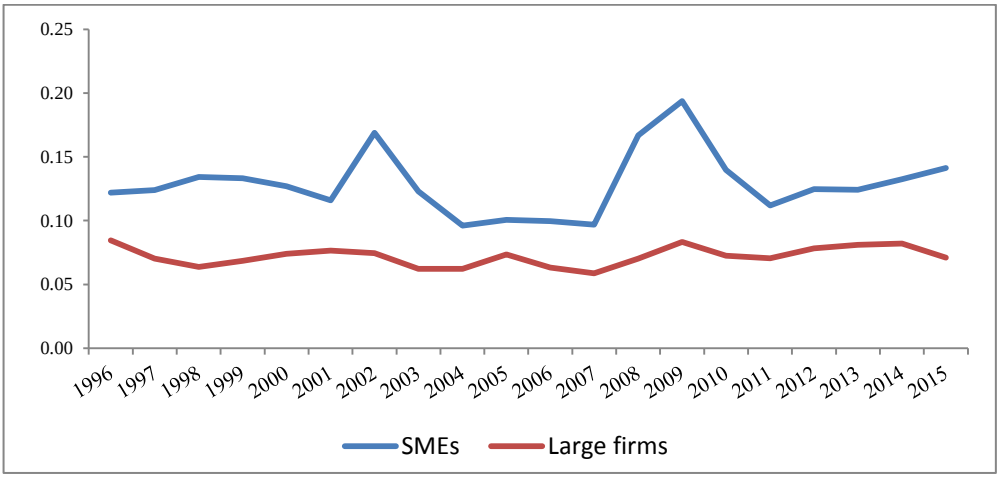


**Figure 3.4 Other non-financial liabilities to total liabilities**

The blue line and the red line represent yearly aggregated other non-financial liabilities to total liabilities ratios of non-financial firms in CBRT database from 1996 to 2015 for SMEs and large firms, respectively. In according with Turkish accounting system, other non-financial liability component consists of following items: (i) Amounts Owed to Partnerships/Shareholders, (ii) Amounts Owed to Participations, (iii) Amounts Owed to Affiliated Enterprises, (iv) Amounts Owed to Affiliated Employees, and (v) Miscellaneous. The last miscellaneous items are the accounting entries, which are neither financial debt nor trade debt, and not related with first four other liabilities items. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise.

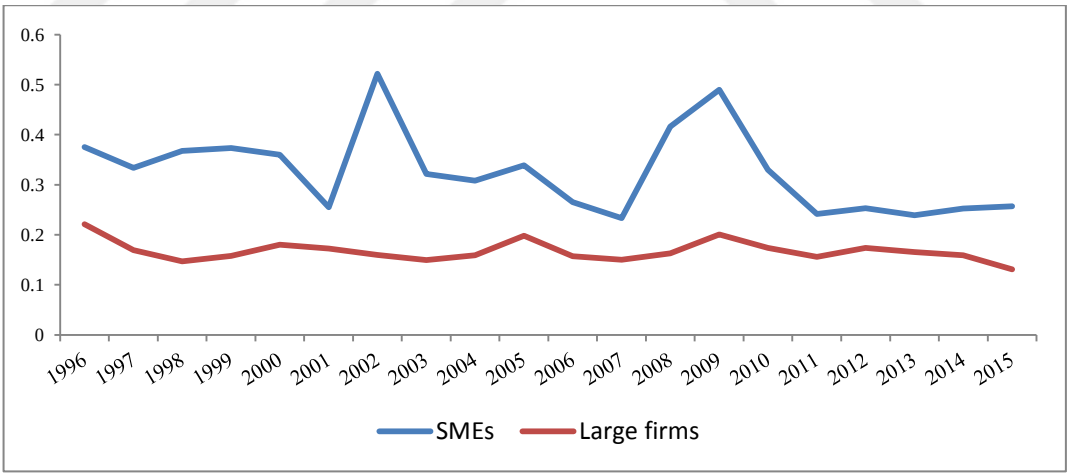


**Figure 3.5 Other non-financial liabilities to total financial debt**

The blue line and the red line represent yearly aggregated other non-financial liabilities to total financial debt ratios of non-financial firms in CBRT database from 1996 to 2015 for SMEs and large firms, respectively. In according with Turkish accounting system, other non-financial liability component consists of following items: (i) Amounts Owed to Partnerships/Shareholders, (ii) Amounts Owed to Participations, (iii) Amounts Owed to Affiliated Enterprises, (iv) Amounts Owed to Affiliated Employees, and (v) Miscellaneous. The last miscellaneous items are the accounting entries, which are neither financial debt nor trade debt, and not related with first four other liabilities items. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise.

To sum up, Chapter 2 of this study provides novel evidence that in contrast to large firms, SMEs' financial debt decreases when uncertainty of economic environment increases persistently and when macroprudential policy tools are tightened by regulators. Trend analyses of aggregated balance sheet components provide some insights regarding how SMEs do survive during such economic environments. They reveal that SMEs tend to finance their operations by increasing their other non-financial liability components. These are the accounting entries, that are neither financial nor trade debt, and I argue that these are the hidden reserves, i.e., owners` or their relatives' personal wealth. It seems owners of SMEs use them directly instead of using them as collateral. This behaviour could be rational considering the additional costs and red tape associated with loans and collateralization. Anecdotal evidence provided by certified public accountants is also in line with this argument.

### 3.4. Empirical Model and Results

In addition to insights provided by the aggregated trend analyses, in this section I conduct empirical tests to provide a formal evidence for the argument established in the introduction. Details of the empirical model and results are presented below.

#### 3.4.1. Empirical Model

In order to examine impacts of macroprudential policy tightening and persistence of uncertainty on other non-financial liability component of Turkish non-financial firms, Panel Fixed Effects Model (PFEM) is employed rather than Pooled Ordinary Least Squares (OLS). OLS is a restrictive model that specifies a constant slope and ignores the unobservable fixed effects. Hence, it yields inconsistent and biased estimates. In PFEM model, different intercept terms are allowed for each cross sectional unit and unobserved heterogeneity is accounted for. Moreover, PFEM provides unbiased estimated by accounting for the unobserved heterogeneity (Li and Prabhala, 2007; Wooldridge, 2010; Roberts and Whited, 2012). Furthermore, Hausman test results favour PFEM over Random Fixed Effects Model. Panel Fixed Effects Models employed in this study are presented in equations 3.1 to 3.5.

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \quad (3.1)$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \alpha_2 \, x \, P_UNCI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \quad (3.2)$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \alpha_2 \, x \, P_UNCI_t + \alpha_3 \, x \, MPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \quad (3.3)$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, UNCI_t + \alpha_2 \, x \, P_UNCI_t + \alpha_3 \, x \, MPI_t + \alpha_4 \, x \, UNCIxSIZE + \alpha_5 \, x \, P_UNCIxSIZE + \alpha_6 \, x \, MPIxSIZE + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \quad (3.4)$$

$$Y_{it} = \alpha_0 + \alpha_1 \, x \, P_UNCI_t + \alpha_2 \, x \, POZ_P_UNCI_t \, xMPI_t + \alpha_1 \, x \, NEG_P_UNCI_t \, xMPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it} \quad (3.5)$$

where dependent variable, $Y_{it}$ denotes other non-financial liabilities/total assets for firm *i* in year *t*. *UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively. I also incorporate *UNCIxSIZE*, *P_UNCIxSIZE* and *MPIxSIZE* terms to examine interactions between firm size and uncertainty, persistence of uncertainty and macroprudential policy, respectively. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables mentioned in Section 1.4. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term.

I also argue that the impact of MPI might be different depending on whether uncertainty is persistently decreasing or increasing. In order to assess validity of this argument, I incorporate interaction terms, namely $POZ_P_UNCI_{it}$ x $MPI_{it}$ and $NEG_P_UNCI_{it}$ x $MPI_{it}$ to the model as shown in equation 3.5. $POZ_P_UNCI_{it}$ is constructed as a dummy variable, which takes a value of *1* when uncertainty is

increased persistently in time *t* and *0* otherwise; and $NEG_P_UNCI_{it}$ which takes a value of *1* when uncertainty is decreased persistently in time *t* and *0* otherwise.

### 3.4.2. Results

In order to test the argument established in introduction, I estimate alternative panel model specifications by incorporating interaction terms between firm size and related factors for the full sample and present the estimation results in Table 3.1.

At first glance, in column 1, I do find that uncertainty index is significantly positively associated with other non-financial liability ratio for the full sample. However, the coefficient of uncertainty index, *UNCI* does not remain significant in all alternative model specifications. On the other hand, persistence of uncertainty index is significantly positively associated with other non-financial liability ratio in all alternative model specification. This robust relationship suggests that reaction of firms to uncertainties depend on the nature of it. Firms seem to increase their other non-financial liabilities only when uncertainty is persistently increasing. This finding is in line with findings of the previous chapter.

In column 7, I do find that macroprudential policy index is positively associated with other non-financial liability ratio. The coefficient of *MPI* is highly significant at 1% level. This relation is robust to alternative specifications as well. This suggests that other non-financial liability ratios of Turkish non-financial firms are increasing when macroprudential policy tools are tightened during the sample period.

In addition, coefficients of both interaction terms, *MPIxSIZE* and *P_UNCIxSIZE* are significant and negative. They are robust to alternative model specifications. These robust relationships suggest that impacts of both macroprudential policy and persistence of uncertainty are lessening with increasing firm size, which is in line with the argument established in the introduction.

## Table 3.1 Other non-financial liabilities, macroprudential policies and uncertainty

The sample consists of non-financial firms in the confidential database of CBRT over the period 2007-2015. The table presents results for the full sample from alternative model specifications of fixed effects panel model in Eq. (3.4); $Y_{it} = \alpha + UNCI_t + P_UNCI_t + MPI_t + UNCIxSIZE + P_UNCIXSIZE + MPIxSIZE + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes other non-financial liabilities to total assets of firm *i* in year *t*; *UNCI*, *P_UNCI* and *MPI* are the variables of interest denoting uncertainty, persistence of uncertainty, and macroprudential policy indices, respectively and *UNCIxSIZE*, *P_UNCIxSIZE* and *MPIxSIZE* terms are their interactions with the firm size. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. $\mu_i$ is (unobservable) time invariant firm specific effect, and $\varepsilon_{it}$ is the idiosyncratic error term. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Other Liabilities / Total Assets | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| UNCI | 0.0074*** | | 0.0071*** | 0.014* | | 0.0051 | | 0.022** |
| | (0.001) | | (0.001) | (0.007) | | (0.009) | | (0.011) |
| UNCI X SIZE | | | | 0 .0004 | | 0.0001 | | -0.001 |
| | | | | (0.000) | | (0.000) | | (0.000) |
| P_UNCI | | 0.0038*** | 0.0035** | | 0.0238** | 0.0249* | 0.068*** | 0.0743*** |
| | | (0.001) | (0.001) | | (0.010) | (0.013) | (0.022) | (0.022) |
| P_UNCI X SIZE | | | | | -0.001** | -0.001* | -0.003*** | -0.003*** |
| | | | | | (0.000) | (0.000) | (0.001) | (0.001) |
| MPI | | | | | | | 0.0648** | 0.0889*** |
| | | | | | | | (0.025) | (0.028) |
| MPI X SIZE | | | | | | | -0.003** | -0.004*** |
| | | | | | | | (0.001) | (0.001) |
| ***Firm Characteristics*** | | | | | | | | |
| Profitability | -0.067*** | -0.068*** | -0.068*** | -0.071*** | -0.072*** | -0.071*** | -0.072*** | -0.071*** |
| | (0.020) | (0.020) | (0.020) | (0.019) | (0.019) | (0.019) | (0.019) | (0.019) |
| Size | -0.006*** | -0.005*** | -0.006*** | -0.005*** | -0.005*** | -0.005*** | -0.005*** | -0.005*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Growth | 0.0004 | 0.0002 | 0.0004 | 0.0002 | 0.00003 | 0.0001 | 0.0001 | 0.0003 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Tangibility | 0.011 | 0.0114 | 0.0113 | 0.006 | 0.006 | 0.0058 | 0.0058 | 0.0059 |
| | (0.010) | (0.010) | (0.010) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) |
| Business risk | -0.007 | -0.007 | -0.007 | 0.0038 | 0.0037 | 0.004 | 0.0037 | 0.0038 |
| | (0.024) | (0.024) | (0.024) | (0.022) | (0.022) | (0.022) | (0.022) | (0.022) |
| ***Industry Specific Factor*** | | | | | | | | |
| Industry median leverage | 0.0197 | 0.0173 | 0.0097 | 0.0201 | 0.0164 | 0.009 | -0.005 | -0.018 |
| | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) | (0.024) | (0.025) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | |
| GDP growth | 0.0155 | -0.053*** | 0.0265 | 0.0043 | -0.062*** | 0.0156 | -0.12*** | -0.047 |
| | (0.024) | (0.015) | (0.025) | (0.023) | (0.014) | (0.024) | (0.031) | (0.033) |
| Inflation | -0.112* | 0.0932** | -0.099 | -0.087 | 0.1119*** | -0.077 | 0.3537*** | 0.2043* |
| | (0.063) | (0.042) | (0.062) | (0.059) | (0.039) | (0.058) | (0.117) | (0.115) |
| Government leverage | -0.062** | -0.002 | -0.037 | -0.06** | -0.005 | -0.04 | 0.0537 | 0.0322 |
| | (0.025) | (0.025) | (0.026) | (0.024) | (0.024) | (0.025) | (0.033) | (0.032) |
| FDI | 0.0474 | 0.0874* | 0.1119** | 0.059* | 0.1022** | 0.1268*** | 0.3206*** | 0.4007*** |
| | (0.036) | (0.045) | (0.047) | (0.035) | (0.044) | (0.046) | (0.110) | (0.116) |
| Constant | 0.1599*** | 0.105*** | 0.1205*** | 0.1503*** | 0.0951*** | 0.1099*** | -0.048 | -0.065 |
| | (0.033) | (0.036) | (0.036) | (0.033) | (0.036) | (0.036) | (0.070) | (0.071) |
| Observations | 59,141 | 59,141 | 59,141 | 58,798 | 58,798 | 58,798 | 58,798 | 58,798 |
| Adjusted $R^2$ | 0.0681 | 0.0687 | 0.068 | 0.0705 | 0.0714 | 0.0706 | 0.0711 | 0.0693 |

## Table 3.2 SMEs versus large firms

The sample consists of non-financial firms in the confidential database of CBRT over the period 2007-2015. The table presents results of fixed effects panel model in Eq. (3.3); $Y_{it} = \alpha + P_UNCI_t + MPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes other liabilities to total assets of firm *i* in year *t*; *P_UNCI* and *MPI* are the variables of interest denoting persistence of uncertainty, and macroprudential policy indices, respectively. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. Estimations for firm size classification based on net sales criterion and number of employees are reported in Panel A and Panel B, respectively. Firms are divided into quartiles based on their net sales, and a firm is classified as "large" if it is in the highest net sales quartile and an ''SME'' otherwise. Based on European Union as well as Turkish official criterion, a firm is classified as an''*SME*'' if its number of employees is less than 250, and "large" otherwise. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Other Liabilities / Total Assets | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Full sample | | Panel A : Size based net sales criterion | | | | Panel B: Size based number of employees | | | |
| | | | SMEs | | Large firms | | SMEs | | Large firms | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| P_UNCI | 0.0038*** | 0.0136*** | 0.0058*** | 0.0194*** | -0.002 | 0.0024 | 0.0053*** | 0.0147** | -0.002 | 0.0068 |
| | (0.001) | (0.005) | (0.002) | (0.007) | (0.001) | (0.006) | (0.001) | (0.006) | (0.002) | (0.008) |
| MPI | | 0.0119** | | 0.0165** | | 0.0050 | | 0.0114* | | 0.0110 |
| | | (0.005) | | (0.008) | | (0.007) | | (0.006) | | (0.010) |
| ***Firm Characteristics*** | | | | | | | | | | |
| Profitability | -0.068*** | -0.067*** | -0.06*** | -0.060*** | -0.065** | -0.064** | -0.051*** | -0.051*** | -0.129** | -0.129** |
| | (0.020) | (0.020) | (0.021) | (0.021) | (0.030) | (0.030) | (0.019) | (0.019) | (0.064) | (0.064) |
| Size | -0.005*** | -0.005*** | -0.006*** | -0.006*** | -0.001 | -0.000 | -0.006*** | -0.005*** | -0.0001 | -0.000 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.003) | (0.003) | (0.001) | (0.001) | (0.005) | (0.005) |
| Growth | 0.0002 | 0.0003 | 0.0005 | 0.0005 | 0 .00003 | -0.000 | 0.0001 | -0.000 | 0.001 | 0.0011 |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) | (0.001) | (0.001) |
| Tangibility | 0.0114 | 0.0115 | 0.0117 | 0.0118 | 0.0156 | 0.0156 | 0.0117 | 0.0117 | 0.0097 | 0.0098 |
| | (0.010) | (0.010) | (0.013) | (0.013) | (0.010) | (0.010) | (0.011) | (0.011) | (0.018) | (0.018) |
| Business risk | -0.007 | -0.006 | -0.007 | -0.006 | -0.04 | -0.039 | 0.008 | 0.0083 | -0.148 | -0.147 |
| | (0.024) | (0.024) | (0.029) | (0.029) | (0.042) | (0.042) | (0.025) | (0.025) | (0.090) | (0.090) |
| ***Industry Specific Factor*** | | | | | | | | | | |
| Industry median leverage | 0.0173 | -0.001 | 0.0197 | -0.006 | 0.0082 | -0.000 | 0.0232 | 0.0052 | -0.028 | -0.047 |
| | (0.021) | (0.024) | (0.030) | (0.035) | (0.029) | (0.034) | (0.026) | (0.030) | (0.037) | (0.047) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | | | | | | |
| GDP growth | -0.053*** | -0.106*** | -0.048** | -0.122*** | -0.056*** | -0.078* | -0.055*** | -0.106*** | -0.043* | -0.091* |
| | (0.015) | (0.031) | (0.023) | (0.047) | (0.017) | (0.041) | (0.020) | (0.039) | (0.023) | (0.053) |
| Inflation | 0.0932** | 0.3211*** | 0.1029* | 0.4211** | 0.0842* | 0.1792 | 0.1095** | 0.3282** | -0.007 | 0.2026 |
| | (0.042) | (0.117) | (0.060) | (0.176) | (0.049) | (0.152) | (0.049) | (0.142) | (0.097) | (0.210) |
| Government leverage | -0.002 | 0.0543 | -0.002 | 0.0749 | -0.014 | 0.0100 | -0.002 | 0.0514 | -0.038 | 0.0136 |
| | (0.025) | (0.033) | (0.037) | (0.048) | (0.028) | (0.043) | (0.031) | (0.040) | (0.037) | (0.055) |
| FDI | 0.0874* | 0.2883*** | 0.1206* | 0.3999** | -0.003 | 0.0811 | 0.1223** | 0.3156** | -0.071 | 0.1133 |
| | (0.045) | (0.110) | (0.063) | (0.164) | (0.054) | (0.136) | (0.054) | (0.135) | (0.095) | (0.194) |
| Constant | 0.105*** | -0.025 | 0.105** | -0.075 | 0.0547 | -0.000 | 0.0934** | -0.031 | 0.1193 | -0.0003 |
| | (0.036) | (0.070) | (0.047) | (0.102) | (0.058) | (0.105) | (0.042) | (0.085) | (0.086) | (0.142) |
| Observations | 59,141 | 59,141 | 39,937 | 39,937 | 19,204 | 19,204 | 46,684 | 46,684 | 12,457 | 12,457 |
| Adjusted $R^2$ | 0.0687 | 0.0684 | 0.0548 | 0.0541 | 0.0409 | 0.0414 | 0.0618 | 0.0614 | 0.0437 | 0.0444 |

For robustness, I reestimate panel regressions for SMEs and large firms separately in order to examine whether impacts of macroprudential policy and persistence of uncertainty differ among size classification of firms. Two different approaches are used to determine the size classification of firms. Details of these classifications are given in Section 1.6.5. Panel A of Table 3.2 represents panel regression estimations results using firm size classification based on net sales criterion while Panel B represents estimation results using European Union and Turkish official firm size criterion based on number of employees.

In Panel A of Table 3.2, I do find that macroprudential policy and persistence of uncertainty indices are positively associated with other non-financial liability ratios of SMEs. In column 3 and 4, controlling firm specific, industry specific and other related macroeconomic variables, the coefficients of both *P_UNCI* and *MPI* are significant at 1% and 5% levels, respectively. Strikingly, results differ among different size classes. In column 5 and 6, associations turn out to be insignificant for large firms. This reveals that other non-financial liability ratios of SMEs increase when uncertainty is increasing persistently and also when macroprudential policy is tightened during the sample period while no such relationship appears for large firms.

Panel B presents re-estimations of the empirical model by using European Union and Turkish official firm size criterion based on number of employees instead of net sales criterion. Coefficients of both *MPI* and *P_UNCI* are positive and significant for SMEs (columns 7 and 8) while neither of them is significant for large firms (columns 9 and 10) as in Panel A. Thus, results are robust to alternative firm size classifications.

Moreover, I estimate the empirical panel model in equation 3.5 in order to assess the argument that the impact of *MPI* might be different depending on the nature of uncertainty. Specifically I incorporate the interaction terms, $POZ_P_UNCI_{it}$ x $MPI_{it}$ and $NEG_P_UNCI_{it}$ x $MPI_{it}$ to the panel model which determine the impact of *MPI* when uncertainty is persistently increasing or decreasing, respectively. Results are reported in Panels A and B of Table 3.3 for alternative firm size classifications.

Results reveal that persistence of uncertainty index is positively associated with other non-financial liability ratios of SMEs but not that of large firms. The coefficient of *P_UNCI* remains positive and significant for SMEs in both column 2 of Panel A and column 4 of Panel B while it turns out to be insignificant for large firms in columns 3 and 5. Results are in line with those in Table 3.2. Thus, this relationship is robust to both alternative model specifications and firm size classifications.

Besides, in columns 4 and 5, there seems to be an association between $POZ_P_UNCI_{it}$ *x* $MPI_{it}$ and other non-financial liability ratio. However, these relations are not robust since they turn out to be insignificant when an alternative size classification based on net sales criterion is used (columns 2 and 3).

On the other hand, I do find a significant robust relationship between $NEG_P_UNCI_{it}$ *x* $MPI_{it}$ and other non-financial liability ratios for SMEs only. The coefficient of $NEG_P_UNCI_{it}$ *x* $MPI_{it}$ is positive and significant for SMEs (columns 2 and 4) while it is insignificant for large firms (columns 3 and 5). These results provide significant evidence in support of the aforementioned claim that the impact of *MPI* differs depending on the nature of the uncertainty. Results reveal that the *MPI* seems to be more effective in increasing SMEs' other non-financial liability ratios when uncertainty is persistently decreasing. Overall, estimations using the empirical panel models provide significant evidence in support of the argument established in the introduction.

Moreover, in order to control for the possible bias induced by firm entry or exit, I re-estimate all model specifications for the firms that have at least T years of consecutive data, where $T \in [4, 9]$. T= 3 represents the full sample since the sample of this study consists of firms that has at least 3 years of consecutive data. No bias due to exit or entry of firms is evident in results.[7]

[7] To conserve space, these results are not reported in the thesis. However, they are available from the author of thesis upon request.

## Table 3.3 Does impact of MPI differs depending on the nature of uncertainty?

The sample consists of non-financial firms in the confidential database of CBRT over 2007-2015. The table presents results of fixed effects panel model in Eq.(3.5); $Y_{it} = \alpha + P_UNCI_t + POZ_P_UNCI_t xMPI_t + NEG_P_UNCI_t xMPI_t + \sum_k \gamma_k F_{k,it-1} + \sum_l \beta_l I_{l,it} + \sum_m \delta_m EE_{m,it} + \sum_n \theta_n X_{n,it} + \mu_i + \varepsilon_{it}$ where $Y_{it}$ denotes other liabilities to total assets of firm *i* in year *t*; *P_UNCI* and *MPI* are the variables of interest denoting persistence of uncertainty, and macroprudential policy indices, respectively. $POZ_P_UNCI_{it}$ is constructed as a dummy variable which takes value of *1* when uncertainty is increased persistently in time *t* and *0*, otherwise; and $NEG_P_UNCI_{it}$ which takes value of *1* when uncertainty is decreased persistently in time *t* and *0*, otherwise. Definitions of these variables are given in Section 2.2.1. Besides, *F* is the vector of firm characteristics while *I* is the industry specific control variables; *EE* denotes the proxies for economic environment and *X* is the macroeconomic control variables defined in Section 1.4. Estimations for firm size classification based on net sales criterion and number of employees are reported in Panel A and Panel B, respectively. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10 % levels is indicated by ***, **, and *, respectively.

| | Other Liabilities / Total Assets | | | | |
|---|---|---|---|---|---|
| | Full sample | Panel A : Size based net sales criterion | | Panel B: Size based number of employees | |
| | | SMEs | Large firms | SMEs | Large firms |
| | (1) | (2) | (3) | (4) | (5) |
| P_UNCI | 0.0105** | 0.0151** | 0.00283 | 0.0109** | 0.0042 |
| | (0.004) | (0.006) | (0.004) | (0.005) | (0.007) |
| NEG_P_UNC x MPI | 0.0118** | 0.0159** | 0.00722 | 0.0117* | 0.0062 |
| | (0.004) | (0.007) | (0.005) | (0.006) | (0.008) |
| POZ_P_UNC x MPI | -0.004 | -0.004 | 0.00023 | -0.010* | 0.0178** |
| | (0.005) | (0.007) | (0.006) | (0.006) | (0.008) |
| ***Firm Characteristics*** | | | | | |
| Profitability | -0.067*** | -0.059*** | -0.0645** | -0.050*** | -0.128** |
| | (0.020) | (0.021) | (0.030) | (0.019) | (0.064) |
| Size | -0.005*** | -0.006*** | -0.0009 | -0.006*** | -0.000 |
| | (0.001) | (0.001) | (0.002) | (0.001) | (0.005) |
| Growth | 0.0004 | 0.0006 | 0.00007 | 0.0001 | 0.0010 |
| | (0.000) | (0.001) | (0.001) | (0.000) | (0.001) |
| Tangibility | 0.0113 | 0.0117 | 0.01556 | 0.0113 | 0.0105 |
| | (0.010) | (0.013) | (0.010) | (0.011) | (0.018) |
| Business risk | -0.006 | -0.006 | -0.0396 | 0.0083 | -0.147 |
| | (0.024) | (0.029) | (0.042) | (0.025) | (0.090) |
| ***Industry Specific Factor*** | | | | | |
| Industry median leverage | -0.001 | -0.007 | -0.0057 | 0.0132 | -0.058 |
| | (0.028) | (0.041) | (0.035) | (0.035) | (0.048) |
| ***Macroeconomic/Economic Environment Factors*** | | | | | |
| GDP growth | -0.078*** | -0.080*** | -0.0733*** | -0.080*** | -0.056* |
| | (0.019) | (0.028) | (0.023) | (0.024) | (0.032) |
| Inflation | 0.2115** | 0.2597** | 0.17205* | 0.1972* | 0.1287 |
| | (0.087) | (0.128) | (0.100) | (0.106) | (0.172) |
| Government leverage | 0.0043 | 0.0068 | -0.0073 | -0.000 | -0.017 |
| | (0.025) | (0.037) | (0.029) | (0.031) | (0.036) |
| FDI | 0.1457* | 0.2035 | 0.04986 | 0.1378 | 0.0668 |
| | (0.087) | (0.129) | (0.093) | (0.109) | (0.161) |
| Constant | 0.0712 | 0.0567 | 0.02659 | 0.0825 | 0.0394 |
| | (0.051) | (0.074) | (0.066) | (0.064) | (0.098) |
| Observations | 59,141 | 39,937 | 19,204 | 46,684 | 12,457 |
| Adjusted $R^2$ | 0.0676 | 0.0526 | 0.042 | 0.0599 | 0.0451 |

### 3.5. Concluding Remarks

Despite their crucial role in Turkish economy, credit constraints and difficulties in accessing capital have been the two major problems faced by SMEs. Chapter 2 of this study provides a novel evidence indicating that SMEs' financial debt decreases when uncertainty of economic environment increases persistently and when macroprudential policy tools are tightened by regulators. Considering the fact that Turkey has extensively used macroprudential policies explicitly and economic agents have confronted with financial turmoils, domestic and geopolitical uncertainties frequently in the last decade, how SMEs do survive in such economic environment remains to be puzzling. This study is the first one to explore the issue. In this chapter of my thesis, I provide insights, and I attempt to unfold the riddle by introducing an argument regarding the issue.

Based on BEEPS survey, Kurul and Tiryaki (2014) report two interesting findings. First, compared to large firms, collateral requirements are significantly higher for SMEs in Turkey, which became more severe right after the 2008-2009 financial crisis. Second, following tangible assets of the firm, personal wealth of owners is the most frequently requested collateral by banks, and this is much more relevant for SMEs than large firms. Reconciling these with the findings from the previous chapter, I argue that these two issues are expected to be the case when macroprudential policy tools are tightened and uncertainties in economic environment increase persistently. Considering relatively higher collateral to loan ratios requested from SMEs and lower tangible assets of these firms, it is reasonable to expect the owners of SMEs to collateralize their personal and/or their relatives` wealth to obtain loans in order to satisfy their financial needs and in order to survive during such economic environments mentioned above.

Why does an owner of a firm not use her personal wealth directly instead of using it as collateral? Considering additional costs and the red tape associated with loans and collateralization, owners of firms might prefer the former. If so, in accordance with the usage of personal and/or relatives` wealth, some fluctuations are expected

in balance sheet components of these firms, namely owners' equity and/or non-financial liabilities.

Trend analyses reveal that neither non-financial debt liability components with the exception of other non-financial liabilities nor owners' equity of Turkish non-financial firms exhibit upward fluctuations when uncertainty of economic environment increases persistently and when macroprudential policy tools are tightened by regulators. However, this upward fluctuations in other non-financial liabilities is observed only for SMEs but not for large firms.

Strikingly, other non-financial liabilities of SMEs reach above half of total financial debt during such economic conditions. In particular, amounts owed to partnerships, and miscellaneous items in other non-financial liability component, which are neither financial debt nor trade debt, account for the fluctuations in this variable. This suggests that SMEs tend to finance themselves by increasing their usage of these sources. I argue that these are the under-the-mattress savings (hidden reserves) of firms' owners. Anecdotal evidence provided by certified public accountants is also in line with this argument.

In addition, panel model estimations provide significant evidence in support of the argument introduced in this chapter. Moreover, result of empirical panel model show that reactions of firms to uncertainties depend on the nature of it They increase their other non-financial liability component when uncertainty is persistently increasing rather than when the uncertainty itself is increasing. This finding is consistent with the findings of the previous chapter.

Findings of this study also provide support for the common belief that there exists significant amount of under-the-mattress savings kept out of the financial system in Turkey. Considering the lack of savings problem of the country and financial constraints on SMEs, which prevents them from realizing their full potential in the economy, findings of this study emphasize the importance of developing appropriate policy designs regarding these issue. Furthermore, understanding the

behaviour and coping mechanisms of SMEs and other economic agents during these times is also important in designing appropriate policies.

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# APPENDICES

## A. CURRICULUM VITAE

**PERSONAL INFORMATION**

Surname, Name: Yarba, İbrahim
Nationality: Turkish (TC)
Date and Place of Birth: 14 March 1977, Batman
Marital Status: Single
Email: ibrahim.yarba@tcmb.gov.tr/ibrahimyarba@gmail.com

**EDUCATION**

| Degree | Institution | Year of Graduation |
|---|---|---|
| MA | Boston University, Boston, USA<br>Graduate School of Arts & Sciences<br>Department of Economics | 2009 |
| BS | Bilkent University, Ankara, Turkey<br>Faculty of Business Administration<br>Department of Management | 1999 |
| High School | Ankara Fen Lisesi, Ankara, Turkey | 1995 |

**WORK EXPERIENCE**

| Year | Place | Enrollment |
|---|---|---|
| 2000- Present | Central Bank of Turkey | Central Bank Specialist |

**FOREIGN LANGUAGES**

Advanced English

**ACADEMIC HONORS AND ACHIEVEMENTS**

Full Scholarship (tuition and stipend) awarded by Bilkent University for undergraduate study (1995-1999).

Ranked among the top 100 of one and half million participants in the National Student Selection and University Placement Examination (1995).

Ranked among the top 100 of half million participants in the National Student Selection and High School Placement Examination (1992).

Scholarship awarded by The Scientific & Technological Research Council of Turkey (TUBİTAK) (1992)

## B. TURKISH SUMMARY / TÜRKÇE ÖZET

### MAKROİHTİYATİ POLİTİKALAR, SÜREKLİLİK ARZEDEN BELİRSİZLİKLER VE ŞİRKET BORÇLANMA DİNAMİKLERİ TÜRKİYE'DEKİ REEL SEKTÖR ÜZERİNE BİR ÇALIŞMA

Bu çalışma üç bölümden oluşmaktadır. Birinci bölümde, gelişmekte olan ülkeler içinde önemli bir yere sahip Türkiye'deki finansal olmayan firmaların kredi dinamiklerinin son yirmi yıl için kapsamlı bir analizinin yapılması amaçlanmaktadır. Finans literatürünün en önemli konularından biri olan bu alanda çok sayıda ampirik çalışma olsa da, bu çalışmaların çoğunluğunun gelişmiş ülkelere odaklandığı ve gelişmekte olan ülkeler için yapılan çalışmaların kısıtlı sayıda olduğu görülmektedir. Konuya ilişkin yapılan çalışmalarda, bir biri ile çelişen sonuçlar raporlanmakta ve tek bir teorinin kredi dinamiklerini açıklamada yetersiz kaldığı görülmektedir. Konu, gerek gelişmiş ülkeler gerekse de gelişmekte olan ülkeler için henüz tam olarak açıklığa kavuşturulamamış olmakla birlikte, gelişmekte olan ülkeler için söz konusu durumun daha olumsuz bir boyutta olduğu görülmektedir.

Türkiye ve diğer gelişmekte olan ülkeler için yapılan çalışmaların en önemli eksikliklerinden birinin, bu çalışmalarda kullanılan örneklemlerin temsil gücünün zayıflığı olduğu görülmektedir. Bu durum, bu ülkelerdeki veriye erişim konusundaki zorluğa bağlanabilir. Bunun yanı sıra, mevcut çalışmalardaki analizlerin görece daha kısa zaman dilimleri için yapıldığı görülmektedir. Bu durum, konunun kapsamlı bir şekilde analiz edilmesinin önemini ortaya çıkarmaktadır. Bu bağlamda, bu çalışmada kredi dinamiklerinin kapsamlı bir şekilde incelenmesi ve konuya daha fazla ışık tutulması amaçlanmaktadır.

Bunun yanı sıra, Türkiye, gelişmekte olan piyasalar içerisinde önemli bir ülke olarak görülmekle birlikte, son dönemlerde en kırılgan ülkelerden biri olarak da değerlendirilmektedir. Söz konusu kırılganlık değerlendirilmesinde en önemli

unsurlardan biri olarak gösterilen kamu borcunun, Türkiye'de, 2000-2001 finansal krizi sonrası uygulanan ekonomik istikrar programları ile azaldığı görülmektedir. Buna karşın, finansal olmayan Türk şirketlerinin borç seviyelerinin söz konusu dönemde önemli bir oranda arttığı da bilinmektedir. Uluslararası Ödemeler Bankasının (BIS) verilerine göre emsal ülkeler içinde, 2008-2016 döneminde, gayri safi yurtiçi hasılaya oranla şirket borç seviyesindeki en yüksek artış oranına sahip ülke Türkiye'dir. Uluslararası Para Fonunun (IMF) Ekim 2015 tarihli Küresel Finansal İstikrar Raporunda ise bu durum, Türkiye ekonomisinin kırılganlığını artıran en önemli faktörlerden biri olarak değerlendirilmiştir. Bu bağlamda, Türkiye'deki finansal olmayan şirketlerinin kredi dinamiklerinin belirleyicilerinin kapsamlı analizi büyük önem taşımaktadır. Ayrıca sonuçların, gerek makro gerekse de mikro ihtiyati politikalar açısından önemli politika çıkarımları olması da konunun önemine farklı bir boyut katmaktadır.

Türkiye'deki finansal olmayan şirketlerin kredi dinamiklerine ilişkin yapılan çalışmalar kısıtlı sayıdadır. Bu çalışmaların kullandıkları veri setlerinin de çoğunlukla sadece halka açık şirketleri, dolayısıyla çoğunlukla büyük firmaları içerdiği görülmektedir. Literatürde halka açık olmayan Türk şirketlerini inceleyen sadece üç çalışma olup, bu çalışmaların da bir biri ile çelişen sonuçlar raporladığı görülmektedir. Bu bağlamda, bu çalışma, daha detaylı bir analiz ile Türkiye'deki finansal olmayan şirketlerin kredi dinamiklerine ilişkin daha kapsamlı bir resmini sunmayı amaçlamaktadır.

Bu doğrultuda, bu çalışmada Türkiye'deki finansal olmayan şirketlere ilişkin kapsamlı ve temsil gücü yüksek bir veri tabanı kullanılmaktadır. Bu çalışmanın özgün diğer bir yönü olarak da değerlendirilebilecek firma düzeyindeki bu veri seti, kamuya açık olmayan bir veri seti olup Türkiye Cumhuriyet Merkez Bankası'ndan (TCMB) temin edilmiştir. Bu veri seti her yıl için ortalama 10.771 firmaya ilişkin bilgiler içermektedir. Farklı ölçek ve sektörlerde hem halka açık hem de halka açık olmayan firmalar da bu veri setinde yer almaktadır. Diğer çalışmalara kıyasla, en güncel verileri kullanan bu çalışma ayrıca, en uzun örneklem süresini de (1996-2015) analiz etmektedir.

Konuya ilişkin en kapsamlı çalışmalardan biri olan Graham vd. (2015), Amerika Birleşik Devletleri'ndeki finansal olmayan firmaları incelemiş ve geleneksel modellerin firmaların sermaye yapısına ilişkin kararlarını açıklamada yetersiz kaldığını raporlamıştır. Çalışmanın sonuçları, firmaya özgü değişkenlerden ziyade ekonomik koşullara ilişkin değişkenlerin, firmaların kararlarında daha önemli faktörler olduğunu göstermektedir. Bu durumun Türkiye için de geçerli olup olmadığının analiz edilebilmesi için, firmaya ve firmanın içinde bulunduğu endüstriye özgü değişkenler ile makroekonomik faktörlerin yanı sıra, ekonomik koşullara ilişkin finansal gelişmişlik düzeyi, kamu borcu ve hisse senedi piyasasındaki getiri oranları da bu çalışmanın ampirik modeline dâhil edilmiştir.

Son on beş yılda, Türkiye'nin kamu borçluluğunun önemli oranda azaldığı görülmektedir. Uluslararası Ödemeler Bankasının (BIS) verilerine göre, önceki dönemdeki trendin aksine, 2001 - 2015 döneminde, gayri safi yurt içi hasılaya oranla söz konusu borç oranının yüzde 78'den yüzde 32,9 seviyesine düşmüş olması, buna karşın şirket borçluluğun aynı dönemde gayri safi yurt içi hasılaya oranla yüzde 24'ten yüzde 56 seviyesine yükselmiş olması dikkat çekmektedir. Bu bağlamda, kamu borçluluğunun şirket borçlanması üzerindeki olası dışlama/yer açma etkisi incelemeye değer bir konudur.

Bunun yanı sıra, Türkiye'deki finansal gelişmişlik düzeyinin, son dönemde etkinlik, derinlik ve erişilebilirlik bağlamında belirgin bir ölçüde ilerleme kaydettiği görülmektedir. Finansal kuruluşların asimetrik bilgi gibi literatürde altı çizilen diğer finansal sorunları azaltmadaki ve finansmana erişimi kolaylaştırmadaki önemli işlevi göz önünde bulundurulduğunda, şirketlerin finansal borç oranlarının finansal gelişmişlik düzeyi ile pozitif bir ilişki içinde olması beklenir. Türkiye'de bu durumun geçerli olup olmadığının incelenebilmesi için, önceki çalışmalarda kullanılan ve finansal piyasaların ve finansal kuruluşların çok boyutlu ve kompleks yapısını göz önünde bulundurmayan ölçütler yerine, bu durumu göz önünde bulunduran, Svirydzenka (2016) tarafından oluşturulmuş en güncel finansal gelişmişlik endeksi, açıklayıcı bir değişken olarak bu çalışmanın ampirik modeline dâhil edilmiştir.

Çalışmada Sabit Etki Panel metodolojisi kullanılmıştır. En Küçük Kareler yöntemi, sabit eğim varsayımıyla ve panel verideki sabit etkiyi göz önünde bulundurmadan model tahmini yapmakta, bu nedenle tutarsız ve yanlı sonuçlara neden olmaktadır. Bahse konu sorunlara Sabit Etki Panel metodolojisi çözüm bulmaktadır (Li ve Prabhala, 2007, Wooldridge, 2010, Roberts ve Whited, 2012). Ayrıca, Hausman testi sonucuna dayanılarak Rastsal Etki Panel metodolojine kıyasla, Sabit Etki Panel metodolojisinin daha uygun bir model olduğu görülmüştür.

Sabit Etki Panel metodolojisi kullanılarak ampirik modelin uygulanması ile ilk olarak, Graham vd. (2015)'in bulgularının aksine, Türkiye'deki reel sektör firmalarının finansal borç oranlarının değişiminde, sadece ekonomik koşullara ilişkin değişkenlerin değil, aynı zamanda firmaya ve firmanın ait olduğu endüstriye özgü değişkenler ile diğer makroekonomik faktörlerin de belirleyici olduğu sonucuna ulaşılmıştır. Sonuçlar, firma karlılığının ve endüstri medyan kaldıraç oranının hemen hemen tüm model spesifikasyonlarında, şirket finansal borç oranı ile anlamlı bir ilişki içinde olduğunu göstermektedir. Söz konusu ilişki, ilk değişken için negatif iken ikincisi için pozitiftir. Bunun yanı sıra, firma büyüme oranı ile kısa vadeli borç oranı arasında da anlamlı bir negatif ilişki gözlenmektedir. Benzer negatif ilişki firma risk düzeyi ile uzun vadeli borç oranı arasında da bulunmaktadır. Sonuçlar ayrıca, firmaların maddi duran varlık oranları yükseldikçe kısa vadeli borç oranlarının azaldığını, buna karşın uzun vadeli borç oranlarının da arttığını göstermektedir.

Diğer taraftan, finansal gelişmişlik düzeyi arttıkça şirketlerin kısa vadeli borçlanma oranlarının azaldığı, buna karşın uzun vadeli borç oranlarının arttığı görülmektedir. Ayrıca, uzun vadeli borç oranı üzerindeki bu anlamlı pozitif etki, diğer tüm açıklayıcı değişkenler içindeki en güçlü etki olarak göze çarpmaktadır. Buna ek olarak, sonuçlar, kamu borç oranının şirket borçları üzerinde anlamlı bir negatif etkisinin olduğunu da göstermektedir.

Diğer taraftan, firmaların borçlanma dinamiklerinin halka açıklık ve firma ölçeği gibi değişkenler bazında olası farklılaşmasının analiz edilebilmesi için

örneklem bu değişkenler bazında alt gruplara ayrılmış ve ampirik model, her bir alt grup için yeniden tahmin edilmiştir. Ayrıca, farklı zaman periyotları için de modelin ayrı ayrı analizi yapılmıştır. Daha doğru ve sağlam sonuçlar elde edebilmek için firmaların büyüklük sınıflandırması iki farklı yöntem kullanılarak yapılmıştır. İlk olarak, literatürde yaygın olarak kullanılan firmaların net satış tutarı üzerinden yapılan sınıflandırma benimsenmiştir. Bu sınıflandırma metodunda firmalar, her yıl net satış tutarları üzerinden katillere ayrılmış ve net satış tutarı üçüncü kartelden büyük olan firmalar büyük, küçük olan firmalar ise küçük ve orta ölçekli firma olarak sınıflandırılmıştır. İkinci sınıflandırma metodu olarak ise Türkiye'de ilgili resmi makamlarca kullanılan Avrupa Birliği kriteri kullanılmıştır. Bu kriterde çalışan sayısı 250'den fazla olan firmalar büyük, çalışan sayısı 250 ve altında olan firmalar ise küçük ve orta ölçekli firma olarak sınıflandırılmıştır.

Alt gruplar bazında yeniden tahmin edilen panel modelinin sonuçları, şirket borçluluğu üzerindeki kamu borçluluğunun olumsuz etkisinin halka açık şirketlerden ziyade halka açık olmayan şirketler için geçerli olduğunu göstermektedir. Aynı durum finansal gelişmişlik düzeyinin olumlu etkisi için de geçerlidir. Bunun yanı sıra, şirketlerin yüksek risklilik seviyesinin küçük ve orta ölçekli firmalar ile halka açık olmayan firmaların borçlanma kapasitesi üzerinde sınırlayıcı bir etkisi görülmektedir. Dikkat çekici bir şekilde, bu durum ne büyük firmalar ne de halka açık firmalar için söz konusu değildir.

Ayrıca, finansal gelişmişlik düzeyinin hem küçük ve orta ölçekli hem de büyük firmaların uzun vadeli borçları üzerinde olumlu bir etkisi görülmektedir. Dikkat çekici bulgulardan biri de kamu borçluluğunun "dışlama" ve "yer açma" dönemlerindeki firma finansal borçlanması üzerindeki etkisinin asimetrik olmasıdır. Sonuçlar, kamu borçluluğunun "dışlama" dönemlerinde sadece küçük ve orta ölçekli firmaların finansal borçlanmalarını olumsuz etkilemesine karşın, kamu borçluluğunun "yer açma" dönemlerinde hem büyük hem de küçük ve orta ölçekli firmaların finansal borçlanmalarını olumlu etkilendiğini göstermektedir.

Çalışmanın ikinci bölümünde ise makro ihtiyati politikaların ve belirsizliklerin şirket borçlanma dinamikleri üzerindeki etkileri incelenmektedir. İktisadi faaliyetler hükümet, hane halkı, finansal aracılar ve firmalar gibi ekonomik birimlerin kararları ile şekillenir. Bu birimler de kararlarını, karar alma sürecinin doğası gereği, belirsizlik ortamlarında almaktadır. Bu bağlamda, belirsizliğin ekonomik birimlerin kararları üzerinde, dolayısıyla da tüm ekonomi üzerinde önemli bir etkisinin olması beklenebilir.

Belirsizliğin borç verenler ile borç alanlar arasındaki asimetrik bilgi üzerinde olumsuz bir etkisi bulunmaktadır. Belirsizliğin yüksek olduğu ortamlarda firmaların iflas etme olasılıkları da yükselir. Bu dönemlerde bankalar, firmalara kredi vermeyi geciktirme eğilimde olurlar. Bu durumun da şirketlerin büyümesi üzerinde yavaşlatıcı bir etkisi olur (Greenwald ve Stiglitz, 1990). Literatürde, belirsizliğin ekonomik koşullar ve öngörülen nakit akışının getiri oranı (Bhattacharya ve dg., 2017, Wang vd., 2014), şirket kararları (Bernanke, 1983; Bloom vd., 2007), şirketlerin ilk halka arz işlemleri (Colak vd., 2013), varlık fiyatları (Pastor ve Veronesi, 2013; Brogaard ve Detzel, 2012), şirket yatırım kararları (Chen vd., 2016; Gulen ve Ion, 2016; Bloom, 2009 2014; Julio ve Yook, 2012), sermaye harcamaları ve istihdam kararları (Bloom vd., 2007; Ghosal ve Ye, 2015), ve şirket AR&GE yatırımları (Wang vd. 2017; Czarnitzki ve Toole 2007, 2011) üzerindeki etkisi incelenmiştir.

Buna karşın, belirsizliğin şirket borçlanma dinamikleri üzerindeki etkisine ilişkin kısıtlı sayıda çalışma bulunmaktadır. Bunun yanı sıra, gerek yurt içi gerekse de jeopolitik belirsizliklerin önemli rol oynadığı Türkiye gibi bir ülkedeki finansal olmayan şirketler için bu konuyla ilgili herhangi bir çalışma bulunmamaktadır. Bu çalışma, Türkiye'deki belirsizlik düzeyinin finansal olmayan şirketlerinin borçlanma dinamikleri üzerindeki etkisini inceleyen ilk çalışma olma özelliğini taşımaktadır. Bu amaçla, bu çalışmada Temel Bileşenler Analizi kullanılarak Türkiye'nin belirsizlik düzeyini ölçen bir endeks oluşturulmuştur.

Literatürde, belirsizlik düzeyinin ölçümü için çok farklı yöntemler kullanılmıştır. Bunlara, döviz kurunun türev piyasalardaki ima edilen oynaklığı (Bloom, 2009), iş dünyasına ilişkin düzenlenen anketlerdeki istatistiksel dağılımlar (Bachmann vd., 2013), çok sayıdaki ekonomik değişkenin tahmin edilemeyen kısımlarının ekonometrik modellerle ayrıştırılması (Jurado vd., 2015) ve gerçek zamanlı istatistiksel modeller ile hesaplanan tahmin hataları (Scotti, 2016) örnek olarak gösterilebilir.

Bu çalışmada ise, belirsizlik endeksi hesaplamasında ekonomik belirsizlikle ilişkili olan finansal değişkenler kullanılmıştır. Bu noktada, genel ekonomik koşulların belirsizlik ölçümünde, sadece finansal değişkenlerin yeterli olmayabileceği iddia edilebilir. Ancak, son dönem çalışmalarından Caldara vd., (2016)'nın belirsizlik şoklarının aktarım mekanizmasındaki en önemli unsurun finansal değişkenler olduğunu göstermesi, bu çalışmada oluşturulan endeks için önemli bir destek sağlamaktadır.

Bunun yanı sıra, Stock ve Watson (2012) ekonomik belirsizliklerle CDS'ler arasındaki yüksek korelasyonu raporlamaktadır. Stock ve Watson (2012) ayrıca, Caldara (2016) ile paralel olarak, CDS'ler ile ekonomik belirsizliklerin aynı şokları tanımladığı sonucuna varmıştır. Gilchrist ve Zakrajsek, (2012)'de tahvil piyasasındaki risk primlerinin finansal gerilimlerin bir ölçümü olduğunu göstermiştir. Ayrıca, Türkiye'de finansal piyasalar için önemli bir indikatör olan döviz kuru oynaklığının gerek reel sektör gerekse de tüketici güven endeksleri ile olan korelasyonu da yüksek seviyededir.

Bu bağlamda, belirsizlik endeksi oluşturulmasında, en çok işlem hacmine sahip 5 yıl vadeli CDS'ler, en yaygın olarak kullanılan Türkiye'nin Gelişmekte olan Ülkeler Tahvil Endeksi spreadi (EMBI), hem USD/TL hem de EUR/TL paritelerinin 1 ay ve 1 yıl vadeli ima edilen oynaklıkları kullanılmıştır. Temel Bileşenler Analizi kullanılarak, söz konusu finansal değişkenlerin günlük verilerinden tek bir faktör oluşturulmuştur. Bu çalışmada kullanılan firma düzeyindeki verilerin yıllık bazda olması nedeniyle, oluşturulan günlük endeks

verilerinin yıllık ortalamaları hesaplanarak yıllık bazda endeks verilerine ulaşılmıştır.

Diğer taraftan, Türkiye gibi sıklıkla hem yurt içi ve hem de jeopolitik risklerle karşı karşıya kalınan bir ülkede, ekonomik birimlerin belirsizliklere alışkın olması beklenebilir. Bu bağlamda, belirsizlikten ziyade süreklilik arz eden belirsizliklerin kredi dinamikleri için daha uygun bir belirleyici olacağı düşünülmektedir. Diğer bir ifadeyle, kredi dinamiklerinin belirsizliğin geçici olup olmamasına bağlı olduğu ileri sürülmektedir. Bu argümanın test edilebilmesi için, bu çalışmada belirsizlik endeksine ek olarak belirsizliğin sürekliliğine ilişkin bir endeks daha oluşturulmuştur.

Diğer taraftan, son yıllarda makro ihtiyati politikaların hem gelişmiş ülkeler hem de gelişen ülkeler tarafından yoğunlukla kullanıldığı görülmektedir. Özellikle 2008-2009 küresel finansal krizinden sonra, dünya genelinde hem merkez bankaları hem de ilgili düzenleyici birimler düzeyinde, gerek ulusal gerekse de küresel boyutta finansal istikrarın sağlanmasında makro ihtiyati politikaların önemine ilişkin ortak bir algı oluştuğu görülmektedir. Örneğin, G - 20 ülkelerin maliye bakanları ile merkez bankası başkanları 2010 yılının Ekim ayında makro ihtiyati politika çerçevesi üzerinde daha fazla çalışılması konusunda görüş birliğine varmıştır.

Finansal sistemde oluşan sistematik riskler ve olumsuz şoklar reel ekonomi üzerinde de ciddi menfi sonuçlar doğurur. Politika yapıcılar tarafından makro ihtiyati politika çerçevesi, bu olumsuz etkileri azaltan önemli bir araç olarak değerlendirilmektedir. Bu politikalar, finansal kuruluşların olumsuz şoklara karşı dirençlerini yükselterek finansal istikrarı sağlamayı amaçlamaktadır. Bu doğrultuda, kredi ve varlık fiyatları arasında aynı yönlü oluşan ve birbirini besleyen döngülerin azaltılması ve olumsuz şoklara karşı tamponlar oluşturulmasının yanı sıra, sürdürülemez kredi büyümesinin ve istikrarsız fonlamanın kısıtlanması amaçlanır (IMF, 2013).

Gelişmekte olan en kırılgan ülkelerden biri olarak değerlendirilen Türkiye'de 2011`den bu yana makro ihtiyati politikalar artan bir oranda kullanılmaktadır. Bu bağlamda, TCMB enflasyon hedeflemesine ek olarak finansal istikrarı da politika çerçevesine dâhil etmiştir. Ayrıca, finansal risklere karşı etkin politikalar üretebilmek amacıyla Türkiye'de Finansal İstikrar Komitesi oluşturulmuştur (Türkiye'deki makro ihtiyati politika uygulamalarına yönelik daha detaylı bilgi için bkz. Kara, 2016).

Konunun önemine paralel olarak son yıllarda, makro ihtiyati politikaların etkilerini inceleyen bir literatürün oluştuğu görülmektedir. Brunnermeier vd. (2009), Lim vd. (2011, 2013), Ostry vd. (2012), Tovar vd. (2012), Claessens ve Ghosh (2013), Galati ve Moessner (2013, 2014), Freixas vd. (2015), Bruno ve Shin (2015), Claessens (2015), Cerutti vd. (2016, 2017) ve Fendoğlu (2017) çalışmaları bu literatüre örnek olarak verilebilir. Bu çalışmaların sonuçları, makro ihtiyati politikaların kredi büyümesi üzerindeki olumsuz etkilerine ilişkin anlamlı bulgular sunmaktadır.

En kapsamlı ve en güncel çalışmalardan biri olan Cerutti et al. (2017), 119 ülkeyi içeren bir veri setini kullanarak makro ihtiyati politikaların daha düşük kredi büyümesi ile ilişkili olduğunu göstermiştir. Çalışmanın sonuçları, bu ilişkinin özelikle gelişmekte olan ülkeler için geçerli olduğunu göstermiştir. Bu bulgu ile aynı doğrultuda, Fendoğlu (2017) makro ihtiyati politikaların sıkılaştırılmasının Türkiye'nin de dâhil olduğu 18 gelişmekte olan ülkenin kredi döngülerini kısıtlamada yardımcı bir faktör olduğunu raporlamıştır.

Buna karşın, bahse konu literatür kredi büyümesini toplulaştırılmış genel seviye üzerinden ele almaktadır. Çoklu ülke veri setlerini kullanan bu çalışmaların odak noktasının da daha çok gelişmiş ülkeler olduğu görülmektedir. Literatürdeki bu boşluğu doldurmak amacıyla bu çalışma, son yıllarda makro ihtiyati politikaları artan oranda kullanan ve önemli bir geçiş ekonomisi olan Türkiye'de, bu politikaların kredi dinamikleri üzerindeki etkisini incelemektedir. Bu çalışma,

makro ihtiyati politikaların kredi dinamikleri üzerindeki etkilerini firma düzeyinde inceleyen ilk çalışma olma özelliğini taşımaktadır.

Bu çalışmanın diğer bir farklı yönü de makro ihtiyati politikalar, belirsizlik ve belirsizliğin sürekliliğinin aynı modelde bir araya getirilmesi ve bu önemli faktörlerin şirketlerin finansal borçluluğu üzerindeki eş zamanlı etkilerinin analiz edilmesidir. Ayrıca, bu çalışmada kamuya açık olmayan ve firma düzeyinde emsalsiz bir veri seti kullanılmaktadır. Türkiye'deki finansal olmayan şirketlere yönelik bu veri seti hem halka açık hem halka açık olmayan, farklı sektör ve ölçeklerde firmaları içine alan kapsamlı ve temsil gücü yüksek bir veri setidir.

Bu çalışmada, bahse konu faktörlerin şirketlerin finansal borçluluğu üzerindeki etkisini analiz etmek için Sabit Etki Panel modeli kullanılmıştır. Modelde çok geniş bir yelpazede, çok sayıda kontrol değişkeni kullanılmıştır. Ayrıca, söz konusu etkilerin firma büyüklüğüne göre değişip değişmediğinin incelenebilmesi için model, küçük ve orta ölçekli firmalar ile büyük firmalardan oluşan alt gruplar için ayrı ayrı yeniden tahmin edilmiştir. Sağlam sonuçlar elde edebilmek için firma büyüklüğünün belirlenmesinde iki farklı sınıflandırma yöntemi kullanılmıştır. Birinci yaklaşımda literatürde sıklıkla kullanılan net satış kriteri baz alınırken, ikinci yaklaşımda hem Avrupa Birliği hem de Türkiye`deki resmi makamlar tarafından kullanılan çalışan sayısı kriteri esas alınmıştır.

İlk olarak, ampirik panel modelinin sonuçları, süreklilik arz eden belirsizliklerin firmaların finansal borçlarının toplam yükümlükleri içerisindeki payının açıklanmasında, belirsizliğe kıyasla daha uygun ve belirleyici bir faktör olduğunu göstermektedir. Bu bağlamda sonuçların, gerek yurt içi gerekse de jeopolitik risklerle sıklıkla karşı karşıya kalan Türkiye kredi piyasası oyuncularının belirsizlik ortamında faaliyet göstermeye alışmış olduklarına yönelik argümanı desteklediği görülmektedir. Ayrıca, sonuçlar belirsizliklerin sürekli olarak arttığı dönemlerin yanı sıra, Türkiye'deki finansal olmayan şirketlerin finansal borç oranının makro ihtiyati politikaların sıkılaştırıldığı dönemlerde de olumsuz etkilendiğini göstermektedir. Sonuçları daha ilginç yapan bulgu ise bu durumun

büyük firmalar için değil sadece küçük ve orta ölçekteki firmalar için geçerli olmasıdır.

Bu bulgunun daha sağlamlaştırılması amacıyla farklı model spesifikasyonları uygulanmıştır. İlk olarak modele söz konusu faktörlere ek olarak bu faktörlerin firma büyüklüğü ile çarpılması sonucu oluşturulan etkileşim terimleri eklenmiş ve firma büyüklüğü arttıkça hem makro ihtiyati politika araçlarının sıkılaştırılmasının hem de süreklilik arz eden belirsizliklerin olumsuz etkilerin azaldığı görülmüştür. Bunun yanı sıra ampirik panel modeli büyük firmalar ile küçük ve orta ölçekli firmalardan oluşturulan alt örneklem grupları için ayrı ayrı tahmin edilmiştir. Sonuçlar söz konusu olumsuz etkilerin küçük ve orta ölçekli firmalardan oluşan alt örneklem grubu için anlamlı, büyük firmalardan oluşan alt örneklem grubu için anlamsız olduğunu göstermektedir.

Bunun yansıra, makro ihtiyati politikaların ve belirsizliğin firmaların finansal borçluluğu üzerindeki etkisine ilişkin ilave sağlamlık elde edebilmek için finansal borçların toplam yükümlük içindeki oranı yerine finansal borçların toplam varlıklar içindeki oranı bağımlı değişken olarak kullanılarak model yeniden tahmin edilmiştir. Sonuçlar, süreklik arz eden belirsizliklerin ve makro ihtiyati politika araçlarının sıkılaştırılmasının, sadece küçük ve orta ölçekli firmaların finansal borç oranları üzerinde olumsuz bir etkiye sahip olduğuna yönelik ilave destekleyici bulgular sağlamıştır.

Çalışmanın üçüncü bölümünde ise, makro ihtiyati politikaların sıkılaştırıldığı ve belirsizliklerin süreklilik arz ettiği dönemlerde, büyük firmalara kıyasla daha fazla finansal borç kısıtı yaşayan küçük ve orta ölçekli işletmelerin, bu dönemlerde nasıl ayakta kalabildiği incelenmektedir. Son yıllarda, küçük ve orta ölçekli işletmelerin hem gelişmiş hem de gelişmekte olan ülkelerin ekonomilerine olan önemli katkılarından dolayı, artan bir oranda odak noktası olmaya başladıkları görülmektedir. Türkiye İstatistik Kurumun 2016 yılında yayımladığı Küçük ve Orta Büyüklükteki Girişim İstatistiklerine göre, Türkiye'de, küçük ve orta ölçekli işletmeler toplam istihdamın yaklaşık yüzde 73'ünü, toplam cironun yüzde 62'sini,

yatırımın yüzde 55'ini ve faktör maliyetiyle katma değerin yüzde 53,5'ini oluşturmuştur. Türkiye ekonomisindeki bu önemli rollerine karşın, küçük ve orta ölçekli firmalar için kredi kısıtı ve finansmana erişimdeki zorluklar uzun bir süredir temel bir sorun olarak dikkat çekmektedir.

Bu alandaki en güncel çalışmalardan biri olan Kurul ve Tiryaki (2016), Avrupa İmar ve Kalkınma Bankası ile Dünya Bankasının ortaklaşa düzenledikleri firma anketlerine dayanarak yaptıkları çalışmada, Türkiye'de kredi kısıtı sorununun firma büyüklüğünün azalmasıyla daha fazla arttığını raporlamaktadır. Bu tezin ikinci bölümü de Kurul ve Tiryaki (2016)'nin bu sonucuna paralel bulgular sunmaktadır. İkinci bölümde yapılan ampirik analizler, ekonomik belirsizliklerin sürekli olarak arttığı ve makro ihtiyati politika araçlarının sıkılaştırıldığı dönemlerde büyük firmaların aksine küçük ve orta ölçekli firmaların finansal borçlanma konusunda zorluk yaşadığını göstermektedir.

Son yıllarda, Türkiye'de makro ihtiyati politikaların yoğunlukla kullanıldığı ve ekonomik birimlerin hem yurt içi hem de jeopolitik risklerle sıklıkla karşı karşıya kaldığı göz önünde bulundurulduğunda, küçük ve orta ölçekli firmaların bu koşullar altında nasıl ayakta kaldıkları tam olarak açıklanamayan bir konu olmaya devam etmektedir. Bu çalışma, bu durumu açıklığa kavuşturmayı amaçlamaktadır.

Türkiye'de tasarruf eksikliği uzun bir sureden beri en önemli sorunlardan biri olarak görülmektedir. Diğer taraftan, finansal sistem dışında tutulan önemli bir miktarda yastık altı tasarrufun varlığına ilişkin genel bir algı da bulunmaktadır. Bu durum çoğunlukla sosyal ve demografik faktörlerle ilişkilendirilmektedir. Bu durum ayrıca, yurt içinde yerleşik yatırımcıların risk algısı ve belirsizlere karşı oluşturdukları ihtiyat güdüsü ile de ilişkilendirilebilir.

Bu bağlamda, S&P, Temmuz 2017 tarihli "Bankacılık Sektörü Ülke Risk Değerlendirmesi" raporunda Türkiye'deki bir çok şirket ve hane halkının saklı rezervlerinin olduğunu ve bunları ekonomik stres dönemlerinde kullandıklarını iddia etmiştir. S&P'nin bu durumu şirketlerin bu dönemlerde hala dirençli olabilmelerinin nedenlerinden biri olarak göstermesi dikkat çekmiştir.

Bunun yanı sıra, Nisan 2008 ve Ocak 2009 dönemlerini kapsayan Avrupa İmar ve Kalkınma Bankası ile Dünya Bankası ortaklığı ile düzenlenen şirket anketlerine dayanan diğer bir çalışmalarında, Kurul ve Tiryaki (2014), küçük ve orta ölçekli firmalar için kredi işlemlerindeki teminat zorunluluğunun büyük şirketlere kıyasla oldukça yüksek olduğunu raporlamıştır. Teminat - kredi oranının mikro ölçekli firmalar için yüzde 121, küçük ölçekli firmalar için yüzde 92, orta ölçekli firmalar için yüzde 95 ve büyük firmalar için ise yüzde 67 olduğu belirtilmiştir. Bu çalışmanın bulgularının dikkat çeken yönleri ise iki baslıkta özetlenebilir. Birincisi, bankalarca kredi karşılığı olarak istenen teminat koşullarının 2008-2009 finansal krizinden sonra daha ağırlaşmasıdır. İkinci dikkat çeken bulgu ise, maddi duran varlıklardan sonra şirket sahiplerinin kişisel varlıklarının, bankalar tarafından kredi işlemlerinde teminat olarak en çok istenen varlık grubu olmasıdır. Ayrıca, bu durumun büyük firmalara kıyasla küçük ve orta ölçekli firmalar için çok daha geçerli bir durum olduğu raporlanmıştır.

Kurul ve Tiryaki (2014)'nin bu bulguları ile bir önceki bölümün bulguları birlikte düşünüldüğünde, büyük firmalara kıyasla finansal borçlanma konusunda zorluk yaşayan küçük ve orta ölçekli firmaların, ekonomik belirsizliklerin süreklilik arz ettiği ve makro ihtiyati politika araçlarının sıkılaştırıldığı dönemlerde bankalarca kredi karşılığı olarak istenen teminat koşullarının ağırlaşması beklenebilir. Bunun yanı sıra, küçük ve orta ölçekli firmaların büyük firmalara kıyasla görece düşük seviyedeki maddi duran varlıkları ve yüksek teminat - kredi oranı göz önünde bulundurulduğunda, bu firmaların sahiplerinin yukarıda belirtilen ekonomik koşullarda, finansal ihtiyaçlarını karşılamak ve ayakta kalmak için kişisel varlıklarını da teminat olarak gösterme zorunluluklarının oluşması makul bir önerme olarak değerlendirebilir.

Bu noktada, bu firmaların sahipleri, kişisel varlıklarını teminat olarak kullanmak yerine neden doğrudan kullanmasın sorusu makul bir soru olarak değerlendirebilir. Kredi ve teminat işlemlerinin ilave maliyetleri ve formaliteleri göz önünde bulundurulduğunda, firma sahiplerinin süreklilik arz eden stres zamanlarında ve makro ihtiyati politikaların sıkılaştırıldığı dönemlerde kişisel

varlıklarını teminat olarak kullanmak yerine doğrudan kullanmayı tercih etmeleri beklenebilir. Eğer bu durum söz konusu ise, şirket sahiplerinin kişisel varlıklarının kullanımına paralel olarak makro ihtiyati politikaların sıkılaştırıldığı ve belirsizliklerin sürekli bir şekilde arttığı dönemlerde bu şirketlerin bilanço kalemlerinde; sermaye hesaplarında ya da finansal olmayan yükümlülük kalemlerinde, bu durumu yansıtan hareketlerin olması gerekir.

Bu argümanı incelemek için, ilk olarak veri setindeki firmaların bilanço kalemleri detaylı bir şekilde analiz edilmiştir. Firmaların bilanço kalemlerinin toplulaştırılmış zaman serilerinin trend analizlerinde, söz konusu ekonomik koşulların olduğu dönemlerde sadece diğer yükümlülükler kaleminde sistematik ve belirgin artışlar görülmüş, buna karşın bu kalem dışındaki herhangi bir yükümlülük kaleminde ya da herhangi bir sermaye hesabında bahse konu zamanlarda sistematik bir dalgalanma olmadığı görülmüştür. Söz konusu diğer yükümlülük hesabı temel olarak ortaklara borçlar ve diğer muhtelif borçlardan oluşmaktadır. Bunlar, ne finansal borç ne de ticari borç olan yükümlülük kalemleridir. Küçük ve orta ölçekli firmaların diğer finansal olmayan yükümlülüklerinin söz konusu ekonomik koşullarda finansal borçlarının yarısından daha yüksek bir seviyeye ulaşması söz konusu yükümlülük kaleminin ihmal edilemez bir büyüklükte olduğunu göstermektedir.

Ayrıca, trend analizinin ilginç olan yönü ise diğer yükümlülük kalemlerinde ortaya çıkan sistematik ve belirgin artışların sadece orta ve küçük firmalar için geçerli olmasıdır. Bu sonuç, küçük ve orta ölçekli firmaların finansal kredi alma zorluğu çektikleri bahse konu dönemlerde, kendilerini diğer yükümlülük kalemlerini artırarak finanse ettiklerini göstermektedir. Ne finansal olan borç ne de ticari borç olan bu bilanço kalemindeki artışların firma sahiplerinin ya da yakınlarının kişisel varlıkları olması, diğer bir ifadeyle yastık altı tasarruflar (saklı rezervler) olması, yukarıda oluşturulan argümanlar ışığında beklenen bir durumdur. Yeminli mali müşavirlerle yapılan görüşmeler de bu iddiayı destekler niteliktedir.

Ayrıca, bu çalışmada trend analizlerinden sağlanan kanıtlara ek olarak, söz konusu iddiayı test etmek amacıyla ampirik bir model oluşturulmuştur. 2007 – 2009 dönemi için firma seviyesinde kamuya açık olmayan ve TCMB'den sağlanan reel sektör veri seti kullanılarak Sabit Etki Panel metodolojisi kullanılmıştır. Bunun yanı sıra, panel modeli farklı büyüklükteki firmalardan oluşan altı örneklem grupları için ayrı ayrı tahmin edilmiştir. Daha sağlam sonuçlar elde edebilmek için firma sınıflandırılmaları net satış kriterinin yanı sıra hem Avrupa Birliği hem de Türkiye'deki resmi makamlar tarafından kullanılan çalışan sayısı kriteri olmak üzere iki farklı yaklaşım kullanılarak yapılmıştır.

Panel modelinin sonuçlarında dikkat çeken ilk nokta, küçük ve orta ölçekli firmaların reaksiyonlarının belirsizliklerin yapısına göre değiştiğidir. Diğer bir ifadeyle, bu firmaların diğer finansal olmayan yükümlülüklerini ekonomideki belirsizlik zamanlarından ziyade bu belirsizliklerin süreklilik arz ettiği dönemlerde artırdıkları görülmektedir. Bu bulgu, bu çalışmanın bir önceki bölümün bulgularını destekleyici ilave bir kanıt olarak değerlendirilebilir.

Ayrıca sonuçlar, ekonomideki belirsizliklerin süreklilik arz ettiği dönemlere ek olarak makro ihtiyati politikaların sıkılaştırıldığı dönemlerde de firmaların diğer yükümlülük kalemlerini artırdıklarını göstermektedir. Sonuçların dikkat çekici boyutu ise bu durumun büyük firmalar için değil sadece küçük ve orta ölçekli firmalar için geçerli olmasıdır.

Bu bulgunun daha sağlamlaştırılması amacıyla farklı model spesifikasyonları uygulanmıştır. İlk olarak modele söz konusu faktörlere ek olarak bu faktörlerin firma büyüklüğü ile çarpılması sonucu oluşturulan etkileşim terimleri eklenmiş ve firma büyüklüğü arttıkça hem makro ihtiyati politika araçlarının sıkılaştırılmasının hem de süreklilik arz eden belirsizliklerin diğer yükümlülükler üzerindeki artırıcı etkilerinin azaldığı görülmüştür. Buna ek olarak ampirik panel modeli büyük firmalar ile küçük ve orta ölçekli firmalardan oluşturulan alt örneklem grupları için ayrı ayrı tahmin edilmiştir. Sonuçlar söz konusu olumsuz etkilerin küçük ve orta ölçekli firmalardan oluşan alt örneklem grubu için anlamlı büyük firmalardan

oluşan alt örneklem grubu için anlamsız çıktığını göstermektedir. Panel analizinin sonucu olan bu bulgular, trend analizlerinin sonuçları ile yeminli mali müşavirlerden sağlanan küçük hikayeler ile aynı paralelde olup bu çalışmanın ortaya attığı iddiayı destekleyen ilave kanıt sağlamaktadır.

Sonuç olarak, bu çalışmanın birinci bölümünde finans literatürünün önemli bir parçası olmakla birlikte gelişmekte olan ülkeler için kısıtlı sayıda ve birbiri ile çelişkili bulgular bulunan kredi dinamiklerine konusuna daha fazla ışık tutmak amacıyla, Türkiye'deki reel sektör firmaların borçlanma dinamikleri kapsamlı bir şekilde analiz edilmiştir. Ayrıca, son yıllarda Türkiye'nin en kırılgan gelişmekte olan ülkeler arasında gösterilmesinde önemli bir faktör olarak değerlendirilen ve son yıllarda belirgin bir şekilde artan şirket borçluluğunun belirleyicilerinin analiz edilmesi de çalışmaya önemli bir boyut kazandırmaktadır.

Kamuya açık olmayan ve TCMB'den sağlanan reel sektöre ilişkin firma düzeyindeki kapsamlı ve temsil gücü yüksek veri seti ve çok geniş bir yelpazedeki kontrol değişkenlerinin kullanıldığı bu çalışmada, uygulanan Sabit Etki Panel modelinin sonuçları, ekonomik koşullara ilişkin faktörlerin yanı sıra firmaya ve firmanın ait olduğu endüstriye özgü faktörlerin de şirket borçluluğunun değişimlerinde etkin olduğunu göstermiştir.

Bunun yanı sıra, panel modelinin sonuçları, finansal gelişmişlik düzeyi ile şirket borçluluğu arasında anlamlı bir pozitif ilişki olduğunu göstermektedir. Finansal gelişmişlik düzeyinin bu etkisinin halka açık firmalardan ziyade halka açık olamayan firmalar için geçerli olması dikkat çekici bir bulgu olarak ortaya çıkmaktadır. Ayrıca finansal gelişmişlik düzeyinin şirketlerin uzun vadeli borçlanmaları üzerinde olumlu bir etkisi görülmektedir. Söz konusu olumlu etki hem büyük firmalar için hem de küçük ve orta ölçekli firmalar için geçerli olsa da küçük ve orta ölçekli firmalar için söz konusu etkinin çok daha güçlü olduğu görülmektedir. Ayrıca, firmaların risk seviyesinin hem küçük ve orta ölçekteki firmalar hem de halka açık olmayan firmaların borç alma kapasitelerini olumsuz etkilediği, bu durumun büyük ya da halka açık firmalar için geçerli olmadığı

görülmektedir. Bu sonuçlar, finansal piyasaların ve kurumsal gelişimin, asimetrik bilgiye ilişkin olarak ortaya çıkan sorunlar ile sermayeye erişimin önündeki engellerin azaltılmasındaki önemli rolüne vurgu yapmaktadır.

Öte yandan, sonuçların dikkat çeken diğer bir boyutu ise, kamu borçluluğunun şirket borçluluğu üzerinde "yer açma" etkisinin olduğu dönemlerde hem büyük firmaların hem de küçük ve orta ölçekli firmaların bu etkiden olumlu faydalanmasına karşın, "dışlama" dönemlerinde ise sadece küçük ve orta ölçekli firmaların olumsuz etkilendiğinin görülmesidir. Bu bağlamda sonuçlar, ülke ekonomisine verdiklerine katkının aksine küçük ve orta ölçekli firmaların finansal kısıtlarına ve kredi erişimindeki zorluklarına ışık tutmakta ve konuya ilişkin uygun politika üretilmesinin önemine dikkat çekmektedir.

Çalışmanın ikinci bölümünde ise, ekonomik ortamın belirsizliğinin ve makro ihtiyati politikaların kredi dinamikleri üzerindeki etkileri analiz edilmiştir. Son yıllarda, finansal istikrarın sağlanmasında gerek gelişmiş ülkeler gerekse de gelişmekte olan ülkeler tarafından makro ihtiyati politikalar, sıklıkla kullanılan araçlar olarak dikkat çekmektedir. Özellikle 2008 – 2009 finansal krizinden sonra hem akademik arenada hem de politika uygulayıcıları arasında konunun artan oranda dikkat çektiği görülmektedir. Konuya ilişkin son dönemde gelişen bir literatür oluşmasına karşın, bu çalışmalar kredi büyümesini toplulaştırılmış veriler üzerinden ele almıştır. Bu çalışma ise, makro ihtiyati politikaların kredi dinamikleri üzerindeki etkisini firma düzeyinde inceleyen ilk çalışma olma özelliğine sahiptir.

Bunun yanı sıra, bu çalışma ekonomik belirsizliklerin Türkiye'deki reel sektör firmalarının kredi dinamikleri üzerindeki etkisini incelemekte ve bu yönüyle de ilk olma özelliğini taşımaktadır. Makro ihtiyati politikalarının son yıllarda artan oranda kullanıldığı Türkiye'de hem yurtiçi hem de jeopolitik belirsizliklerin önemli rol oynadığı görülmektedir. Bu bağlamda, çalışmanın bu bölümünde Temel Bileşenler Analizi kullanılarak Türkiye'deki ekonomik koşullara ilişkin bir belirsizlik endeksi oluşturulmuştur. Diğer taraftan, gerek yurt içi gerekse de jeopolitik belirsizliklerin sıklıkla yaşandığı Türkiye'de, ekonomik birimlerin söz konusu belirsizliklerde

faaliyet göstermeye alışmış olmaları beklenebilir. Bu düşünceden yola çıkılarak, bu çalışmada, belirsizlikten ziyade belirsizliklerin süreklilik arz edip etmemesinin kredi dinamikleri üzerinde daha belirleyici bir faktör olacağı iddiası öne sürülmüştür. Bu kapsamda, belirsizlik endeksine ek olarak belirsizliğin sürekliliğine ilişkin de bir endeks oluşturulmuştur.

Çok sayıda kontrol değişkenleri dâhil edilerek uygulanan Sabit Etki Panel modelinin sonuçları, kredi piyasasının belirsizlikten ziyade belirsizliklerin sürekliliğine tepki verdiğine ilişkin iddiayı destekleyen anlamlı kanıtlar sunmuştur. Ayrıca, panel modelinden elde edilen sonuçlar, belirsizliklerin sürekliliğinin yanı sıra, makro ihtiyati politika araçlarının sıkılaştırılmasının da finansal borçluluk oranları üzerinde olumsuz bir etkiye sahip olduğunu göstermektedir. Bu bulgunun dikkat çeken yönü ise, bu olumsuz etkinin büyük firmalardan ziyade, sadece küçük ve orta ölçekli firmalar için geçerli olmasıdır. Bu bulgular, Türkiye'deki küçük ve orta ölçekli firmaların ekonomik potansiyellerinin aksine yaşadıkları finansman zorluklarına yönelik daha önceki çalışmaların sonuçlarını desteklemektedir. Bunun yanı sıra, Seker ve Correa (2010) Türkiye'deki küçük ve orta ölçekli firmaların Doğu Avrupa ve Orta Asya ülkelerindeki emsallerine kıyasla daha düşük büyüme hızlarına sahip olduğunu raporlayarak bu şirketlerin potansiyellerinin altında faaliyet gösterdiğine ilişkin önemli bulgular sunmaktadır. Bu kapsamda bu çalışmanın bulguları, küçük ve orta ölçekli firmaların ülke ekonomisi üzerindeki hayati önemini göz önünde bulunduran doğru diyazn edilmiş makro ihtiyati politikaların önemini ortaya çıkarmaktadır.

Çalışmanın son bölümünde ise, ekonomik stres zamanlarında mevcut finansman sorunları artan küçük ve orta ölçekli firmaların nasıl ayakta kalabildiklerini açıklama yönelik bir iddia üretilmiş ve bu iddiaya ilişkin ampirik kanıtlar sunulmuştur.

Çalışmada ilk olarak, firmaların bilanço kalemlerinin toplulaştırılmış zaman serilerinin trend analizleri yapılmıştır. Bu analiz, küçük ve orta ölçekli firmaların finansal kredi alma zorluğu çektikleri belirsizliklerin sürekli olarak arttığı ve makro

ihtiyati politikaların sıkılaştırıldığı dönemlerde kendilerini diğer yükümlülük kalemlerini artırarak finanse ettiklerini göstermektedir. Ne finansal olan borç ne de ticari borç olan bu bilanço kalemindeki artışların firma sahiplerinin ya da yakınlarının kişisel varlıkları olduğu, diğer bir ifadeyle yastık altı tasarruflar (saklı rezervler) olduğuna yönelik bu çalışmada oluşturulan iddia, yeminli mali müşavirlerle yapılan görüşmelerle de desteklenmektedir.

Buna ek olarak, geniş bir kontrol değişkeni seti kullanılarak 2007-2015 dönemi için uygulanan Sabit Etki Panel modelinin sonuçları da söz konusu iddiaya ilave kanıt sunmaktadır. Elde edilen bulguların sağlamlığı farklı model tanımları ile onaylanmıştır.

Ayrıca, çalışmanın bu bölümünde elde edilen bulgular, bir önceki bölümünde ortaya atılan firmaların belirsizlikten ziyade belirsizliklerin süreklilik arz edip etmemesine tepki verdiklerine ilişkin iddiayı desteklemektedir.

Bunun yansıra, çalışmanın bulguları Türkiye'de finansal sistem dışında önemli bir miktarda yastık altı tasarruf tutulduğuna ilişkin ortak algıyı desteklemektedir. Tasarruf açığının uzun bir süredir Ülkemizin en önemli sorunlarından biri olduğu ve ekonomiye sağladıkları hayati katkılara rağmen küçük ve orta ölçekli firmaların karşı karşıya kaldığı finansman sorunları göz önünde bulundurulduğunda, bu çalışmanın bulguları, küçük ve orta ölçekli firmalar ile diğer ekonomik birimlerin davranışlarının daha iyi analiz edilmesi ve bu bağlamda uygun politika tasarımlarının önemine vurgu yapmaktadır.

## C. TEZ FOTOKOPİSİ İZİN FORMU

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**YAZARIN**

Soyadı : Yarba
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Bölümü : İşletme

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